
Vermont Tech

Catalog 2015-2016

Bachelor of Science

Applied Business Management
Architectural Engineering Technology
Business Technology & Management
Computer Engineering Technology
Computer Information Technology
Computer Software Engineering
Construction Management
Dental Hygiene
Diversified Agriculture
Electrical Engineering Technology
Electromechanical Engineering Technology
Manufacturing Engineering Technology
Nursing
Professional Pilot Technology
Renewable Energy

Associate of Applied Science

Agribusiness Management Technology
Architectural & Building Engineering Technology
Automotive Technology
Business Technology & Management
Construction Management
Dairy Farm Management Technology
Diesel Power Technology
Equine Studies
Fire Science
General Engineering Technology
Landscape Design & Sustainable Horticulture
Veterinary Technology

Associate of Science

Computer Information Technology
Computer Software Engineering
Nursing
Respiratory Therapy

Associate of Engineering

Civil & Environmental Engineering Technology
Computer Engineering Technology
Electrical Engineering Technology
Mechanical Engineering Technology

Certificate

Paramedicine
Practical Nursing

Foreword

This catalog has been prepared to give prospective students at Vermont Technical College a comprehensive preview of the college.

Notice of College Regulations

The information contained in this catalog is current at the time of publication and subject to change at any time. The regulations included in this catalog and other official college statements are binding on all students. The college reserves the right to change any of the regulations or curriculum at any time. Students will be deemed to have had sufficient notice of all official regulations when such are contained in official publications or posted on the college's website www.vtc.edu. Should you have questions not answered in this catalog, please e-mail admissions@vtc.edu or write to:

Office of Admissions
Vermont Technical College
PO Box 500
Randolph Center, VT 05061-0500

Vermont Tech: (802) 728-1000
Office of Admissions: (800) 442-8821 or (802) 728-1444
Fax: (802) 728-1390

Non-Discrimination & Equal Opportunity Statement

Every member of Vermont Tech should work to ensure non-discriminatory processes and practices with faculty, staff, and students. Qualified students are recruited for, admitted to, and participate in all college programs without discrimination on the basis of race, color, sex, sexual orientation, religion, creed, national origin, age, veteran status, or disability. Vermont Tech will provide reasonable accommodations to create equal opportunities for students with documented disabilities.

Faculty, administrators, and staff are employed without discrimination on the basis of race, color, sex, sexual orientation, religion, creed, national origin, age, veteran status, or disability unrelated to job requirements. Vermont Tech will make reasonable accommodations to the known disability of an otherwise qualified applicant or employee.

Additionally, the Vermont State Colleges will engage in affirmative efforts to recruit, admit, and support students and to recruit, employ, and support employees in order to achieve the diversity which advances the educational mission.

The Vermont State Colleges complies with state and federal laws related to equal opportunity and non-discrimination. Any questions or complaints about potential or perceived discrimination in violation of any state or federal law should be directed to: the Vermont Tech Ombudsperson, the VSC Office of the Chancellor, the Vermont Office of the Attorney General, or the federal Equal Opportunity Employment Commission.

If auxiliary aid or service is needed to apply for admission or employment, please contact Vermont Tech's Learning Skills Specialist at 728-1396. For questions related to Title IX, please contact the Title IX coordinator via mail at PO Box 500, Randolph Center, Vermont 05061.

Academic Calendar 2015-2016

2015 Fall Term

| | | |
|----------|--------------|---|
| Friday | August 21 | Residence halls open for new Williston students Williston Orientation |
| Saturday | August 22 | Residence halls open for new Randolph students Welcome weekend starts for new students |
| Sunday | August 23 | Residence halls open for returning students Academic Day: first-year student advising/department meetings Convocation |
| Monday | August 24 | Classes begin for all students on all campuses Late student registration begins |
| Friday | September 4 | Add/drop period ends |
| Monday | September 7 | Labor Day: no classes |
| Monday | September 28 | Early warnings due |
| Friday | October 2 | Early warnings posted |
| Friday | October 9 | Deadline for I grade from spring or summer Vacation begins after classes |
| Monday | October 19 | Classes resume |
| Friday | October 30 | Last day to drop with W (60% point) |
| Monday | November 2 | Student faculty evaluation period begins |
| Thursday | November 12 | Registration for spring term begins |
| Friday | November 20 | Thanksgiving recess begins after classes |
| Monday | November 30 | Classes resume |
| Monday | December 7 | Late registration for spring term begins |
| Monday | December 14 | Last day of classes for term Student faculty evaluation period ends |
| Tuesday | December 15 | Final exams and presentations week begins |
| Saturday | December 19 | Final exams and presentations week ends |
| Monday | December 21 | Final grades due |

2016 Spring Term

| | | |
|--------|-------------|---|
| Sunday | January 17 | New student orientation |
| Monday | January 18 | Classes begin |
| Friday | January 29 | Add/drop period ends |
| Monday | February 15 | Early warnings due |
| Friday | February 19 | Early warnings posted Vacation begins after classes |
| Monday | February 29 | Classes resume |
| Friday | March 11 | Deadline for make-up of I grades from fall Graduation applications due |
| Friday | March 25 | Last day to drop with a W (60% point) |
| Monday | March 28 | Student faculty evaluation period begins |
| Friday | April 1 | Vacation begins after classes |

Academic Calendar

| | | |
|-----------------|-----------------|---|
| Monday | April 11 | Classes resume Registration for summer and fall terms begins |
| Thursday | April 14 | Honors Convocation |
| Monday | April 25 | Late registration for summer and fall terms begins |
| Friday | May 6 | Last day of classes Student faculty evaluation period ends |
| Monday | May 9 | Final exams and presentations week begins |
| Friday | May 13 | Final exams and presentations week ends |
| Sunday | May 15 | Final grades due |
| Tuesday | May 17 | Final grades posted |
| Saturday | May 21 | Commencement |
| Sunday | May 22 | Commencement |
| Thursday | May 26 | VAST graduation |

PN Academic Calendar 2015-2016

2015 Fall Term

| | | |
|-----------------|---------------------|--|
| Friday | August 21 | Residence halls open for new Williston students Williston Orientation |
| Saturday | August 22 | Residence halls open for new Randolph students Welcome weekend starts for new students |
| Sunday | August 23 | Residence halls open for returning students Academic Day: first-year student advising/departments meetings Convocation |
| Monday | August 24 | Classes begin for all students on all campuses Late student registration begins |
| Friday | September 4 | Add/drop period ends |
| Monday | September 7 | Labor Day: no classes |
| Monday | September 28 | Early warnings due |
| Friday | October 2 | Early warnings posted |
| Friday | October 9 | Deadline for I grade from spring or summer |
| Monday | October 12 | Columbus Day: no classes |
| Friday | October 20 | Last day to drop with a W (60% point) |
| Monday | October 26 | Student faculty evaluation period begins |
| Monday | November 2 | Registration for winter terms begin |
| Tuesday | November 24 | Thanksgiving break begins after classes |
| Monday | November 30 | Classes resume |
| Friday | December 4 | Student faculty evaluation period ends Fall term ends after classes |

2015 Winter Term

| | | |
|--------|-------------|--|
| Monday | December 7 | Classes begin |
| Friday | December 18 | Vacation begins after classes |
| Monday | January 4 | Classes resume |
| Monday | January 18 | Early warnings due |
| Friday | January 22 | Early warnings posted |
| Friday | February 18 | Last day to drop with a <i>W</i> (60% point) Vacation begins after classes |
| Monday | February 29 | Classes resume |
| Friday | March 4 | Deadline for <i>I</i> grade from fall |
| Monday | March 7 | Registration for Spring2 term begins Student faculty evaluation period begins |
| Friday | April 1 | Vacation begins after classes |
| Monday | April 11 | Classes resume |
| Friday | April 15 | Student faculty evaluation period ends Winter term ends after classes |

2016 Spring2 Term

| | | |
|----------|----------|---|
| Monday | April 18 | Classes begin |
| Friday | April 22 | Graduation applications due |
| Monday | May 16 | Early warnings due Student faculty evaluation period begins |
| Friday | May 20 | Early warnings posted |
| Friday | May 27 | Last day to drop with a <i>W</i> (60% point) |
| Monday | May 30 | Memorial Day: no classes |
| Thursday | June 23 | Student faculty evaluation period ends Spring2 term ends after classes |
| Saturday | June 25 | Commencement |
| Monday | June 27 | Final grades due |

General Information

The college is part of the Vermont State Colleges (VSC) system that includes Castleton State College, Johnson State College, Lyndon State College, and the Community College of Vermont. Vermont Tech offers collegiate-level programs leading to certificates, associate degrees, and bachelor's degrees in agriculture; business; engineering technologies; applied technologies; allied health and nursing; and sustainable technology.

Vermont Tech provides students with a rigorous, broad-based background in technology and applied sciences. Graduates are well-prepared to work with scientists, engineers, and other professionals in meeting the challenges of today's high-tech workplace. They find career opportunities in business, industry, commerce, transportation, agriculture, healthcare, construction, government, and sustainable design.

Vermont Tech Mission Statement

Vermont Tech is an integral and unique institution within the state of Vermont and the Vermont State Colleges offering career-focused, technical education in specialized areas of study related to agriculture, applied sciences, business, engineering, health science, and sustainability. The college offers bachelor's and associate degrees, certificates, and continuing education.

Vermont Tech prepares students for immediate success and productivity in the workforce, continuing formal education, and lifelong learning.

Institutional Values

Vermont Tech emphasizes the core values of dedication, integrity, and responsibility as a foundation for learning, career preparation, and citizenship.

Vermont Tech is dedicated to its tradition of helping students reach their full potential by developing their academic and scholarly proficiency; critical thinking and communication skills; civic responsibility; and global awareness.

The faculty, staff, administration, and students at Vermont Tech are committed to forming a stimulating, compassionate, and supportive learning community which fosters the personal and professional growth of all members.

Vermont Tech values its role in supporting the Vermont economy and meeting the needs of businesses by preparing highly qualified graduates in various occupations, as well as by providing businesses with opportunities for continuing education for their employees.

Institutional Objectives

- Establish a high quality academic environment
- Broaden students' experiences, both academically and socially
- Emphasize the combination of theoretical concepts and practical applications in the curriculum
- Prepare students to adapt to changing technology
- Offer academic and personal support services that enhance student learning
- Furnish placement services for students, graduates, and alumni
- Afford opportunities for faculty and staff development
- Pursue strong liaisons with Vermont elementary and secondary schools
- Inform the general public and potential students of opportunities at Vermont Tech
- Encourage a large and diverse population to enter Vermont Tech
- Strengthen relationships with our community partners
- Provide outreach programs to meet the needs of entrepreneurs, employers, and employees
- Maintain continuing communication and relationships with alumni

Vermont State Colleges Mission Statement

For the benefit of Vermont, the Vermont State Colleges provide affordable, high quality, student-centered, and accessible education, fully integrating professional, liberal, and career study.

This integrated education, in conjunction with applied learning experiences, assures that graduates of VSC programs will:

- Demonstrate competence in communication, research, and critical thinking
- Practice creative problem-solving, both individually and in collaboration
- Be engaged, effective, and responsible citizens
- Bring to the workplace appropriate skills and an appreciation of work quality and ethics
- Embrace the necessity and joy of lifelong learning

The Vermont State Colleges also offer numerous opportunities for others to engage in continuous learning to meet their specific goals.

History

Vermont Technical College is one of the five member institutions of the Vermont State Colleges system.

In Public Act No. 1 of 1866, the Vermont legislature established the first public schools in Vermont devoted to the education of teachers. The schools were located in Randolph, Johnson, and Castleton. The Randolph State Normal School served in this capacity until 1910, when the legislature determined that there was a need for a state agricultural school and established the Vermont School of Agriculture at the Normal School site.

Over its long years of service, the Vermont School of Agriculture (VSA) graduated many Vermonters who were distinguished by their numerous and notable contributions to agriculture and government.

In response to evolving educational needs, technical courses were added to the offerings of the school in 1957 and the institution was given a new name reflecting this expanding mission: Vermont Agricultural and Technical Institute (VATI). It was the first technical institute in Vermont, with an initial enrollment of approximately 75 students.

By act of the 1961 legislature, VATI and the then-state teacher colleges (Castleton, Johnson, and Lyndon) were placed under the control of a newly-created public corporation known as Vermont State Colleges. Community College of Vermont joined the other state colleges in 1975.

The name VATI was changed to Vermont Technical College on July 1, 1962 and the college was authorized to grant Associate of Applied Science degrees. The Associate of Engineering degree was first granted in 1965.

Another milestone was reached on May 7, 1993 when the Vermont State Colleges Board of Trustees approved the college's first baccalaureate degree program: the Bachelor of Science in Architectural Engineering Technology.

Students may now enroll in fifteen additional baccalaureate programs leading to bachelor of science degrees.

Nursing programs were added to the college curriculum in 1994 when Vermont's three schools of practical nursing became part of the Vermont Tech community. Beginning in the fall of 1996, Practical Nursing became a credit-bearing program that could also be applied toward a two-year Associate Degree in Nursing from Vermont Tech. The Bachelor of Science in Nursing was added in 2013.

Location

Vermont Tech's main campus in Randolph Center is located on over 544 acres. Interstate 89 passes within one mile of the campus. Buses from the metropolitan areas serve the area and Amtrak's Vermonter stops in downtown Randolph twice daily.

Vermont Tech also maintains a campus in Williston, Vermont. The Williston campus is accessible from exit 12 off Interstate 89.

The college operates ten nursing campuses throughout the state.

Academic Recognition

By authority conferred by the legislature of the State of Vermont, the Trustees of Vermont State Colleges have authorized Vermont Tech to grant the degrees of Associate of Applied Science, Associate of Science, Associate of Engineering, and Bachelor of Science with a major in the program pursued.

The Vermont Academy of Science and Technology (VAST) at Vermont Tech has Independent

School Approval for grade 12 from the Vermont State Board of Education.

Vermont Tech is an institutional member of the New England Association of Schools and Colleges, the Vermont Higher Education Council, and the American Society for Engineering Education.

Accreditation

Vermont Tech is accredited by the New England Association of Schools and Colleges Commission on Institutions of Higher Education.

The following programs are accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>: Architectural & Building Engineering Technology; Architectural Engineering Technology; Civil & Environmental Engineering Technology; Computer Engineering Technology; Electrical Engineering Technology; Electromechanical Engineering Technology; Mechanical Engineering Technology. The Dental Hygiene associate degree program is accredited by the Commission on Dental Accreditation, 211 East Chicago Avenue, Chicago, Illinois 60611-2678, (312) 440-4653.

The Veterinary Technology program is accredited by the American Veterinary Medical Association as a program for educating veterinary technicians at 1931 North Meacham Road, Suite 100, Schaumburg, Illinois 60173.

Vermont Tech's Practical Nursing, Associate of Science in Nursing, Bachelor of Science in Nursing (RN to BSN), and PN and RN re-entry programs are approved by the Vermont State Board of Nursing. The Vermont State Board of Nursing can be contacted at the Office of Professional Regulation, Board of Nursing, 89 Main Street, 3rd Floor, Montpelier, VT 05620-3402. The Practical Nursing and Associate of Science in Nursing programs are accredited by the Accreditation Commission of Education in Nursing (ACEN). The Accreditation Commission of Education in Nursing can be contacted at 3343 Peach Tree Road NE, Suite 500, Atlanta, GA 30326

The Respiratory Therapy program is accredited by the Commission on Accreditation for Respiratory Care, 1248 Harwood Road, Bedford, Texas 76021-4244, 817-283-2835.

Vermont Academy of Science & Technology

The Vermont Academy of Science and Technology (VAST) provides an opportunity for high school seniors with a strong interest and ability in science and math to complete their senior year at Vermont Tech. Recognized by the state of Vermont as an approved independent high school, the program awards high school diplomas. Additionally, because Vermont state law allows VAST students to transfer Vermont Tech credits back to their sending high schools, the students may receive a second high school diploma from that school.

Applications for VAST will be accepted until May 1 and decisions made regarding acceptance into the program by May 15. Any available seats available after May 15 will be filled on a rolling basis.

Entry into VAST is competitive. Students should have a strong academic transcript and PSAT scores of 55 or higher for each sub-score. VAST students are expected to maintain at least a 2.0 GPA while attending Vermont Tech or they will be required to return to their sending high school. To be eligible for a VAST diploma, students must have a minimum of a 2.0 GPA and meet the minimum number of credits as required by the state of Vermont. VAST students are also expected to adhere to all policies and procedures outlined in the Vermont Tech student handbook.

Upon completion of the one-year program, students may remain at Vermont Tech to complete a degree or transfer to another institution.

The Vermont legislature has provided that a Vermont student's general state support grant for the senior year of high school may be used to cover tuition for VAST. Vermont Tech provides financial aid to Vermont residents for any gap that may exist between the state grant and its tuition, enabling Vermonters to attend VAST tuition-free. Other non-tuition fees, including room and board for students who choose to live on campus, are the responsibility of the student.

Campus Facilities

Randolph Center Campus

Vermont Tech's main campus is located in Randolph Center, Vermont. The school has a long history of education, both as a teacher training school and a post-secondary agricultural institution. Today, it is a four-year baccalaureate college offering a wide range of programs leading to bachelor's and associate degrees in technology, agriculture, nursing, allied health, and sustainability.

With four residence halls, two dining facilities, academic buildings equipped with laboratories for numerous technical majors, conference facilities, and our own ski tow, Vermont Tech's main campus is equipped to offer the full traditional college experience as well as acting as an anchor for the wider community and a resource for non-traditional students and lifelong learners.

Williston Campus

Vermont Tech's Williston campus offers a wide array of degree and certificate programs for part-time or full-time students. This campus has been designed to make our top-notch technical education programs available to students looking for a suburban setting with optional housing.

The Williston campus is rapidly expanding, both physically and in terms of enrollment. Programs currently offered include dental hygiene, nursing, respiratory therapy, aviation, electrical engineering technology, computer engineering technology, electromechanical engineering technology, and business management. The campus also supports a wide array of degree and non-degree workforce-education programs for area businesses.

Bennington Campus

The Putnam Memorial School of Practical Nursing was established in 1946 by the Board of Corporators of the Putnam Memorial Hospital, now known as Southwestern Vermont Medical Center. It was the eighth school of practical nursing in the country to be accredited by the National Association for Practical Nurse Education and Service. The Practical Nursing (PN) certificate program continues to be offered at its new site located in downtown Bennington at 210 South Street.

In the fall of 1997, Vermont Technical College enrolled its first class of Associate Degree in Nursing (ADN) students in the Bennington area in response to the community's need for Registered Nurses. Both the PN and ADN programs were offered at the Southwestern Vermont Medical Center campus until August, 2012. At that time, the college, recognizing the need for a larger campus with modern facilities, renovated two floors of an historic building in downtown Bennington. Both nursing programs are now offered in this spacious, modern facility.

Brattleboro Campus

Opening in 1907, the Thompson School for Practical Nurses is the oldest continuously operating school for practical nurse education in the United States.

In 2014, the school relocated to the newly renovated Brooks House, located in historic downtown Brattleboro.

Admissions

The admission process includes a review of all transcripts, letters of recommendation, extra-curricular experiences, essays, and performance on standardized tests, as applicable. Admission is offered to those candidates whose credentials indicate the greatest promise of success in their academic pursuits. Applicants who do not meet the normal admission requirements may be admitted with provisional status. Provisional acceptances may include such requirements as summer coursework prior to enrolling or additional coursework while enrolled.

Application Deadlines

Vermont Tech has a policy of rolling admission for most majors. This means that we process applications throughout the year until we determine that we have filled each semester's class. We reserve the right to close admission once the class is filled. Applicants will be notified promptly of admission status after review of a complete student file.

Because admission to selected programs is exceptionally competitive, decisions on applicants to these programs are not normally made until the entire applicant pool has been received. The priority application deadlines for these selected majors are:

| | |
|--|------------|
| Dental Hygiene, Practical Nursing, Veterinary Technology | December 1 |
| Associate Degree in Nursing | March 15 |
| VAST (priority deadline) | May 1 |

After the initial round of reviews, complete files are reviewed on a rolling admission, space-available basis.

Standardized Testing

All freshman admission candidates are required to take either the SAT I or the ACT. Applicants who are already out of high school are not normally required to take either exam. The College Entrance Examination Board code for Vermont Tech is 3941. The ACT code number is 4323.

First-Year Applicant Requirements

If you have never previously attended any college or university, please submit:

- Completed application
- \$40 application fee (payable to Vermont Technical College)
- Official high school transcript with at least the first marking period grades of the senior year or official scores from a high school equivalency exam (GED)
- SAT I, ACT results
- Personal essay (250-300 words; discuss your motivation for pursuing a college degree at Vermont Tech or write about a topic of your choice)

Transfer Applicant Requirements

If you have previously taken college-level work at another college or university, please submit:

- Completed application
- \$40 application fee (payable to Vermont Technical College)
- Official high school transcript or official scores from a high school equivalency exam (GED)
- Official transcript(s) from all colleges previously attended (seeking transfer credit or not)
- Official transcript(s) from any other VSC school attended prior to the 2002 summer term
- SAT I, ACT results, if available
- Personal essay (250-300 words; discuss your motivation for pursuing a college degree at Vermont Tech or write about a topic of your choice)

Vermont Academy of Science & Technology Applicant Requirements

If you are applying to this accelerated high school program, please submit:

- Completed application
- \$40 application fee (payable to Vermont Technical College)
- Official high school transcript with at least the first marking period grades of the junior

- year or a home school plan
- PSAT, SAT I, or ACT results
- Two letters of recommendation (one from a teacher, one from a guidance counselor or principal)
- Personal interview
- College-administered placement test
- On a separate page, please write an essay about why you are applying to the Academy; Please address the following: What do you envision yourself doing ten years from now? How do you think attending the Academy will help you reach these goals? What can you contribute to the Vermont Tech community? Describe a significant event in your life and how it has affected you.

The priority application deadline for VAST is May 1. We accept applications after this date.

Nursing, Respiratory Therapy, Dental Hygiene Applicant Requirements

If you are applying to one of the allied health programs, please submit:

- Completed application (indicate your first choice location only)
- \$40 application fee (payable to Vermont Technical College)
- Official high school transcript or official scores from a high school equivalency exam (GED)
- Official transcript(s) from all colleges previously attended (seeking transfer credit or not)
- SAT I or ACT results, if available
- Vermont Tech placement test scores
- Two signed letters of recommendation, dated within the past six months, on letterhead. Letters should address your work ethic; communication skills; potential for adaptation to a fast-paced clinical environment; and potential to competently and compassionately deliver healthcare to patients across the lifespan. Letters from family members or friends cannot be accepted
- Personal essay (250-300 words; discuss your motivation for pursuing a college degree at Vermont Tech or write about a topic of your choice)
- (*Nursing only*) Prior to start of classes, provide proof of current Health Provider CPR certification

All Nursing, Dental Hygiene, and Respiratory Therapy students are required to pass a background check prior to June 1 (see policy on page 12).

Additional Requirements for Associate Degree in Nursing

- A copy of your current LPN license (without any sanctions/restrictions)
- If you are not a graduate of the Vermont Tech PN program, you must show completion of college-level equivalency for: Anatomy & Physiology (8 credits), Nutrition (3 credits), and Concepts of Human Growth & Development (3 credits)
- If you are a graduate of a non-college PN program, you must submit a program transcript
- Proof that you have passed the PN National Council Licensure Exam (NCLEX-PN)
- If a current PN student, you must attain a first semester GPA of 3.0 or higher. If a LPN graduate, you must have a GPA of 3.0 in your LPN coursework. BIO 2120, ENG 1061, MAT 1040, PSY 1010, and/or an approved Arts/Humanities elective may be taken after LPN graduation to improve your GPA to a 3.0 level
- If you are a LPN, you must submit two signed recommendations on letterhead that address your clinical competence; work ethic; potential transition to a RN role, particularly with respect to leadership, management, and accountability; and interpersonal skills
- If a current PN student, at least one of the letters of recommendation must be from a clinical faculty member

PN students attempting to complete courses for the ADN program may not enroll in spring or summer courses at any VSC institution until their spring term is complete.

Additional Requirements for Bachelor's Degree in Nursing

For Non-VTC applicants, the following are required:

- Unencumbered, active license as a Registered Nurse within the United States
- RN graduate of an accredited nursing program
- BIO 1030, 2011, 2012, 2120; ENG 1060/1061; MAT 1040; PSY 1010, 1050; chemistry recommended

Nursing Direct Progression Policy

A student accepted into either the PN or the ADN program may progress directly (if s/he qualifies) to the next level nursing program at Vermont Tech without having to reapply. Please refer to the Nursing curriculum pages for more information.

Nursing Policy for Criminal Background Checks & Positive Drug Screens

To ensure the safety of any and all patients under the care of Vermont Tech nursing students and to ensure the safety of all faculty and students, criminal background checks are required for all students admitted to pre-licensure programs (PN and ADN). All PN and ADN students are required to have a criminal background check (CBC) which includes FBI fingerprinting. This CBC must be completed and reviewed prior to the first day of class. In the event that the student is admitted late, this CBC must be completed and reviewed prior to any clinical experience.

Any student who fails to comply with this process will not be allowed to continue in the program. The school will use the information reported to us for screening purposes and to secure clinical placements. In the event that there are positive findings (either convictions on the CBC or positive drug screens at the sites that require them), the Associate Dean of Nursing and a member of the college's administration will review the information and meet with the student. The student must provide a written explanation of any and all convictions and positive drug screens prior to this meeting. Court documents must also be provided that detail the disposition of the case. Failure to do this will result in dismissal from the program. The Associate Dean of Nursing and the college administrator will review all provided documentation and make a determination as to the student's enrollment status in the Nursing program.

Students must also report any convictions that occur after the CBC while enrolled in school.

A third-party vendor will be conducting the CBC and drug screens and will maintain the records. Accepted students will be given instructions on when and where to complete these with their admission packets.

International Applicant Requirements

If you are applying as an international student, please submit:

- Completed application
- \$40 application fee (payable to Vermont Technical College)
- Official secondary school transcript evaluated by World Education Services (www.wes.org) or an equivalent international transcript evaluator
- Official college/university transcript (if applicable) with course-by-course evaluation by WES or an equivalent international transcript evaluator
- Personal essay (250-500 words on a topic of your choice)
- Official TOEFL score if English is not your first language. The minimum score required is 500 for the paper test, 173 for the computer test, and 61 for the internet test. IELTS is also accepted with a recommended score of 5.5 or higher for all Engineering, Allied Health, and Professional Pilot Technology majors. A score of 5 or higher will be accepted for the following majors: Business Technology & Managements, Computer Information Technology, Construction Management, Diversified Agriculture, and Landscape Design & Sustainable Horticulture. The Pearson Test is accepted with a score of 44 or higher recommended
- Official financial statement indicating your ability to pay one full year of tuition, room, and board. Proof must be provided on official bank letterhead and is needed before an I-20 can be issued
- A copy of your passport information page with your complete name, date of birth, country of birth, and country of citizenship via email

International students are encouraged to apply between the months of November and April due to the lengthy visa process. Upon acceptance, international students are required to submit a \$300 deposit before we will issue your I-20. The \$300 will be credited to the fall semester bill.

Vermont Tech Program Prerequisites

| Program | Degree | Prerequisite |
|---|---------|--|
| Agribusiness Management Technology | AAS | algebra I; algebra II recommended, 2 years of science (chemistry preferred) |
| Applied Business Management | BS | 50 transferrable higher education credits |
| Architectural & Building Engineering Technology Architectural Engineering Technology | AAS, BS | algebra I & II; geometry; lab physics or chemistry (physics preferred) |
| Automotive Technology | AAS | algebra I; algebra II recommended; geometry; lab physics or chemistry recommended |
| Business Technology & Management | AAS, BS | algebra I; algebra II recommended |
| Civil & Environmental Engineering Technology | AE | algebra I & II; geometry; lab physics or chemistry |
| Computer Engineering Technology | AE, BS | algebra I & II; geometry; lab physics or chemistry (physics preferred) |
| Computer Information Technology | AS, BS | algebra I & II; geometry; lab physics or chemistry |
| Computer Software Engineering | AS, BS | algebra I & II; geometry; lab physics or chemistry |
| Construction Management | AS | algebra I; algebra II recommended; geometry; lab physics or chemistry recommended |
| Construction Management | BS | completion of AAS in Construction Management |
| Dairy Farm Management | AAS | algebra I; algebra II recommended; 2 years of science (chemistry preferred) |
| Dental Hygiene | AS, BS | algebra I & II; geometry; lab biology; lab chemistry; minimum Accuplacer scores of 70 for arithmetic, 40 for algebra; freshman English placement; 2 letters of recommendation |
| Dental Hygiene (degree completion) | BS | AS in Dental Hygiene with 2.5 minimum GPA; 2 letters of recommendation |
| Diesel Power Technology | AAS | algebra I; algebra II recommended; geometry; lab physics or chemistry recommended |
| Diversified Agriculture | BS | algebra I & II; lab physics or chemistry |
| Electrical Engineering Technology | AE, BS | algebra I & II; geometry; lab physics or chemistry (physics preferred) |
| Electromechanical Engineering Technology | BS | completion of AE program in EET, MEC, or equivalent |
| Equine Studies | AAS | algebra I; algebra II recommended; biology; lab chemistry |
| Fire Science | AAS | algebra I; algebra II recommended; geometry; lab physics or chemistry (chemistry preferred) |
| Landscape Design & Sustainable Horticulture | AAS | algebra I; algebra II recommended; 2 years of science (lab courses preferred) |
| Manufacturing Engineering Technology Mechanical Engineering Technology | AE, BS | algebra I & II, geometry; lab physics or chemistry (physics preferred) |
| Nursing | C | algebra I; lab chemistry; lab biology (within the last 10 years); minimum Accuplacer scores of 70 for arithmetic, 40 for algebra; freshman English placement, 2 letters of recommendation |
| Nursing | AS | LPN licensure with 3.2 minimum GPA after first semester and 3.0 GPA in LPN coursework or equivalent; minimum Accuplacer scores of 70 for arithmetic; 40 for algebra; freshman English placement; clinical assessments for current students or 2 letters of recommendation for PN graduates; high school lab chemistry or college microbiology (current PN students: see Direct Progression Policy) |
| Nursing | BS | unencumbered active US RN license; RN graduate of an accredited Nursing program; 2.05 minimum ADN GPA |
| Professional Pilot Technology | BS | algebra I & II; geometry; lab physics or chemistry |
| Renewable Energy | BS | algebra I & II; geometry; lab physics or chemistry |
| Respiratory Therapy | AS | algebra I; lab chemistry; lab biology (within the last 10 years); minimum Accuplacer scores of 70 for arithmetic, 40 for algebra; freshman English placement; 2 letters of recommendation |
| Veterinary Technology | AAS | algebra I & II; biology; lab chemistry |

AAS: Associate of Applied Science

AE: Associate of Engineering

AS: Associate of Science

BS: Bachelor of Science

C: Certificate Program

Admission & Housing Deposits

Accepted students must remit a tuition deposit of \$200 on or before May 1 for the fall semester or December 15 for the spring semester. An additional \$100 housing deposit is required for students who are planning to live on campus. After these dates, deposits will be accepted on a space-available basis. The deposits are credited toward the first semester's bill and are non-refundable after May 1.

RSP-Approved Programs

Vermont Tech participates in the Regional Student Program (RSP) of the New England Board of Higher Education. Under this agreement, students from other New England states pay 150% of the in-state tuition per academic year if the student enters an eligible program under the RSP pact. A program not generally eligible because it is also offered in a student's home state may be eligible if the student's legal residence is closer to Vermont Tech than to the home state institution. State eligibility is subject to change without notice.

| | CT | MA | ME | NH | RI |
|---|----|----|----|----|----|
| Agribusiness Management | ◇ | ◇ | ◇ | | ◇ |
| Architectural & Building Engineering Technology | | ◇ | | | ◇ |
| Architectural Engineering Technology | ◇ | | ◇ | ◇ | ◇ |
| Automotive Technology | | | | | ◇ |
| Business Technology & Management (2 year) | ◇ | ◇ | | ◇ | |
| Business Technology & Management (4 year) | | | ◇ | ◇ | |
| Civil & Environmental Engineering Technology (2 year) | | | | | ◇ |
| Computer Engineering Technology (2 year) | | | ◇ | | |
| Computer Engineering Technology (4 year) | | | ◇ | | ◇ |
| Computer Information Technology (2 year) | | | ◇ | | ◇ |
| Computer Software Engineering (2 year) | | ◇ | ◇ | ◇ | ◇ |
| Computer Software Engineering (4 year) | | ◇ | | | |
| Construction Management (2 year) | ◇ | ◇ | | | ◇ |
| Construction Management (4 year) | | ◇ | | ◇ | ◇ |
| Dairy Farm Management | | ◇ | ◇ | | ◇ |
| Dental Hygiene | ◇ | ◇ | | ◇ | |
| Diesel Power Technology | ◇ | | | | ◇ |
| Diversified Agriculture | | ◇ | ◇ | | ◇ |
| Electrical Engineering Technology (2 year) | ◇ | | ◇ | | ◇ |
| Electrical Engineering Technology (4 year) | ◇ | | | ◇ | ◇ |
| Electromechanical Engineering Technology | ◇ | ◇ | ◇ | ◇ | ◇ |
| Equine Studies | | | ◇ | | ◇ |
| Fire Science | ◇ | | | | |
| Landscape Design & Sustainable Horticulture | | | ◇ | | ◇ |
| Manufacturing Engineering Technology | | | | ◇ | ◇ |
| Mechanical Engineering Technology | | | ◇ | | |
| Renewable Energy | ◇ | ◇ | ◇ | ◇ | ◇ |
| Veterinary Technology | | | | | ◇ |

Good Neighbor Policy

Reduced tuition rates are available for residents of the following states and counties:

| | |
|----------------------|--|
| Massachusetts | Berkshire, Franklin |
| New Hampshire | Coos, Grafton, Sullivan, Cheshire |
| New York | Clinton, Essex, Washington, Rensselaer |

Definition of a Vermont Resident

The following criteria must be met by a student prior to being granted resident status for the purpose of admission, tuition, and other Vermont Tech charges.

- The applicant shall be domiciled in Vermont, said domicile having been continuous for one year immediately prior to the date of application unless the student has been in the armed services, Peace Corps, or other recognized national service organization and has retained Vermont as his/her permanent address during the period of absence and has returned to Vermont immediately following discharge from these services. Changes in residency status shall become effective for the semester following the date of reclassification.
- Domicile shall mean a person's true, fixed, and permanent home, to which he or she intends to return when absent. A residence established for the purpose of attending an educational institution or qualifying for resident status for tuition purposes shall not of itself constitute domicile. Domicile shall not be dependent upon the applicant's marital status.
- The applicant must demonstrate such attachment to the community as would be typical of a permanent resident of his or her age and education.
- Receipt of significant financial support from the applicant's family will create a rebuttable presumption that the applicant's domicile is with his or her family
- An applicant becoming a student at an institution of higher learning in Vermont within one year of first moving to the state shall have created a rebuttable presumption of residence in Vermont for the purpose of attending an educational institution.
- A student eligible for tuition purposes to enroll as a resident student in another state shall not be enrolled as a Vermont resident.
- A student enrolled at Vermont Technical College shall be classified by the college's Office of Admissions as a resident or non-resident for tuition purposes. The decision by the officer shall be based upon information furnished by the student and other relevant information. The officer is authorized to require such written documents, affidavits, verifications, or other evidence that he or she deems necessary.
- The burden of proof shall, in all cases, rest upon the student claiming to be a Vermont resident and shall be met upon a presentation of clear and concurring evidence.
- A student with resident status will lose that status if he or she fails to meet the above requirements at any time. In this event, resident tuition and other charges shall continue in effect only until the end of the academic year.
- The decision of the Office of Admissions on the classification of a student as a resident or non-resident may be appealed in writing to the college's Dean of Administration.

Further appeal of a student's residency classification may be made in writing to the Chancellor of the Vermont State Colleges. The decision of the Chancellor shall be final.

Dual Enrollment

Across the country, high school students are taking advantage of dual enrollment opportunities. Dual enrollment programs allow a student to take college courses, sometimes concurrently, while still in high school. Dual enrollment programs may be found at the home high school, the regional technical center, and/or the college campus.

Students who take advantage of the dual enrollment program receive a VSC transcript. Credits earned can then be used to further the students' education at Vermont Tech or at other participating post-secondary institutions. A college transcript provides evidence of a student's academic ability and ambitions for furthering his/her education. This may assist students seeking entrance into their chosen college. Acceptance of transfer credits is at the discretion of the receiving post-secondary institution.

While participation in dual enrollment will not reduce financial expenses at Vermont Tech, other benefits of the program include getting a jump start on college courses, taking advantage of a lighter credit load during the first semester, taking additional courses to balance out other occupational desires, or trying out a college course in a non-threatening venue.

English for Speakers of Other Languages (ESOL)

According to language acquisition experts, non-native speakers of English need five to seven years of consistent exposure to oral and written academic language to achieve proficiency in college-level work. With this fact in mind, the following conditions and recommendations apply:

- Vermont Tech's writing placement test determines the student's appropriate English course. If the student's English skills are below the minimum level, he or she will be required to take ESL 0141. The ESOL student must achieve at least a *B* and demonstrate improved skills in two post-course placement tests in order to advance
- ESOL students who place in higher-level English courses will benefit from structured time at the Center for Academic Success. Tutors work with students to improve reading and writing skills. In addition, ESOL software in vocabulary, grammar, and pronunciation are available for study and practice
- Students who do not achieve a placement level of 3 or its equivalent may require extra terms to complete their degree program
- Students at all sites have access to ESOL support

Placement Testing

Students who are provisionally accepted may be required to take placement tests in English and mathematics. Test results are used to ensure that students are placed in the correct courses at registration.

Students who have completed a bachelor's degree at a regionally accredited US college or university or have met the English and mathematics program requirements may be exempted.

If a student's skills are below minimum levels, s/he will be required to take developmental courses in the appropriate areas. This would result in additional coursework and a longer overall enrollment period.

A student has the right to appeal the results of the placement test one time if dissatisfied with original score.

Acceptance guidelines for nursing, dental hygiene, and respiratory therapy include placement into freshman-level English and minimum Accuplacer scores of at least 70 on arithmetic and at least 40 on algebra for Nursing and Dental Hygiene, 50 for Respiratory Therapy. Testing may be waived if an applicant has previous assessment testing from another VSC or if the applicant has approved transfer credit in English and mathematics.

Student Registration, Schedules, & Class Listings

Vermont Tech courses are available online at <https://webservices.vsc.edu>. Click on *Prospective Students* and then *Search for Sections*.

All of the Vermont Tech terms start with the letter *T*. For example, *T15FA* translates to the fall 2015 term at Vermont Tech.

First-year students are registered by the Office of the Registrar after placement testing results and prior credit information are received and the tuition deposit is paid. Registration for continuing students is completed in the prior term. There is no online registration for new students.

During orientation and the first week of classes, students may meet with advisors or department representatives regarding schedule changes.

Non-Degree Students

Non-degree students may register two weeks prior to the start of the term. Students who wish to enroll for coursework but not for a program must meet the prerequisite requirements for the courses for which they register and are subject to the same academic regulations and standards as degree students.

Registration for courses is subject to the availability of those courses, with initial priority being given to degree students. Non-degree students register for classes through the Office of the Registrar. There is no online registration for non-degree students nor are they eligible for federal financial aid.

Transfer Credit

If an applicant has attended another VSC school prior to the 2002 summer term or another college outside the VSC system, Vermont Tech requires official transcripts. These should be sent directly to the Office of Admissions from the college at the time of application.

Transcript evaluations are available upon request.

Generally, credit for applicable college courses taken may be granted for those courses completed at a regionally accredited institution with a grade of C- or better or C for any science course required for PN, ADN, BSN, DHY, or RSP; however, the transferred grades will not be computed into a student's GPA. For our Nursing programs, science courses need to be completed within the last ten years in order for transfer credit to be awarded.

Courses taken at an accredited institution on a pass/fail basis may be transferred. Vermont Tech may require the student to obtain a grade equivalent in the course from the institution at which the course was taken.

Examinations may be required to show competence in subject material. Vermont Tech will be the final judge as to what transfer credit it accepts. Transfer credit varies depending upon a number of factors, such as the student's academic record; the college or university attended; and the program selected.

Credits earned within the VSC are transferable to other colleges or universities only at the discretion of the receiving institution.

Advanced Standing

Admission candidates may be granted advanced standing in a degree program by transfer of courses from other accredited post-secondary institutions, advanced placement examination, recognized equivalent military courses, credit by challenge examinations, or previous relevant experience.

Consideration of previous relevant experience for credit is initiated by a completed academic portfolio to the department chairs through the Dean of Academic Affairs. If approved, the portfolio is returned to the Office of the Registrar with the signatures of approval from the program's department chair, the credit-granting department, and the Academic Dean. The college may require a challenge exam in these cases.

Advanced standing toward a degree program is subject to the following restrictions: no more than 50% of the total required credits may be obtained by advanced standing for an associate degree or the +2 portion of a bachelor's degree. No more than 50% of the total major technical course credits in an academic program may be obtained by advanced standing.

Summer Programs

Vermont Tech offers a number of summer courses. We also offer a four-week intensive Summer Bridge program that prepares students for a successful transition into college. Students focus on acquiring knowledge, developing strong study skills, and becoming comfortable with life as a college student.

Academic Affairs

Orientation

Prior to the start of the fall and spring terms, the college will send accepted applicants detailed instructions on orientation and how to view class registration online. This will include information on housing assignments, recommended room furnishings, rules for cars on campus, and other general items.

Academic Advising

Vermont Tech is committed to providing comprehensive advising designed to enrich the educational experience of every student. Students are assigned academic advisors, usually within their program department, and are encouraged to meet with their advisors throughout the academic year to discuss their progress and future plans.

Students having academic or personal difficulties may get extra help from faculty advisors to identify problem areas; clarify educational and personal goals; resolve difficulties; and obtain referrals to other campus services. If students need to change advisors, they should contact the Office of the Registrar.

Attendance & Assignment Requirements

Students are expected to meet the attendance and assignment requirements set by each instructor for each class in which they are enrolled. Failure to meet these requirements may result in removal from the class roster with a failing grade.

In cases of excessive absences and upon the recommendation of the instructor, students may be dismissed from the college with failing grades.

The make-up of any work missed for any reason will be at the discretion of the instructor. Any time a student misses a class, exam, laboratory, or other scheduled event, it is the student's responsibility to inform the instructor and to make satisfactory arrangements for any make-up work.

Participation in varsity athletic contests may be considered excused absences. Practices are not excused absences. Athletes are responsible for all work missed and the instructor and athlete will make every reasonable effort to establish an acceptable make-up procedure. If no reasonable make-up alternative is possible, academic standing has priority.

Transcripts

Credits earned within the VSC system are not considered transfer credit. All VSC courses taken starting in the 2002 summer term will be included and count in the determination of quality points and GPA on the Vermont Tech transcript.

A transcript is a copy of a student's permanent record of attendance at the college and cannot be altered. Current or former students may request that the college issue an official transcript of his or her record to any school, employer, or other agency. For each transcript, students must submit a written, signed request to the Office of the Registrar. A transcript fee will be charged. Transcripts will be sent as soon as possible. Please allow a minimum of five days for normal processing and two weeks following the end of a term. Transcripts will not be sent for a student who has not satisfied financial obligations to the college.

Grade Point Average (GPA) Calculation

GPA is determined by dividing the quality points earned by the GPA credits attempted. GPA credits are those taken for a letter grade, A through F. Remedial or zero level letter-graded courses taken count as GPA credits only in the term taken. They are not included in the cumulative GPA.

Grading System

| Grade | Quality Points |
|-------|----------------|
| A+ | 4.0 |
| A | 4.0 |

| Grade | | Quality Points |
|-------|--|----------------|
| A- | | 3.7 |
| B+ | | 3.3 |
| B | | 3.0 |
| B- | | 2.7 |
| C+ | | 2.3 |
| C | | 2.0 |
| C- | | 1.7 |
| D+ | | 1.3 |
| D | | 1.0 |
| D- | | 0.7 |
| F | <i>Failure</i> | 0.0 |
| P | <i>Pass</i> | 0.0 |
| NP | <i>No Pass</i> | 0.0 |
| I | <i>Incomplete</i> | 0.0 |
| AU | <i>Audit</i> | 0.0 |
| W | <i>Withdrawn</i> | 0.0 |
| CR | <i>Credit Received (Challenge, AP, CLEP, etc.)</i> | 0.0 |
| TR | <i>Transfer Credit Received</i> | 0.0 |

Official grades are issued online at the end of each semester. Unofficial academic warnings are issued online prior to the mid-point of each term.

Grade Amelioration Policy

One time in an academic career, a student who is changing programs or VSC schools may, with proper approval, have selected grades excluded from the calculation of his or her cumulative GPA in the new academic program. Grades may only be excluded for courses required in the old program that are not required in the new or subsequent four-year program. All credits earned in courses excluded from the calculation are lost. This policy does not apply to electives or credits used for any diploma, certificate, or degree already awarded.

Approval from the student's new program department chair or director is required for grade amelioration. The student must have:

- One term of at least 6 credits with a term GPA of 2.00 or better following the term for which amelioration is requested
- Approval from the Academic Deans of both the home and sending institutions

Auditing Courses

Tuition charges for an audit course will be 50% of the full applicable per-credit rate. Students registering to audit a course must do so by the end of the add/drop period.

If space is available, students may audit a Vermont Tech course provided they have met all course prerequisites and have obtained the permission of the instructor. The audit course credit hours will not be applied to student credit load or status.

Instructors, in giving permission for an audit, will specify the expectations for students participating as an auditor. Students who successfully audit a course will receive an *AU* grade, which carries no credit or quality points. Students who do not meet expectations of the audit will be dropped from the course with no grade or with a *W* grade. Students may not change to audit status to avoid receiving poor final grades.

Incomplete Work

A grade of *I* applies to work in a course which has not been completed because of illness or

other satisfactory reasons. The incomplete work must be made up as specified by the instructor no later than halfway through the subsequent term.

The grade for the course will be determined by the quality of the make-up work and the previously completed work. If the student fails to complete the assigned work, the instructor will determine a default grade that will be entered on the student's transcript. A student receiving an *I* grade may enroll in courses for which the incomplete course is a prerequisite. Continued enrollment in the new course is contingent on completion of the incomplete course with a passing grade.

Repeated Courses

When a course is repeated and completed, the initial grade remains on the record but does not count in the GPA or for credit. The most recent grade earned in a course will be entered on the record and used in computing the term and cumulative GPA and class rank. If a grade other than a *W* grade is recorded in the repeated course, all attempts will appear on the record and the most recent earned grade will be used in computing the cumulative GPA.

Add/Drop Period

The normal add/drop period is defined as the first two weeks of classes or the first 15% of class meetings for non-regular offerings. Degree students may add or drop a course until the end of the second week of classes with their advisors' permission. To add a class after the first week, students must have permission from both their advisor and the instructor.

A fee is charged for adding or dropping after the second week. Students will pay for any classes dropped after the second week of classes. Non-degree students must have the instructor's permission to add a course after the first week.

Dropping a Course

A student who drops a course:

- During the normal add/drop period will be dropped from the roster and will receive no grade
- After the normal add/drop period and until the 60% point of a course will receive a grade of *W*
- For students who have enrolled under the VSC Enrollment Consortium Agreement, the school-specific policies and procedures regarding add/drop/withdraw dates and procedures that pertain to each student are those of the home institution
- After the 60% point or who fails to drop the course will receive an earned grade whether they attend the remaining classes or not. Students who fail to drop a course are also responsible for costs incurred

If a student successfully completes a course before withdrawing from the college, he or she will receive from that course's instructor an appropriate grade.

Students who drop courses after the first two weeks of class will not be reimbursed unless they withdraw from all their courses for the term.

Withdrawal from Vermont Tech

To withdraw from Vermont Tech once the term has started, a student must give written notification to the Office of the Registrar or off-campus site office. A parent or guardian must approve withdrawal requests made by minors. A student who stops attending classes after add/drop and does not inform the college will be considered to have withdrawn after the 60% point of the term if the last date of an academically related event cannot be determined.

Students will receive grades based on the guidelines specified in *Dropping a Course*.

Non-Returning Students

Students who do not intend to return to Vermont Tech for the subsequent term should:

- Complete a non-returning student form at the Office of the Registrar or off-campus site office
- Complete an exit interview with the Office of Financial Aid

Leave of Absence

To take a leave of absence once the term has started, a student must request the leave in

writing through the Office of the Registrar or off-campus site office. A parent or guardian must request leave for a minor. Leave requires approval from the Academic Dean.

If the request is for a medical leave of absence, a letter from the student's health practitioner may be required. Students approved for a medical leave of absence based on a letter from their health practitioner must provide a time frame for their return to a normal class schedule.

For a leave of absence to be approved, it is expected that incomplete coursework can be satisfactorily completed upon a student's return and prior to the end of the subsequent term.

If a student fails to return to school at the end of the approved leave of absence or if the student makes a written request to rescind the leave of absence, the withdrawal date will be the original date of the request for leave or the last date of an academic event, whichever is later.

Grades for students on approved leaves of absence will be in accordance with the guidelines specified in *Dropping a Course*, with the exception that *I* or *W* grades may be used after the 60% point until the end of the leave of absence. College policy will be followed for students required by the college to take a mandatory leave of absence.

Credit by Challenge Examination

Students who can document coursework, private study, or on-the-job experiences equivalent to a Vermont Tech course may receive credit by examination. Approval by the department chair is required.

Documentation must be submitted to the department chair at least three weeks prior to the planned date of testing. After review and acceptance by the chair, an application for credit by examination shall be submitted along with a challenge exam fee. Upon satisfactory completion of the exam, a maximum of 12 credits may be given toward any one program. These credits are subject to advanced standing restrictions.

Challenge exams that are taken to replace failed coursework must comply with all of the above criteria and must document new coursework, private study, or on-the-job experience since the failure occurred.

Waiver of Courses

A student may have a specific course waived. A student can initiate a course waiver by an academic petition to the department chair through the Dean of Academic Affairs. The petition must be approved by the student's program department and by the department offering the course. A waived course may have to be replaced by an alternative course.

Substitution of Courses

A student may substitute another course for a specific required course if the student is unable to take the course for a specific, approved reason. A student can request to substitute by an academic petition to the department chair through the Dean of Academic Affairs. The petition must be approved by the student's program department and by the department offering the course.

Student Class Level

Class level is based on total earned credits toward an academic program. It affects financial aid, class standing, and other calculations regarding student progression. Non-degree students have no class standing.

| Level | Earned Credits |
|-----------|----------------|
| Freshman | 0-29.99 |
| Sophomore | 30-59.99 |
| Junior | 60-89.99 |
| Senior | 90+ |

Credit Overload

A student credit overload is defined as a course load in excess of 19 credits in a single term.

Students with a cumulative GPA of 3.00+ may be approved for a load of up to 24 credits in a term. Students with a cumulative GPA of 2.00-2.99 may be approved for a load of up to 21 credits in a term. Students with a cumulative GPA below 2.00 will not be approved for a term credit overload. Students with overloads will be reviewed at mid-term for possible load reduction.

Academic Standing

At the end of each term, academic standing is calculated for each matriculated student. There are three levels of academic standing: good standing, academic probation, and academic dismissal.

Good Standing

Degree students are in good standing if they meet the enrollment criteria for the term and have a cumulative GPA of 2.00 or better (1.75 for students with fewer than 30 earned credits).

Academic Probation

Degree students will be placed on academic probation if they have a cumulative GPA below that required for good standing. Probation is not a punitive measure, but is used to identify students who may need additional services or help.

Academic Dismissal

Degree students may be academically dismissed from the college for a minimum of one term for:

- Receiving a term or cumulative GPA below .70
- Not achieving good standing while on probation (on probation for more than 1 semester)

Students may also be dismissed from individual classes at any time when the instructor and/or Academic Dean determine(s) that continued enrollment is not appropriate, e.g. violation of cheating or plagiarism policy, nonattendance, inappropriate behavior, failure to complete assigned work, etc.

Students dismissed during the term will receive grades of *F* or *NP* in any incomplete course.

Students who are dismissed may not enroll in any Vermont Tech course for a minimum of one term. This applies to consortium enrollment from other VSC institutions as well. Students returning from academic dismissal will be on probation for a minimum of one term.

Appeal of Academic Dismissal

A student who believes there are significant mitigating circumstances shall submit an email letter to the Academic Appeals Committee (AAC).

This letter will include the student's full name, address, and college identification number. It will fully explain the circumstances surrounding the appeal. The AAC will meet and make a recommendation to the Academic Dean, who will make a final decision regarding the appeal. This decision will be final and will not be subject to further appeal. To read about this process more fully, please see the Vermont Technical College Student Handbook.

Students reinstated on appeal will normally be reinstated on academic probation. Students must also appeal to the Office of Financial Aid to have their aid reinstated. This is a separate process from the academic appeal.

Disciplinary Dismissal

Students who are dismissed from Vermont Tech for non-academic reasons are no longer matriculated students. They are not eligible to enroll in Vermont Tech courses. These students may apply for re-admission through the Office of Admissions after they have met the conditions set for them at the time of dismissal. Re-admission requires the approval of the Dean of Students.

Returning Students

Previously matriculated students who have not attended Vermont Tech for one term or more (even in instances of courses in a major not being offered) should contact the Office of Admissions and inform them of their intention to return to Vermont Tech. The Office of Admissions will advise the student whether they need to complete a new application or whether they can preregister for the upcoming semester with the Office of the Registrar. This determination is based on length of absence, program requirements, and other academic considerations.

If returning to complete the Practical Nursing program within a year of leaving, students must perform a demonstration of all skills learned in the appropriate lab/clinical course from the year before. This must be done prior to reentry. If a student is unable to perform these skills satisfactorily, s/he will not be readmitted to the program. Students who have been out of the program for more than a year must repeat all nursing Principles & Practices courses in the program.

If returning to complete the Respiratory Therapy program after a semester off, students must perform a demonstration of all skills learned in the appropriate labs/clinical course from the year before. This must be done prior to reentry. If a student is unable to perform these skills satisfactorily, s/he will not be readmitted to the program. Students who have been out of the program for more than a year must repeat all RSP courses in the program.

Returning after Dismissal

Students who have been dismissed from Vermont Technical College may return under the following conditions:

- Students have met the requirements placed upon them at the time of dismissal
- Students notify the Office of Admissions in writing of their intent to return to Vermont Tech
- Students are approved for re-admission by the Office of Admissions

Upon receiving notification from the Office of Admissions, the department chair or program coordinator will determine whether a fall or spring re-admission is most appropriate and will send a preregistration to the Office of Admissions outlining coursework and/or suggested coursework prior to re-admission. The Office of Admissions will forward returning student information to the Office of the Registrar, student housing, and the Office of Financial Aid.

Returning students desiring financial aid will have to appeal to the Office of Financial Aid to have their aid reinstated. A new housing contract will need to be completed if the student wishes to live on campus. After returning, students will be on probation and will receive increased supervision and academic support for a minimum of one semester. Students will also be required to enroll in and pass the Effective Learning course.

Changing Programs

If a student wishes to change programs, s/he must petition through the Office of the Registrar and be approved by the appropriate department chairperson.

Dual Major/Dual Degree

Students who wish to receive an additional degree or major must complete a Change of Program request form, available from the Office of the Registrar. The student must complete all of the requirements of the new major or degree. Courses that have already been completed do not need to be taken again. An additional associate degree major must contain at least fifteen credits that were not part of the previous major. An additional bachelor's degree major must contain at least thirty credits that were not part of the previous major.

Course schedules are designed for full-time students who are pursuing one major. Therefore, dual majors typically require a minimum of one extra year at Vermont Tech.

Students who earn multiple majors will be awarded one degree with the additional majors annotated on the diploma.

Residency Requirement & Matriculation

A matriculated student is one who has been formally accepted by the college as being registered in a degree program. All matriculated students have a minimum number of credit hours that must be taken at Vermont Tech. For bachelor's candidates, the residency requirement is that 30 of the last 39 credit hours must be achieved in courses specifically taken at Vermont Tech. For associate candidates, the last 15 credit hours must be achieved in courses taken specifically at Vermont Tech. Exceptions to the residency requirement may be considered and requires approval from the Dean of Academic Affairs.

Graduation Standards

A Vermont Tech degree demonstrates not only accomplishment in the major field, but also acquisition of the fundamental transferable skills required for success in today's world. For this reason, Vermont Tech is committed to ensuring that graduates have achieved proficiency in written and oral communication, quantitative reasoning, and information literacy.

All degree students will be required to demonstrate competence in these disciplines at the appropriate level for their degree program. Students will have more than one opportunity to meet the expected level of performance.

All transfer students are required to take all graduation standards except:

- Students with a bachelor's degree or higher
- Students who have completed the assessments at another VSC college
- Students who are granted a special exemption by the Academic Dean

Procedures for completing the graduation standards are outlined in the Student Handbook.

Graduation Requirements

- Have a 2.00 cumulative GPA
- Complete at least 50% of the coursework at Vermont Tech for degree programs or 15 credits minimum for certificate programs
- Complete 60 credits minimum for an associate degree, 64 for ABET programs
- Complete 120 credits minimum for a bachelor's degree
- Satisfy all financial obligations to Vermont Tech
- Apply for graduation

The department chair will submit program candidates who satisfy the above, as attested by the Registrar, to the full college faculty for recommendation to graduate.

Time Limitation on Graduation Requirements

Students are expected to finish their degree programs with continuous enrollment in the specified number of terms outlined in the curriculum for their programs. Students who leave the college for a full-term will be assigned the requirements for the catalog that is in effect for the year of their return. These students will be expected to meet any new requirements for that catalog year unless the sponsoring department approves an earlier catalog year.

Each student operates under degree requirements in effect at the time of initial acceptance as a degree candidate. If, after two years for a certificate, four years for an associate, or six years for a bachelor's, the degree requirements have not been met, the student must satisfy the graduation requirements in effect during the student's year of graduation.

A student participating in a college-sponsored part-time degree program has two years from the conclusion of the last scheduled course in the sponsored program to complete the degree requirements. After this time, if the degree requirements have not been met, the student must satisfy the graduation requirements in effect during the student's year of graduation.

Requirements for Participating in Graduation

Commencement is an important celebration of a student's academic success, as well as an opportunity for family, friends, and future employers to recognize those efforts in a formal manner. Academic credentials are important benchmarks in a student's career. All students are strongly encouraged to attend commencement.

Students who successfully complete all graduation requirements and are recommended by their departments will graduate and receive a diploma.

Students who are within 7 credits of the graduation requirements; have applied to walk or graduate on their application; and have the recommendation of their department may participate as walkers. Although walkers participate in the graduation ceremony, they will not actually graduate until they have successfully completed all the graduation requirements and are so recommended by their departments. Walkers who subsequently complete their degree requirements must apply for a diploma that will be mailed after approval and the next commencement. Walkers are expected to

complete their remaining requirements within one year.

Term Honors

At the end of each term, degree students who have attained a term GPA of 3.50 or 4.00 while carrying 12 or more letter-graded credit hours and who have not received a failing or incomplete grade in any subject during that semester will be accorded Dean's List honors or President's List honors, respectively.

There is one exception to the above: full-time nursing students are eligible for term honors while enrolled in a non-graded clinical course.

Honor Societies

Vermont Tech students may qualify for membership in the following national honor societies:

Alpha Delta Nu is a national honor society formed by the National Organization for Associate Degree Nursing to recognize the academic excellence of students in the study of Associate Degree Nursing. The society shall encourage the pursuit of advance degrees in the profession of nursing as well as continuing education as a lifelong professional responsibility. Requirements for candidacy are:

- 3.00 or above in Nursing courses (with letter grades of *B* or higher) and a cumulative GPA of 3.00 or above and no previous failures in any Nursing course
- Sophomore status
- Students shall have demonstrated conduct on campus and the clinical areas that reflects integrity and professionalism as determined by the nursing faculty advisors

Phi Theta Kappa is a national honor society formed to recognize and encourage scholarship, academic excellence, leadership, and service among two-year college students. Requirements for candidacy are:

- 3.50 cumulative GPA with no incomplete grades
- Must be working toward a VTC degree with a minimum of 12 credits completed at Vermont Tech

Tau Alpha Pi is the national honor society for associate and baccalaureate degree students in engineering technology. Its purpose is to recognize academic excellence in fields of engineering technology study and to encourage a lifetime commitment to learning and scholarship. Requirements for candidacy are:

- Cumulative GPA of 3.50 with no incomplete grades
- Minimum of 24 credits completed at Vermont Tech while in an engineering technology program

Engineering technology students with more than 48 credits may be considered with a 3.30 or better cumulative GPA.

Sigma Phi Alpha is the national honor society for dental hygiene students. It was formed to recognize, promote, and honor outstanding scholarship, service, and character among students or graduates of dental hygiene schools in the U.S. and Canada. Second year dental hygiene students who rank highest in scholarship and character and who exhibit potential for future growth are, upon recommendation of the full-time dental hygiene faculty, elected to this prestigious group. Membership is limited to ten percent of the graduating class.

Graduation Honors

To be eligible for graduation honors, a degree student must:

- Have a minimum of 30 credits for an associate degree, a minimum of 60 credits for a bachelor's degree completed within the VSC
- Have achieved the following cumulative GPA for all coursework:

| | |
|------------------------|------|
| Cum Laude | 3.50 |
| Magna Cum Laude | 3.70 |
| Summa Cum Laude | 3.90 |

To be eligible for graduation honors, a certificate student must:

- Complete 50% of the degree requirements at Vermont Tech

- Have achieved the following cumulative GPA for all coursework:

| | |
|-------------|------|
| Honors | 3.00 |
| High Honors | 3.50 |

Awards

Each year a number of students receive awards for distinguished performance, noteworthy improvement, and/or superior service and dedication to the college. A student who fulfills the requirements for two degrees is eligible for awards in both majors. Full-time students who are degree candidates are eligible for these awards:

- *The American Society of Civil Engineers Award* is given to the graduating student with the highest academic average and greatest all-around academic development in the Civil and Environmental Engineering Technology program
- *The American Society of Heating, Refrigeration, and Air-Conditioning Engineers Award*, sponsored by the Champlain Valley Chapter, is given to a deserving senior who is graduating from the Bachelor of Science in Architectural Engineering Technology program. The award is based on factors such as participation in student and parent chapter activities and interest and excellence in building mechanical engineering systems. This award is given most years, but not every year
- *The Angus A. Murray Athletic Award* is given to an individual who demonstrates selfless dedication to the college's athletic program
- *The Angus A. Murray Award for Excellence in Writing* is given to a returning student who demonstrates the greatest overall excellence in writing in Vermont Tech's two required English courses
- *The Business Technology & Management Faculty Award* is given to a graduating student for the highest academic average and greatest all-around academic development in this program
- *The Colgate STAR Award* is offered to the graduating dental hygiene students who shows excellence and commitment to the hygiene profession by demonstrating true dedication to the profession; exhibiting extraordinary compassion in patient care; displaying enthusiasm and follow-through for community service; and demonstrating outstanding patient education and motivation skills
- *The Computer Engineering Technology Award* is given to a graduating student with the highest academic average and greatest all-around academic development in this program
- *The Dental Hygiene Peer Recognition Award* is given to a second-year dental hygiene student who, in the opinion of classmates, exhibits the interest, attitude, and cooperative spirit desirable in a dental hygienist
- *The Dorothy Wootton Outstanding Clinician Award* is given by the faculty of the department of Dental Hygiene to the graduating student who best demonstrates outstanding clinical performance
- *The Edward F. Kibby Memorial Award* is given to the athlete who has displayed the most outstanding sportsmanship throughout the year from the Vermont Tech Alumni Association.
- *The Edward H. Jones Testimonial Fund Award* is given to the graduating student who has shown the greatest all-around academic development in an agricultural technology program
- *The Equine Studies Faculty Award* is given to a graduating student with the highest academic average and greatest all-around academic development in this program
- *The Faculty Award* is given to the graduating student who has made the greatest contribution to student activities while attending Vermont Tech
- *The Institute of Electrical & Electronics Engineers Award* is given to a graduating student

with the highest academic average and greatest all-around academic development in the Electrical Engineering Technology program

- *The J. Edward Marceau Memorial Scholarship Award* is given to one graduating Dental Hygiene student who is a Vermont resident and plans to practice in Vermont for at least one full year and, in the opinion of the faculty, exhibits outstanding scholastic achievement and community involvement
- *The Lambda Beta Society* is a national honor society for the profession of respiratory care and students are proposed for membership if they are in the final semester of the Respiratory Therapy program and rank in the top 25% of the graduating class
- *The Landscape Development & Sustainable Horticulture Faculty Award* is given to a graduating student with the highest academic average and greatest all-around academic development in this program
- *The Outstanding Community Service Leader Award* recognizes one outstanding student for his or her contributions to the community. It may be awarded to a student participating in the Community Outreach Team or America Reads program or to a student who has completed a specified number of community service hours
- The Practical Nursing program recognizes clinical excellence through academic awards that are specific to the individual PN nursing campuses. Graduation awards are given at the Bennington, Brattleboro, Williston, and Randolph Center campuses. Additional awards are also awarded under the college's extended campus designation
- *The Nursing Program Award* is given to graduates of the Associate Degree in Nursing program from the Vermont State Nurses Association for clinical excellence, and from the VTC Nursing program for academic excellence
- *The Rena Katz Chernick Memorial Scholarship Award* is given by the Vermont Dental Hygienists' Association in memory of Ms. Chernick, who was a very dedicated, enthusiastic, and active dental hygienist on the state, regional, and national levels. The award is given to the graduating student who exhibits outstanding scholastic achievement
- *The Respiratory Therapy Clinical Excellence Award* is given to the graduating student who, in the opinion of the clinical faculty, demonstrated the professional ideals of competence, integrity, leadership, collaboration, advocacy, and accountability throughout his or her clinical education experiences
- *The Respiratory Therapy Program Award* is given to a graduate of the Respiratory Therapy program for academic excellence
- *The Robert S. Brady Award* is given to the graduating senior who has shown the greatest all-around academic achievement in the Architectural & Building Engineering Technology program. The award is given from the Hanne Williams fund by the Vermont Chapter of the American Institute of Architects
- *The Ruth Freeman Award* is given to the student in the Architectural & Building Engineering Technology program whose work in Architectural Design I has exhibited architectural design excellence. The award is given from the Hanne Williams fund by the Vermont Chapter of the American Institute of Architects
- *The Rutland County Alumni Award* is given to the graduating student who is a Rutland County resident with the highest academic average
- *The Sigma Phi Alpha Board Award Scholarship* is given by the Sigma Alpha Dental Hygiene Honor Society to one or two graduating dental hygiene students with outstanding achievement in academics, as well as community service and with financial need
- *The Society of Manufacturing Engineers Award* is given to a graduating student with the highest academic average and greatest all-around academic development in the Mechanical Engineering Technology program
- *The Stanley G. Judd Memorial Fund Award* is given to the graduating student with the

highest academic average in an agricultural technology program from the Vermont Tech Alumni Association

- *The Student Engineering Technician of the Year Award* is given to a student completing the second year in an associate or bachelor's degree program in engineering technology who is selected from nominations by the engineering technology departments for outstanding scholarship, character, and leadership
- *The Student Engineer of the Year Award* is given to a student completing the final year in a bachelor's degree program in engineering technology who is selected from nominations by the engineering technology departments for outstanding scholarship, character, and leadership
- *The VTC Fire Science Special Recognition Award* is dedicated to the Vermont Tech Fire Science student(s) whose combined academic achievement, leadership, and service to the program and to the college deserves special recognition
- *The Vermont Association of Professional Horticulturists Student Award* is given to a second-year student in the Landscape Design & Sustainable Horticulture program who exemplifies the qualities of a professional in the field: motivation, direction, leadership, and respect for both humans and the natural environment. The recipient must have earned at least 30 credits and hold a GPA of 3.0 or greater
- *The Vermont Automobile Dealers Association Award* is given to a graduating student with the highest academic average and greatest all-around academic development in the Automotive Technology program
- *The Vermont Dental Hygienists Association Membership Spirit Award* is given to the graduating Dental Hygiene student who exhibits a high level of professional pride and enthusiasm for the profession of dental hygiene
- *The Vermont Tech Faculty Memorial Fund Scholarship* is given to a student who has completed the freshman year and whose outstanding scholarship exemplifies excellence in technology. This award was created by the faculty as a memorial to the men and women who served on the faculty and have passed away
- *The W. Newton Ryerson Award for Excellence in Freshman Mathematics & Physics* is given to a returning student with a GPA of 3.5 or higher in freshman mathematics and physics courses who demonstrates excellence in laboratory performance and a positive general attitude as shown by class and/or laboratory participation and/or assisting other students
- *Who's Who Among Students at American Junior Colleges*: each department nominates students for this honor given for academic achievement, community service, leadership in extracurricular activities, and potential for success

Honesty & Ethics

Vermont Tech expects high standards of truthfulness and honesty in all academic work. Any student who is found guilty of academic dishonesty will face disciplinary action, up to and including dismissal from the college. Cheating refers to plagiarizing or using unauthorized aids or copying another person's work on exams, quizzes, or assignments.

Center for Academic Success

The staff and programs at the Center for Academic Success (CAS) provide students with assistance to reach their full potential and be successful while attending Vermont Tech. This assistance includes both the academic and personal support necessary to meet academic, personal, and career goals: tutoring; short-term counseling and goal-setting; study and test-taking assistance; and financial literacy information and assistance. The TRIO Student Support Services program and Services for Students with Disabilities are also housed at the CAS. The main office is on the Randolph Campus, with staffing provided at the Williston campus as well. Students enrolled at other sites can contact their site coordinator or the main CAS office to arrange for services which are delivered via several methods: phone, Skype, Adobe Connect, or in person.

Academic Counseling

Academic counseling includes a variety of services designed to help students with concerns about reaching their academic goals. Counselors provide informal academic assessments, academic and vocational counseling, and help with study skills. Referrals for individual tutoring with professionals in specific courses are also available.

Assistive Technology

The CAS provides access to a variety of assistive technology software programs and hardware designed to help students with such things as scanning, editing, or dictating documents; having documents read aloud by the computer for editing or test-taking; and developing or organizing information.

Career Development Center

The Career Development counselor provides assistance with career and college transfer decision-making, individual assistance, and workshops on writing resumes.

Services for Students with Disabilities

Students with disabilities are encouraged to meet with the Learning Specialist to explore their options and determine their eligibility for accommodations. Interviews and phone calls to address particular concerns are welcome at any time during the admission process or after enrollment at the college. All information regarding a disability is kept in strict confidence and never becomes a part of the student's academic record. Accommodations are always determined individually on a case-by-case basis. Available services include: academic counseling, student support group, classroom accommodations, training in the use of assistive technology, and assistance in obtaining auxiliary aids.

Student Support Services/TRIO Program

The SSS/TRIO Program at Vermont Tech provides support services designed to increase student retention and graduation. Funded by a special grant from the U.S. Department of Education, SSS/TRIO provides services to first-generation college students, low-income students, and students with disabilities. This program is widely used by students for academic and career counseling; assistance in transferring to associate and bachelor's degree programs; improving study skills; developing reading and writing skills; individual tutoring; workshops; peer advising; support groups; cultural events; field trips; information on financial literacy; and help with financial aid forms and issues.

Support & Counseling

The Center for Academic Success focuses on wellness for emotional and mental health. The center offers workshops, mentors, and support groups on stress, adjusting to college, test anxiety, and other issues related to student wellness. The center also offers referrals to off-campus mental health agencies where appropriate. Students with specific mental health concerns may work with the counselor at the CAS for assistance locating appropriate community treatment resources.

Tutoring Services

The Tutoring Center provides a wide range of academic services, including tutoring by appointment; evening and afternoon walk-in tutoring; test review sessions; study groups; and writing assistance with papers at any point in the writing process, as well as lab reports and projects. ESOL computer programs are available to students to practice vocabulary, pronunciation, and grammar. All tutoring services are free of charge. It is available for most courses and to any student hoping to do better in terms of grades or comprehension of content.

Hartness Library

Hartness Library exists to support learning, teaching, research, and other activities of the college. Located in the heart of the Randolph Center campus, the library provides a comfortable and welcoming place to study, learn, and gather with friends to work in collaboration. The library has study and meeting rooms, computers, printers, and scanners available for the campus community to use. A satellite location on the Williston campus is staffed by a librarian and offers the same services as the main library. To explore our resources and services, visit our website at <http://hartness.vsc.edu/vtc>

Collection

The library collection includes over 42,000 books; 23,000 ebooks; 14,000 streamed films and documentaries; 6,000 videos and DVDs; 39,000 full-text online periodical titles; and course reserve materials. Students have 24-hour access to the library's extensive online resources from anywhere through the library's website using a laptop or a mobile device. Our free interlibrary service is available to request books or journal articles which the library does not own. The collection is developed with input from our faculty to ensure that we are supporting our students and the curriculum effectively.

Reference Services

The staff and professional librarians offer students support in finding and evaluating resources for their research. Librarians and staff are available to help students face-to-face, using our 800 number, via live online chat, text message, or by email. Librarians may also be embedded in online classes to serve students online and at VTC's other sites and campuses. The library provides an online library orientation, video tutorials, a research basics guide, and librarian-created subject guides to help familiarize students with library resources and services.

Information Literacy

The library supports students in meeting the Vermont State Colleges information literacy graduation standard through our instruction program. Librarians visit classes for face-to-face library orientation and information literacy instruction early in the semester. The library supports online students in meeting the requirements using online interactive tutorials, subject guides, and by embedding librarians in online classes.

Public Notice Designating Directory Information

Directory information is information which would not generally be considered harmful if disclosed. It includes the following: name; home and college addresses; telephone listing; mailing address; date of birth; major; enrollment status (full-time or part-time); dates of attendance; awards received; weight and height of athletic team members; photographs; most recent and previous educational institutions attended; and participation in officially recognized activities and sports.

Currently enrolled students may withhold disclosure of personally identifiable, directory-type information under the Family Educational Rights and Privacy Act (FERPA). To withhold disclosure, written notification must be received by the Office of the Registrar. Forms requesting the withholding of directory information are available. Vermont Tech assumes that failure on the part of any student to specifically request the withholding of directory information indicates individual approval for disclosure.

Student Records Review, Release, & Right-to-Know

Annually, Vermont Tech informs students of FERPA. This act was designated to protect the privacy of educational records; to establish the right of students to inspect and review their educational records; and to provide guidelines for the correction of inaccurate or misleading data through informal and formal hearings. Students also have the right to file complaints with the FERPA Office concerning alleged failures by the institution to comply with the act.

The college has a policy of disclosing educational records to Vermont Tech and VSC officials with a legitimate educational interest without prior consent. Questions concerning FERPA may be referred to the Office of the Registrar.

VSC Enrollment Consortium Agreement

By agreement of the five Vermont State Colleges (Castleton, Lyndon, Johnson, Vermont Tech, and the Community College of Vermont), students enrolled at any VSC institution may simultaneously enroll in courses at other VSC institutions and receive full credit for those courses at their home institution. This agreement eliminates duplication of registration or other enrollment fees and students receive financial aid based upon their total credit enrollment within the VSC. Course-specific fees of \$100 or more are reimbursed by the student to the institution where those fees are incurred.

Students seeking to benefit by this agreement must ensure that coursework will meet program requirements at the home institution prior to enrolling at the other VSC institution. Registration for courses at other VSC institutions will be through the home institution. The school-specific

policies and procedures regarding degree requirements, transfer credits, placement levels, refund policies, and add/drop/withdraw dates and procedures that pertain to each student are those of the home institution. When registering, it is important that students receive information and advising based on their own school's policies and procedures. Therefore, students will register at their home institutions (or online via Web Services, with home institution approval) for all courses to be taken within the VSC, regardless of where the course will be taken.

Students enrolled in the LPN program are not eligible for the VSC enrollment consortium because of the divergent calendar of that program.

Students who desire to enroll exclusively at another VSC school other than their home institution may do so for a maximum of two terms. To be eligible for this, students must be matriculated at the home institution and must secure written permission in advance of their enrollment from the home institution.

Courses taken at any VSC institution will be included in GPA calculations at the home institution.

Tuition & Fees 2015-2016

Estimated Costs of Attendance

Students are responsible for familiarizing themselves with the cost descriptions; payment and refund policies; and the definition of residency for tuition payment purposes as detailed below. In the following cost charts, all charges are based on full-time enrollment (12-19 credits per semester) and are subject to change.

Cost Chart One: Fall & Spring Terms

All programs except Nursing, Dental Hygiene, & Aviation

| | Vermont | Residents | Non-VT | Residents | RSP/NEBHE | Program |
|-----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | Term | Year | Term | Year | Term | Year |
| Tuition | \$6,228 | \$12,456 | \$11,916 | \$23,832 | \$9,336 | \$18,672 |
| Double Room | 2,887 | 5,774 | 2,887 | 5,774 | 2,887 | 5,774 |
| Board (Gold plan)**** | 1,961 | 3,922 | 1,961 | 3,922 | 1,961 | 3,922 |
| Student Activity Fee | 131 | 262 | 131 | 262 | 131 | 262 |
| Facilities Fee* | 386 | 772 | 386 | 772 | 386 | 772 |
| Matriculation Fee** | 360 | 360 | 360 | 360 | 360 | 360 |
| Health Insurance*** | 1,203 | 1,940 | 1,203 | 1,940 | 1,203 | 1,940 |
| Total | \$13,156 | \$25,486 | \$18,844 | \$36,862 | \$16,264 | \$31,702 |

Cost Chart Two: Nursing

| | Vermont Residents | ADN (2 Semes- ters) | RSP/NEBHE | Vermont Residents | PN (3 Semes- ters) | RSP/NEBHE |
|-------------------------|----------------------|---------------------------|-----------------|----------------------|--------------------------|-----------------|
| | | Non-VT Residents | | | Non-VT Residents | |
| Tuition | \$13,080 | \$24,408 | \$19,320 | \$17,985 | \$33,561 | \$26,565 |
| Double Room | 5,774 | 5,774 | 5,774 | 6,929 | 6,929 | 6,929 |
| Board (Gold plan)**** | 3,922 | 3,922 | 3,922 | 4,707 | 4,707 | 4,707 |
| Student Activity Fee | 262 | 262 | 262 | 361 | 361 | 361 |
| Facilities Fee* | 772 | 772 | 772 | 1,060 | 1,060 | 1,060 |
| Matriculation Fee** | 360 | 360 | 360 | 360 | 360 | 360 |
| Health Insurance*** | 1,940 | 1,940 | 1,940 | 1,940 | 1,940 | 1,940 |
| Total | \$26,110 | \$37,438 | \$32,350 | \$33,342 | \$48,918 | \$41,922 |
| Total Off-Campus | \$16,414 | \$27,742 | \$22,654 | \$21,706 | \$37,282 | \$30,286 |

For further information concerning estimated costs of attendance for the Nursing programs, contact the Business Office at (802) 728-1301. Program costs are based on annual full-time cost of the program.

Cost Chart Three: Dental Hygiene

| | Vermont | Residents | Non-VT | Residents | RSP/NEBHE | Program |
|------------------------|---------|-----------|----------|-----------|-----------|----------|
| | Term | Year | Term | Year | Term | Year |
| Tuition | \$7,800 | \$15,600 | \$12,204 | \$24,408 | \$9,660 | \$19,320 |
| Williston Double Room† | 2,887 | 5,774 | 2,887 | 5,774 | 2,887 | 5,774 |
| Student Activity Fee | 131 | 262 | 131 | 262 | 131 | 262 |
| Facilities Fee* | 386 | 772 | 386 | 772 | 386 | 772 |
| Matriculation Fee** | 360 | 360 | 360 | 360 | 360 | 360 |

| | Vermont | Residents | Non-VT | Residents | RSP/NEBHE | Program |
|---------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | Term | Year | Term | Year | Term | Year |
| Health Insurance*** | 1,203 | 1,940 | 1,203 | 1,940 | 1,203 | 1,940 |
| Total | \$12,767 | \$24,708 | \$17,171 | \$33,516 | \$14,627 | \$28,428 |

Cost Chart Four: International Students

| | Undergraduate | Nursing ADN | Nursing LPN | Dental Hygiene |
|-----------------------|-----------------|-----------------|-----------------|-----------------|
| Tuition | \$27,528 | \$28,104 | \$38,643 | \$28,104 |
| Double Room | 5,774 | 5,774 | 6,929 | 5,774 |
| Board (Gold plan)**** | 3,922 | 3,922 | 4,707 | -- |
| Student Activity Fee | 262 | 262 | 361 | 262 |
| Facilities Fee* | 772 | 772 | 1,060 | 772 |
| Matriculation Fee** | 360 | 360 | 360 | 360 |
| Health Insurance*** | 1,940 | 1,940 | 1,940 | 1,940 |
| Total | \$40,558 | \$41,134 | \$54,000 | \$37,212 |

†Williston based on availability; no meal plans available at Williston campus

*Applies to all matriculated students; new students only; incoming rate is \$360

** New students only; incoming rate is \$360; one-time charge for first semester enrolled

*** Required if not covered by another medical plan; you must be a full-time degree seeking student to obtain coverage. The one-semester rate of \$1,203 applies to spring semester incoming students only. \$1,940 is the annual rate for all fall semester students.

**** Meal charges for Randolph Center campus; No meal plans at Williston campus

Other Estimated Expenses (All Cost Charts)

| | Term | Year |
|---------------------------------------|---------|---------|
| Books, transportation, personal needs | \$1,325 | \$2,650 |
| Dental clinic attire, uniforms, shoes | | 1,000 |
| Automotive student tools | | 2,200 |
| Equine riding arena costs | | 2,400 |
| Nursing uniforms | | 250 |
| Dental third-year exams & licensure | | 1,750 |
| Dental instruments & lab materials | | \$1,200 |

Cost Chart Five: Professional Pilot Technology

In addition to tuition and other fees, the Professional Pilot Technology LPN program requires Flight Fees specific to mandated flight time in the aircraft and flight simulators for each of the FAA certificates and ratings.

Flight fees are applied to individual flight courses and are charged prior to the semester that each flight course is taken. The fees outlined below are based on the number of hours the average student takes to complete each course. Additional flight time may be required due to a host of variables, including individual learning style, personal commitment, illness, or weather conditions. Any additional ground or flight instruction required will be billed on an hourly basis until successful completion is reached.

A full syllabus for all ground and flight courses, on campus or at the airport, are available as a handout and will also be posted on both the Vermont Tech website and the Vermont Flight Academy website. This would include pre-flight, post-flight briefing topics, and maneuvers and procedures for simulator instruction and airplane flying for all courses.

If a student chooses not to take the Multi-Engine ratings and the two additional Certified Flight Instructor ratings (Instrument and Multi-Engine), s/he may take an appropriate 3 credit elective to replace the three 1 credit courses and not obtain the last 3 ratings during the senior year.

Flight Fees

| Course | Flight Training | Fees | Flight Hours | Credits |
|-------------------|--------------------|----------|--------------|---------|
| Required: | | | | |
| AER 1020 | Private | \$13,303 | 55 | 2 |
| AER 1120 | Instrument | 12,722 | 52 | 2 |
| AER 2031 | Commercial I | 20,689 | 85 | 2 |
| AER 2032 | Commercial II | 7,320 | 35 | 2 |
| AER 3020 | CFI: Airplane | 6,628 | 25 | 2 |
| Electives: | | | | |
| AER 4010 | CFI: Multi-Engine | 12,228 | 25 | 0.5 |
| AER 4011 | Multi-Engine: Land | 13,630 | 25 | 0.5 |
| AER 4020 | CFI: Instrument | 6,545 | 25 | 1 |
| AER 4030 | Multi-Engine: Sea | 11,049 | 25 | 1 |

All required courses for the BS degree must use full flight hours.

Any extra/optional courses always commence as 141 with an enrollment certificate. If sufficient training is received to complete the FAA check-ride with fewer hours, students can be dropped as 141 students and receive an FAA Part 61 check-ride to complete. When this occurs, excess funding must be returned to the VA or the student's account after financial scrutiny of fewer hours training.

Students choosing not to take any of the extra/optional courses may require another 3 credit hours for 120 credit hours minimum to graduate.

FAA Medical Examination

A FAA 1st Class Medical Exam must be completed by an authorized Aviation Medical Examiner and a copy submitted to the aviation program director or the Office of Admissions by June 1 to be admitted to the program. Estimated medical expense is presently \$145; students may not need any additional medical during the degree program.

FAA Written Exam Fees

A total of six FAA exams are required for certifications and ratings during the four-year program. Each exam costs \$150 and is taken at a CATS Testing Center, as required by the FAA. Vermont Flight Academy operates a full CATS Testing Center at the airport.

FAA Examiner Fees

FAA certifications and ratings require the successful completion of written and flight exams. The flight exams must be given by an FAA Flight Examiner. Before each flight, FAA Examiner Fees are paid directly to the examiner at the time of their Oral and Flight Test for each certificate and rating. Present fees vary from \$300-550 per check ride depending on the certificate or rating.

Pilot Equipment

Students will require: headsets, Federal Aviation Regulations, aviation charts, plotters, E6-B flight computers, aircraft syllabus/course books, flight logbook, oral & practical test prep guides, FAA Practical Test Standards for each course, etc. A list of all required materials will be handed out and posted on the website. Textbooks for non-flight aviation courses are not included. Estimated cost for the four-year program is \$1,700 - 2,000.

Insurance

Vermont Flight Academy carries liability and physical damage (hull) insurance. VFA extends limited liability coverage to students. However, students are responsible for the insurance deductible (in the event of a loss). It is mandatory for each student to purchase an individual non-owner policy for \$314 per year. This provides student liability protection for legal defense; deductible and loss of use; and subrogation.

Appropriate Dress

Aviation is a profession. Students are expected to dress appropriately in ground and flight classes at all times. During flight training at the airport, dress appropriately for the season in which you are operating.

iPhones & iPads

These devices are widely used in aviation and recommended with multiple apps to assist pilots with convenient access to weather, navigation, approach charts, and regulations.

Cost Chart Six: Online Degree Students

| | Vermont Residents | Non-VT Residents |
|------------------------------------|-------------------|------------------|
| Tuition | \$519/credit | \$519/credit |
| Online Fee (each semester) | \$218 | \$218 |
| Matriculation Fee (first semester) | 360 | 360 |

O/S tuition is reduced by a scholarship to net \$519/credit rate.

Optional Room & Board Rates per Semester

| | |
|---|---------|
| Double Room | \$2,887 |
| Single Room | 3,657 |
| Triple Room | 2,592 |
| Gold Meal Plan (unlimited with 75 points at snack bar) | 1,961 |
| 12 Meal Plan (+150 points at snack bar) | 1,888 |
| 8 Meal Plan (+225 points at snack bar) | 1,815 |
| Overnight rooms for emergencies (per night, Randolph Center only) | 35 |

Other Fees: All Programs

| | |
|---|------------------------|
| Application fee (due when applying for admission) | \$40 |
| Course Change | 23 |
| Challenge Exam Fee | 1 per credit cost |
| Deferred Payment Fee | 50 |
| Graduation Fee | 92 |
| Late Class Registration | 60 |
| Late Financial Clearance Fee | 120 |
| Non-degree Student Registration Fee (per semester)* | 65 |
| Returned Payment Fee | 25 |
| Parking Sticker | fall: 75 spring: 50 |
| Portfolio Assessment | 50 |
| Transcript Fee (per copy) | 5 |

* Applies only to students who have not been accepted into a VTC program

Per Credit Tuition & Fees

Degree-seeking students registered for 12 credit hours or more are full-time students and expenses are set forth under cost charts One through Six on the preceding pages. Overload status fees apply to class loads of 20 or more credit hours per semester. Overload credit hours are billed at the rates below. Degree-seeking students registered for fewer than 12 credit hours are considered part-time students and are charged on a per credit basis as indicated below. Non-degree-seeking students are charged for all credits.

Tuition

| | |
|--|-------|
| Vermont Resident (non-Dental Hygiene, non-Nursing) | \$519 |
| Vermont Resident (Nursing) | 545 |

Tuition & Fees

| | |
|--|-------|
| Vermont Resident (Dental Hygiene) | 650 |
| Non-Vermont Resident (non-Dental Hygiene, non-Nursing) | 993 |
| Non-Vermont Resident (Dental Hygiene, Nursing) | 1,017 |
| RSP/NEBHE (non-Dental Hygiene, non-Nursing) | 778 |
| RSP/NEBHE (Dental Hygiene, Nursing) | 805 |
| International (non-Dental Hygiene, non-Nursing) | 1,147 |
| International (Dental Hygiene, Nursing) | 1,171 |

(RSP/NEBHE/GN cost shown as money due after NEBHE credit is applied)

Fees

| | |
|---|------|
| Student Activity Fee (per credit hour, max. 11 credits) | \$11 |
| Non-degree Student Registration Fee (per semester) | 65 |
| Facilities Fee* (per credit hour, max. 11 credits) | 32 |

**All Matriculated Students*

Summer Costs

| | |
|--|-------|
| Vermont Resident (non-Dental Hygiene, non-Nursing) | \$519 |
| Vermont Resident (Nursing) | 545 |
| Vermont Resident (Dental Hygiene) | 650 |
| Non-Vermont Resident (non-Nursing & non-Dental) | 778 |
| Non-Vermont Resident (Nursing & Dental) | 805 |
| RSP/NEBHE (non-Nursing & non-Dental) | 778 |
| RSP/NEBHE (Nursing & Dental) | 805 |
| International (non-Dental Hygiene, non-Nursing) | 1,147 |
| International (Dental Hygiene, Nursing) | 1,171 |

There is no financial aid for summer term; payment in full is expected by the start of summer classes.

Senior Citizen Discount

Non-degree-seeking Vermont citizens age 65 and over will be given a 100% reduction on their tuition. Associated fees are the responsibility of the student.

Explanation of Fees

Application Fee: \$40

This fee is required when a prospective student applies for admission to the college.

Board

Students may choose from three meal plans. The *Gold Plan* offers unlimited meals with \$100 per year in debit points for the snack bar. The *Base Plan* offers 12 meals per week with \$150 per year in debit points. The *8 Meal Plan* offers 8 meals per week with \$220 per year in debit points. Each meal plan also comes with 6 guest meals per semester.

Challenge Exam Fee: 1 per credit cost

This fee is required when students take challenge exams for college credit or advanced standing.

Course Fee

This fee is required to offset the cost of special projects or equipment for specific courses.

Course Change Fee: \$23 per change

This charge is for students who alter their schedules after the second week of classes.

Deferred Payment Fee: \$50 per semester

This fee is charged to students who request that payment of semester charges be deferred because an outside source (employer, VA benefits, etc.) will be providing payment past the normal due date directly to Vermont Tech.

Facilities Fee: up to \$386 per semester

This fee is charged per semester to all matriculated students. Full-time equivalent students (12 credits or more) are charged \$386 per semester. The fee is pro-rated per credit hour for part-time students. Funds raised by the fee support the development of new facilities on the Randolph Center and Williston campuses. In billing, the fee is referred to as *VTC Facilities Fee*.

Graduation Fee: \$92

All graduating students are charged a fee prior to graduation and must pay the fee whether they are participating in the ceremony or not. The fee is charged per degree.

Health Insurance Fee: \$1,940 per year or \$1,203 for spring semester

Health insurance is mandatory for all full-time students not otherwise covered. A student (or his/her parents) must present written proof certifying that s/he is covered to be exempted from the college insurance fee. An online Student Waiver form for the VSC Student Health Insurance Plan must be completed by all full-time students. This form can be found on the student menu in Web Services. Students failing to return the form by the published deadline will automatically be enrolled in and billed for the VSC Health Plan.

Institutional Lab Fee: \$60 per lab credit hour

This fee is required to offset the cost of instruction in lab and studio courses.

Late Financial Clearance Fee: \$120

This fee is charged to students who have not paid or provided proof of how their current semester bill will be paid. Financial holds will be activated approximately 30 days into each semester and this fee charged.

Late Registration Fee: \$60

This fee is an additional charge for students who do not complete the semester's class registration process by the published deadline.

Matriculation Fee: \$360

This fee applies to all matriculated students. For new students only, the incoming rate is \$330. There is a one-time charge for first semester enrolled.

Online Support Fee: \$218

This fee is to provide support infrastructure for students in the college's online programs.

Portfolio Assessment Fee: \$50

This fee is for each portfolio submitted for review.

Registration Fee: \$65

This fee is required of each non-degree student who enrolls in one or more courses during a semester.

Returned Payment Fee

There is a \$25 service charge on any payment that is returned to the Student Accounts Office by the banking institution for insufficient funds, invalid accounts, etc. For checks that were received for cash, no future checks will be accepted.

Student Activity Fee: up to \$131 per semester

This fee covers the expense of student clubs, activities, and associated costs. It also covers admission to most campus events such as concerts, dramatic productions, films, and lectures, as well as recreational and social activities.

Transcript Fee: \$5 per copy

This fee covers the cost of processing transcripts after the initial free copy.

Textbooks & Supplies

The college bookstore sells textbooks, supplies, equipment, calculators, and sundries. The cost of required textbooks and supplies varies depending on the program. Typically, these costs amount to approximately \$700 per semester. The bookstore accepts credit cards and cash. Upon approval from the Business Office, students who have financial aid to cover college expenses plus books will be eligible to charge books to their student accounts 30 days prior to the start of each semester.

Automotive Technology and Construction Management students are required to have their own

tools. Contact the directors of these programs for details.

Calculators

The Vermont Tech mathematics department requires all entering students to have a contemporary graphing calculator for use in mathematics classes. For those taking Technical Mathematics and Calculus, the mathematics faculty recommends either a TI-83 or TI-83+ or an HP-48 or HP-49. We highly recommend that students taking a business math or statistics course have the TI-83 or TI-83+. Although calculators may be bought at local stores, they are also available at the Vermont Tech bookstore.

Other Expenses

College students will incur a variety of other expenses such as the costs of travel, social activities, and laundry. The total of these expenses is difficult to judge and can probably best be determined by each student and his or her family. The college estimates these costs at about \$1,650 a year.

Deposits

Accepted candidates for admission to the college are required to send a \$200 tuition deposit by May 1 (or within two weeks if accepted after May 1). The deposit is considered a token of a student's good faith and is applied to the first semester's tuition and fees. Students are not enrolled in classes or billed semester costs until the deposit is paid.

If a student intends to live on campus, a \$100 room deposit must be sent by May 1 (or within two weeks if accepted after May 1) and must accompany an applicant's completed Room and Board Contract. For returning students, the \$100 room deposit is due in early April. Deposits are non-refundable except for a returning student's room deposit if a refund is requested prior to May 1.

Housing deposits will be placed in a holding account until the end of the spring semester, at which time they will be placed on students' accounts and go toward any dorm damage fines that may be incurred for the academic year. Any amount not used for damage will be refunded to the student at the end of May.

Payment Authorization

Students can authorize a parent or guardian or anyone else they choose to access, log in, view, and/or make a payment on their account via the web. Students *must* complete this process, as Student Accounts staff must know who has permission for account reviews when calls or emails are received from people other than the student.

Semester Payment Plans

Fall plans will be available online at <https://portal.vsc.edu> beginning June 1 or when billed. Select the *VSC Bill Payment for Students and Authorized Users* link at the bottom of the page. You must have a log-in ID, a password, and a billing statement to access this service.

We offer four convenient in-house plans:

- Six payments from June through November
- Five payments from July through November
- Four payments from August through November
- Three payments from September through November

There is a \$30 enrollment fee and a down-payment required when signing up based on the option chosen. Monthly payments are due on the 15th of each month and a \$15 late fee is incurred for payments not made by the due date. Semester balances *must be paid in full* prior to enrolling in future semesters. A new payment plan must be set up each semester.

As a condition of enrollment, students must provide payment in full or proof of how all semester charges will be paid within 30 days of billing. Fall billing begins on June 1.

Veterans who are certified as eligible for the GI Educational Assistance allowance will be permitted to register upon signing an approved payment plan with the business office.

Employer and scholarship payments requiring final grades can be deferred.

Financial delinquency may serve as a basis for dismissal. Financially delinquent students will be denied enrollment for the succeeding semester; issuance of grades or transcripts; or graduation. Reasonable interest and collection costs may be added to delinquent accounts.

Refunds

Tuition, Fees, Room, & Board

If students withdraw or are dismissed before the 60% point of the term, they will be credited tuition, the student activities fee, room, and board on a prorated basis. The date of withdrawal or dismissal is determined by the Office of the Registrar. The prorated calculation will use the number of calendar days completed divided by the number of total calendar days included for the full term.

Financial Aid Refunds

If a student is receiving financial aid and is eligible for credit in accordance with the above paragraph, the credit received will first be applied to financial aid sources. Federal regulations will be used for return of Title IV funds and individual state, college, or outside scholarship policies for return of non-Title IV funds. Because financial aid funds must be used for educational expenses, when a student who is receiving financial aid for non-institutional costs withdraws from the college, a portion of this aid must be repaid. The order of distribution for the return of Title IV funds will be as follows:

1. Unsubsidized FFEL/Direct Stafford Loan
2. Subsidized FFEL/Direct Stafford Loan
3. Perkins Loan
4. FFEL/Direct PLUS Loan
5. Pell Grant
6. FSEOG
7. Other Title IV programs

Other Credits

Board charges will be credited for each full week of extended illness or authorized absence. There will be no credit of room charges for students suspended or dismissed from on-campus housing.

Financial Aid

Financial aid at Vermont Tech is based on the assumption that a student's family will make the maximum effort to finance college expenses. Since there are many more demands on Vermont Tech's financial aid resources than the college can possibly meet, assistance from the college has to be viewed only as supplemental to this family obligation.

All federal funds at Vermont Tech are awarded on the basis of financial need. All students who apply for financial aid by the March 1 priority deadline and who are eligible for assistance will be offered financial aid, subject to the availability of these funds. The amount of any award is determined by the amount of the student's need as computed from information provided by the family on the Free Application for Federal Student Aid (FAFSA) www.fafsa.gov. Recent federal regulations mandate that a needs analysis be completed for anyone who applies for federal financial aid. It is important to file the FAFSA as early as possible to avoid delays in processing loan applications and other forms of campus-based aid. After March 1, late applicants will be considered for aid only after all on-time applications have been processed.

Applicants can expect that a fair portion of an individual's personal savings at the time of each year's application will be applied to college expenses.

Students selected for verification will be required to submit additional information and will be sent a tracking letter accordingly. The Office of Financial Aid uses imaging to maintain and track documentation sent to the office and all originals are shredded.

All FAFSA on the Web applicants and parents of dependent applicants who indicate that they *have filed* or *will file* a federal tax return will be directed to use the IRS Data Retrieval Tool to report and/or update their income information on the FAFSA. The FAFSA Data Retrieval Tool is accessible through the FAFSA website: www.fafsa.gov

Expected Family Contribution

The needs analysis system evaluates all of the information requested and determines a reasonable contribution to be expected from parents and the student towards the student's educational expenses. Unless there are extenuating circumstances, the Office of Financial Aid is required to use this expected family contribution in determining a student's need for college aid. If family financial circumstances change significantly after filing the FAFSA (due to loss of employment, extended illness or disability, etc.), the family should write to the financial aid office as soon as possible outlining this change in personal resources.

For the purpose of application, income is defined as wages, salary, tips, interest accrued, dividends, pensions, welfare, social security, or any other form of income. Deductions against income are made for taxes and there is an employment allowance for parents working outside the home, as well as an income protection allowance that is based upon family size and the total number of family members in college.

Sources of Financial Aid

When a FAFSA is filed, you are applying for the following federal, campus-based, and state aid programs and establishing eligibility for a Federal Stafford Loan.

Federal

The *Federal Pell Grant Program* is an entitlement program. This means that all students who are eligible will receive Pell Grant awards. Eligibility is determined by the family's, as well as the student's, financial resources.

Federal Stafford Loans (both subsidized and unsubsidized) are available to qualified students at Vermont Tech. A subsidized loan is awarded on the basis of financial need. If qualified for a subsidized loan, the federal government pays interest on the loan until the student begins repayment and during authorized periods of deferment. The student pays the interest on the unsubsidized loan while enrolled on at least a half-time basis.

If you're a dependent undergraduate student, you can borrow up to:

- \$3,500 if you're a first-year student enrolled in a program of study that is at least a full academic year

- \$4,500 if you've completed your first year of study and the remainder of your program is at least a full academic year
- \$5,500 a year if you've completed two years of study, are matriculated in a bachelor's degree program, and the remainder of your program is at least a full academic year

Additional unsubsidized Stafford loan limits may be increased by \$2,000 for loans first disbursed after July 1, 2008.

Independent undergraduate students may borrow an additional amount of money up to \$4,000 or \$5,000 a year, depending on their year of study. However, through the unsubsidized loan program students can't borrow more than the cost of attendance minus any other financial aid for which they are eligible.

Both the subsidized and unsubsidized loan eligibility amounts will be outlined on a student's award letter.

All Stafford and PLUS loans are processed through the William D. Ford/Federal Direct Loans Program (Direct Loans). Direct Loans provides Stafford and Parent PLUS loans to parents of dependent undergraduate students through the school, funded directly by the government.

PLUS Loans enable parents with good credit histories to borrow for each child who is enrolled at least half-time and is a dependent student. Parents who wish to apply for a PLUS Loan must fill out a PLUS Loan Request Form which is available through the financial aid office. A PLUS loan request form is automatically mailed with financial aid award notification letters. The yearly limit on a PLUS Loan is the cost of attendance minus any other financial aid for which a student is eligible.

150% Rule for Subsidized Loans

On July 6, 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21) (Public Law 112-141) was enacted and limits a first-time borrower's eligibility for Direct Subsidized Loans to a period not to exceed 150% of the length of the borrower's education program. In the summer of 2013, final regulations were completed.

First-time borrowers on or after July 1, 2013 are subject to the provisions in this legislation. Generally speaking, a first-time borrower is one who did not have an outstanding balance of principal or interest on a Direct Loan or FFEL loan on July 1, 2013.

If you are a first-time borrower, this legislation will affect you.

Stated in your entrance counseling information, the subsidized loan has slightly better terms than the unsubsidized loan. In the past, the US Department of Education has paid the interest for a subsidized loan while the student was in school attending class at least half time. If you are a first-time borrower or borrowed in the past and paid back your previous loans and you are now borrowing again, you will be included in this legislation.

MAP-21 will limit the time period during which you can receive Direct Subsidized loans to 150% of the standard length of the program in which you are enrolled. For example, a bachelor's degree program (which is normally completed in four years attending full time) borrowers can only receive subsidized loans for a maximum of six years (150% of 4 years = 6 years). The period used will be reduced for less than full time study. Once you have received direct subsidized loans for your maximum eligibility period, you may continue to receive direct unsubsidized loans and your subsidized loans may begin to accrue interest. This legislation was enacted to encourage students to obtain their degrees within a reasonable time frame.

Federal Aid Programs Administered by the College

The *Federal Supplemental Education Opportunity Grant* (FSEOG) is a gift of money to assist students with the cost of their education. It is restricted to undergraduates and does not have to be repaid. The maximum amount awarded is \$4,000, the amount awarded depending on a student's need and the availability of funds at Vermont Tech. Average grants range from \$600 to \$1,600 per year. Students who are eligible for Pell grants have first consideration for this fund.

The *Federal Perkins Loan Program* is a low-interest (5%) loan made directly to eligible students by the college from federal funds received for this purpose. If qualified, a student may borrow up to \$15,000 during four years of college. At Vermont Tech, average loans range from \$600 to \$2,000 per year.

The *Federal Work-Study Program (FWS)* is a federal work program administered by Vermont Tech which provides jobs for students on or off campus. Average awards range from \$1,200 to \$1,600 for the year, which translates to approximately 10-14 hours of work per week. Students may also use FWS funds for off-campus non-profit community service placements. Federal Work-Study earnings are not credited on a student's bill. Instead, a student worker receives a paycheck every two weeks.

State

Vermont Incentive Grants are awarded on the basis of financial need. Any full-time undergraduate Vermont resident who plans to attend or is enrolled in an approved post-secondary institution and who has not already received a bachelor's degree is eligible to apply.

Students are required to file supplemental information to the Vermont Student Assistance Corporation (VSAC) to be considered for a Vermont State Grant. Online access is available at www.vsac.org

Grants from other states include Maine, Rhode Island, Connecticut, and Massachusetts. These states offer undergraduate grants or scholarships usable at Vermont Tech. Vermont Tech encourages all students eligible for these grants to apply for them. Contact the financial aid office or your high school guidance office to find out which states require supplemental information.

Veterans' Education Benefits

Veterans planning to attend Vermont Tech using the GI Bill should indicate this on their admissions application. Also, please visit the GI Bill website <http://www.benefits.va.gov/gibill> and complete the VA form 22-1990 Application for Educational Benefits online or download it and mail it to:

VA Regional Office
PO Box 4626
Buffalo, NY 14240-4616

After the VA Processes your application, they will send a certificate of eligibility letter to you, a copy of which should be forwarded to:

Vermont Technical College
Attn: Veterans' Certifying Official
PO Box 500
Randolph Center, VT 05061

Once eligibility is established, student enrollment will automatically be certified with the VA every semester that a student is enrolled. If a student does not want to be certified or is no longer eligible for VA benefits, they must notify the Registrar prior to the start of classes.

Veterans need to be prepared to purchase books and have living expenses for the first four to six weeks of classes. The initial payments can be slow, but will be retroactive to the start of the term once they begin.

Veterans must notify the Registrar of any changes in tuition and fees after the initial enrollment certification is completed each semester. Post-9/11 (Chapter 33) students who are also receiving Air National Guard tuition reduction (25%) must notify the Student Accounts Office of this prior to the start of each semester.

The VA determines the BAH rate based on the zip code of the physical location of the school with administrative capability. They will not pay based on the campus the student may actually be attending. For Post-9/11 (Chapter 33) Veterans, the BAH rate for all Vermont Tech students and campuses (with the exception of students attending the Williston campus) is based on the Randolph Center zip code no matter where the student lives or attends classes. Students attending the Williston campus will be paid the Williston BAH.

The first payments from the VA normally arrive four to six weeks from the beginning of the term, so veterans are not required to pay tuition, fees, or room and board prior to receiving their VA benefits. Students may also set up payment plans to stretch out payments over the term if that becomes necessary. The amount of the payments is dependent on eligibility and entitlements. Vermont Tech does not require Advanced Payment requests for current veteran students or applicants.

The *Vermont National Guard State Educational Assistance Program* provides tuition assistance to eligible members of the Vermont National Guard who are enrolled in undergraduate degree and diploma programs at public colleges in Vermont.

Other

Scholarships administered by the college, including the Vermont Tech Scholars program, are available to students who meet the criteria set for each. Contact the Office of Financial Aid for information about scholarships appropriate to your situation or go to the financial aid page on the college website at www.vtc.edu

Vermont Tech also has institutional grants which are awarded based on financial need and/or merit. Financial need is determined by using the same criteria used for awarding campus-based aid. The maximum amount awarded depends upon the availability of funds, as well as student needs.

Satisfactory Academic Progress (SAP)

Federal statutes and regulations require that recipients of federal financial aid must progress at a pace to ensure students complete their degrees with the maximum time frame allowed and must be in good standing based on cumulative GPA requirements.

Students will be reviewed on a semester basis. Students not making SAP (either the pace or the GPA requirement) as described below will lose their financial aid eligibility for all aid types. Students will have to successfully appeal to the Director of Financial Aid in order to continue to receive Title IV aid despite failing SAP standards. Students who are academically dismissed from their programs are automatically recognized as failing to meet SAP standards.

All semesters of enrollment, including summer, must be considered in the determination of SAP, even periods in which the student did not receive federal student aid funds.

- 1. Pace/Time Progression** Students must successfully complete 67% of their attempted courses within the VSC as recorded and documented by the Office of the Registrar. Dropped courses will not be included. Courses from which the student is withdrawn after the end of the add/drop period will be counted toward attempted courses. For financial aid eligibility, total hours attempted, including transfer credits counted toward the degree, cannot exceed 150% of graduation requirements. As an example: if you attempt/enroll in 12 credits for one semester, you must successfully complete 8 of those 12 credits ($12 \times 67\% = 8$).
- 2. GPA Requirement** Students with fewer than 30 attempted credits must maintain a cumulative GPA of 1.75. Students with 30 attempted credits or greater must maintain a cumulative GPA of 2.0 as recorded and documented by the Office of the Registrar.
- 3. Maximum Time Frame** The maximum time frame for students to complete their academic program may not exceed 150% of the published length of the program, measured in credit hours. As an example: If your associate degree program requires 68 credits, the maximum time frame allowed to complete the program would be 102 credits* ($68 \times 150\% = 102$).

**Different programs have different degree requirements. Consult the catalog description for your specific degree program requirements. Students who have reached the maximum time frame will not be eligible for federal financial aid.*

Appeal Process

An appeal is the process by which a student who is not meeting Vermont Tech's SAP standards can petition the school for reconsideration of Title IV eligibility.

A Vermont Tech Satisfactory Academic Progress Appeal form will be sent to each student not making SAP. The form will explain how the student has failed to meet SAP and the steps that the student needs to take to appeal the loss of financial aid. To appeal, students will have to complete the form and submit it, along with all supporting documentation, to the Director of Financial Aid. As part of the appeal, the student must include information regarding why they failed to make SAP and what has changed in their situation that would allow the student to demonstrate SAP at the next evaluation. An appeal must be based on significant mitigating circumstances that seriously impacted academic performance. Examples of mitigating circumstances are: serious illness, severe injury, death of a family member, and other similar situations.

Approval will be based on the likelihood that the student will meet SAP at the next review. Please note that merely filing an appeal does *not* guarantee continued eligibility for federal aid. Students should make every effort to improve their SAP standing, as they will be limited to two SAP appeals.

If a student's appeal is approved, the student will be considered for federal aid during the probationary periods for which the student has applied and is otherwise eligible. Once the probationary period has concluded, the student may re-establish eligibility to be considered for federal aid for a subsequent semester by meeting SAP standards.

Financial Aid Probation: a status assigned by the school to a student who fails to meet SAP and who has appealed and has had eligibility for aid reinstated

Financial Aid Warning: a status assigned to a student who fails to make SAP. The student may continue to receive Title IV aid for one payment period. No appeal is necessary for this status. Students receive a warning that they need to bring their academic standing up to satisfy academic progress standards in their following semester as outlined or they will lose their eligibility for aid.

Appeal Denial: if an appeal for federal financial aid is denied, the decision is final for that semester. The student may re-establish eligibility to be considered for federal aid for a subsequent semester by taking action that brings compliance with the GPA and pace/time progression components of VTC's SAP policy standards.

Special Circumstances

Students with documented disabilities may be allotted additional time for completion of courses.

Change in Degree Program

All credits earned at Vermont Tech plus transfer credits will normally be counted when the student changes degree programs. Each case will be evaluated on its own merit. Students may not extend their period of enrollment by changing their majors after accumulating maximum credits for a program.

Grades & Credits

Courses with grades of *W* (withdrawn), *I* (incomplete), or *F* (failed) are counted as courses attempted but not earned and are also counted toward the maximum time frame.

Credits earned for repeated courses and remedial coursework will not count toward academic progress. Courses graded solely on a pass/fail basis that are accepted toward the academic program are included when measuring academic progress.

Transfer Students

Transfer credits accepted toward the student's academic program or degree count as both attempted and earned credits and are counted when measuring SAP, but do not impact GPA.

Review of Awards

The Director of Financial Aid reserves the privilege of reviewing and revising awards. Therefore, the applicant should notify the Office of Financial Aid immediately if there is a change in either the student's or the family's financial situation. This includes the receipt of non-college scholarships. Financial aid awards may be adjusted upon receipt of such items as family contributions, grants, outside scholarships, and loans. In order to be eligible for financial aid, such resources may not exceed the total costs of attending VTC.

If a student receives an outside scholarship that the college does not know about at the time an award letter is prepared, he or she will be issued a revised award reflecting an adjustment to avoid an over-award situation. Any initial adjustment will be reflected in unmet need, then the self-help (loan and work) before the gift aid portion of the financial aid package is adjusted.

Most financial aid awards are based originally upon the assumption that a student will enroll as a full-time student (12 or more credits per term), unless s/he has notified us to the contrary. If a student changes status from full- to part-time enrollment, an aid adjustment may result. A review of enrollment status is completed each term at the end of the add/drop period; any aid adjustments are made accordingly.

Notice of Federal Student Financial Aid Penalties for Drug Law Violations

Per Federal Financial Aid Regulations 34 CFR 668.40, HEAO Sec. 488(g), amended HEA Sec. 485 (20 U.S.C. 1092), HEA Sec. 485(k):

In compliance with the above regulation, this statement serves as notice that a student who has a drug conviction for any offense during a period of enrollment for which the student was receiving Title IV HEA program funds (Federal Pell, Supplemental Education Opportunity Grant, Federal Work-Study, Federal Perkins Loan, Federal Stafford Loans, Federal PLUS Loans, Federal Grad PLUS Loans) under any federal or state law involving the possession or sale of illegal drugs will result in the loss of eligibility for any Title IV program funds (see above listing of program funds).

General Education Requirements

In aligning General Education goals at Vermont Tech with the college's overall mission, as addressed within both the prescribed and elective areas of the curriculum, these goals are designed to foster within each student an appreciation for the major domains of human achievement; to provide a common educational experience; to refine ethical reasoning, critical thinking, quantitative, reasoning, qualitative reasoning, writing, information literacy, and communication skills; to nurture civic, cultural, and global awareness and responsibility; to celebrate diversity and common values; to foster lifelong learning; and to produce a well-rounded graduate. This philosophy also aligns with Vermont Tech's definition of the Educated Person: *Vermont Tech faculty, staff, and students believe that an educated person is one who assumes responsibility for his/her own learning, for career preparation, and for citizenship. We believe that an educated person consistently strives to reach his/her full potential, can think critically, is globally aware, is civically engaged, is curious, and is an effective communicator.*

The general education requirements (*some of which apply more to baccalaureate than to associate degree*) are intended to result in a graduate being able to:

- Perform tasks expected of professionals in the field
- Learn new concepts, skills, and technologies
- Communicate effectively, both orally and in writing
- Work in groups and interact appropriately with others, in and out of the group
- Understand the scientific process and apply it to real problems
- Understand qualitative reasoning and apply it to real problems
- Understand quantitative reasoning and apply it to real problems
- Understand algorithmic reasoning and apply it to real problems
- Understand the role of aesthetics in solving problems and recognize alternatives
- Consider appropriate alternatives and weigh competing priorities when engaged in decision-making
- Understand the breadth of cultural enrichment activities available in today's society
- Understand the breadth of personal enrichment activities available in today's society
- Develop and maintain a suite of skills necessary to maintain one's emotional, physical, and financial well-being
- Use sustainable practices in decisions and actions
- Understand the effects of change on organizations
- Understand the cultural impact of decisions and actions
- Consider the effects of changing technology on actions and plans
- Use ethical reasoning in decision-making

The college does not guarantee that general education or elective courses will be available and reserves the right to withdraw or restrict any offering if registration exceeds class capacity, an insufficient number of students enroll in the course, or the availability of faculty or other resources are limited. This does not waive the imperative for students to complete each requirement prior to receiving a degree. Some courses offered by major departments may fulfill the elective requirements, but only for students who are not majoring in the department where these courses are offered and only if General Education Task Force and the Dean of Academic Affairs have approved the courses for elective credit.

Course requirements also may be fulfilled by simultaneous enrollment at other VSC schools under the VSC consortium agreement. Students may not use one course to meet more than one requirement within their program except in meeting a graduation standard or a dual major/degree requirement.

Students should work with their advisors to develop a plan to meet the general education elective requirements without requiring additional class loads or semesters at the college.

Associate degree requirements (20 credits minimum): Depending on specific program requirements, each associate degree student will complete a minimum of the following general education requirements:

- 3 credits of English (composition, writing, and research)
- 3 credits of technical communication
- 4 credits of natural or physical sciences

- 1 credit of information technology
- 6 credits of arts/humanities or social sciences
- 3 credits of mathematics/critical thinking

Bachelor's degree requirements (40 credits minimum): Depending on specific program requirements, each bachelor's degree student will complete a minimum of the following general education requirements:

- 3 credits of English (composition, writing, and research)
- 3 credits of technical communication
- 12 credits of arts/humanities or social sciences (3 credits minimum at the 3000 level)
- 4 credits of information technology
- 8 credits of natural or physical sciences
- 6 credits of mathematics/critical thinking
- 4 credits other general education electives (see list of subjects below)

Information Technology Requirements

Each student will be introduced to computer information technology to include internet orientation, research, e-mail, word processing, and computer software applications applicable to their field of study.

Mathematics/Critical Thinking Requirements

Each student will complete the mathematical or empirical technique for problem solving in logic and critical thinking appropriate for their program of study. In addition to the regular mathematics offerings, there are other courses under separate subject listings that will satisfy the logic and critical thinking component of this requirement.

Natural Sciences Requirements

Students will be introduced to natural or physical sciences, including a laboratory experience. The course of study is determined by the major and can be filled by coursework available as electives. These science courses include BIO, CHE, and PHY, as well as appropriate coursework under other subject listings.

English Requirements

Each student will complete English Composition or an equivalent course or sequence of courses that will emphasize reading and writing and will require the successful completion of a research paper. Degree students may satisfy the English Composition requirements by completing one of the following, as determined by placement: ENG 1042 and 1060; ENG 1060; ENG 1061. Students who do not place into ENG 1060 or 1061 may take ENG 1042 and 1060 to complete English composition requirements. This might require summer courses or additional terms.

Each student will complete ENG 2080 or an equivalent course that emphasizes the principles and forms of communication in the workplace, including a technical report. Each student will complete coursework that emphasizes effective speaking, organization, and presentation skills.

Arts & Humanities & Social Sciences Electives (AH/SS)

Each degree student will be exposed to the methods of inquiry and major concepts in the arts and humanities and to an understanding of human behavior, personality, politics, and economics as well as the social context of human interaction. Courses at the lower level will be offered in survey-type and special topics courses to expose students to a broad array of concepts and to enhance reading, writing, and communication skills. Courses at the upper level will be more in-depth and will require a higher level of student learning and understanding. SS electives will include survey-type courses from the following areas: economics, geography, history, psychology, and social science. For the current year's offerings, see the Academic Scheduling page on the college's website. INT 1005 and the capstone general education course are considered to have both AH and SS content.

Graduation Standards

In addition to required coursework, all Vermont Tech graduates will satisfy four additional graduation standards in written communication, oral communication, information literacy, and quantitative reasoning. These standards will be met and evaluated separately for each standard and must be passed at either an associate level competency or a bachelor's level competency prior to degree conferral (see page 28 for more details).

Minors, Concentrations, & Specializations

The Business Management Technology department offers a minor or concentration in Entrepreneurship and a specialization in Small Business Planning.

A minor is a secondary area of interest that often complements a major or it may be a completely different area of study which serves to balance the student's educational experience and life preparation. A student who satisfies the minor requirements for their area of major study may earn a concentration. Although not a degree requirement of the college, minors and concentrations allow students to group related courses into an organized field of study. Minors require a minimum of 18 credits of related study and a minimum GPA of 2.0 for those credits.

There are no limits to the number of minors that a student may earn. Students apply for a minor in their junior year or by permission of the host department. Students may take courses related to the minor prior to their junior year provided they meet the course requirements. Applying for a minor requires completion of a *Declaration of Intention to Complete a VTC Minor* form. Applicants must be in good academic standing. Graduates of Vermont Tech with a bachelor's degree may not earn a minor.

Minor in Entrepreneurship

In this minor for non-Business bachelor's degree majors, students must take the following courses. No more than nine credits of the minor may be applied to the major degree requirements.

| | | |
|--------------------|------------------------------------|----------|
| BUS 2041 | Entrepreneurship I | 3 |
| BUS 2210 | Small Business Management | 3 |
| BUS 2260 | Principles of Financial Management | 3 |
| BUS 2721 | Business Planning Seminar | 3 |
| BUS 3041 | Entrepreneurship II | 3 |
| Select one: | | |
| ACC 1020 | Survey of Accounting | 3 |
| ACC 2121 | Financial Accounting | <u>3</u> |
| | | 18 |

Concentration in Entrepreneurship

In this concentration for Business bachelor's degree majors, students must take the courses in the previous table. No more than nine credits of the minor may be applied to the major degree requirements.

Specialization in Small Business Planning

In this specialization open to all students (including non-degree), students must take the following courses. All credits may be applied toward graduation requirements.

| | | |
|--------------------|------------------------------------|----------|
| BUS 2210 | Small Business Management | 3 |
| BUS 2260 | Principles of Financial Management | 3 |
| BUS 2721 | Business Planning Seminar | 3 |
| Select one: | | |
| ACC 1020 | Survey of Accounting | 3 |
| ACC 2121 | Financial Accounting | <u>3</u> |
| | | 12 |

Agribusiness Management Technology

Graduates of this program generally pursue careers with the industries and agencies that serve production agriculture. Some typical career choices include: sales and service representatives for feed, fertilizer, and equipment industries; inspectors of milk and other agricultural products; rural credit officers; or specialists with agencies such as the Dairy Herd Improvement Association, the Soil Conservation Service, and the Peace Corps.

Students benefit from the combination of classroom instruction and practical laboratory experience, which includes use of the extensive facilities at the college farms. In addition to the important basics in plant and animal agriculture, the program emphasizes business and communication skills.

Students who complete a degree in Agribusiness Management Technology can transfer seamlessly into bachelor's programs in Business or Diversified Agriculture.

Students with an Associate of Applied Science in Agribusiness Management Technology will:

- Understand the income and expense sources of varied agricultural businesses
- Adequately prepare and assess an agribusiness business plan
- Prepare income and expense accounts
- Understand marketing principles
- Understand small business management including payroll and human resources
- Competently represent agriculture in all venues

The normal number of credits required for the degree is 64.

First Year

| Fall Semester | | Spring Semester | | |
|----------------------|------------------------------|------------------------|----------------------------------|----------|
| ACC 2121 | Financial Accounting | 4 | ACC 1010 Computerized Accounting | 3 |
| AGR 1011 | Agricultural Techniques I | 2 | ACC 2122 Managerial Accounting | 4 |
| AGR 1050 | Livestock Production | 3 | AGR XXXX Agriculture elective | 2-4 |
| ENG 10XX | English | 3 | ENG 2080 Technical Communication | 3 |
| LAH 1020 | Introduction to Horticulture | 3 | LAH 1050 Introduction to Soils | <u>4</u> |
| MAT 1210 | Principles of Mathematics | <u>3</u> | | |
| | | 18 | | 16-18 |

Second Year

| Fall Semester | | Spring Semester | | |
|----------------------|---------------------------------|------------------------|-------------------------------------|------------|
| BUS 2210 | Small Business Management | 3 | BUS 2230 Principles of Marketing | 3 |
| CHE 1020 | Introduction to Chemistry | 4 | BUS 2410 Human Resource Management | 3 |
| CIS 1080 | Intro Spreadsheet/Database Mgmt | 2 | ELE XXXX AH/SS elective | 3 |
| ELE XXXX | AH/SS elective | 3 | XXX XXXX Program/technical elective | <u>3-4</u> |
| Select two: | | | | |
| AGR 2040 | Forage Production | 3 | | |
| BUS 2020 | Principles of Management | 3 | | |
| BUS 2260 | Principles of Financial Mgmt | 3 | | |
| BUS 2270 | Organizational Communication | 4 | | |
| BUS XXXX | Business elective | <u>3</u> | | |
| | | 18-19 | | 12-13 |

Applied Business Management

Graduates of this program will possess high-tech applied skills combined with management and leadership skills directly related to the use of technology in business and industry. The course content and sequence link with functional management areas through case studies and real-world situations. The focus throughout is how technical skills, interpersonal skills, and technology help to build a competitive strength in business.

The Applied Business Management degree focuses on high-tech applied business skills, as well as management and leadership skills directly related to career growth.

Applied Business Management is a degree-completion program that is offered entirely online. Students must have at least 50 transferrable credits to be eligible to apply for the degree.

Students with a Bachelor of Science in Applied Business Management will be able to:

- Understand the accounting cycle including the processing and recording of typical cash receipts, cash payments, sales, vendor, and payroll transactions on an accrual and cash basis; interpret financial statements and prepare budgets; and apply financial information to broad-based business decision making
- Write business letters, memos, email messages, instant messages, and blog posts; create reports using accurate research methods and citations; and develop and deliver an effective oral team presentation on a strategic business topic. Students will be introduced to additional document and communication collaboration systems
- Understand the structure and function of human behavior in organizations and how behavioral influences impact productivity, organizational effectiveness, and efficiency at the individual, small group, and organizational levels
- Develop marketing strategies to satisfy specific target audiences and create a marketing mix using the “4 Ps” of product, price, place, and promotion and apply and integrate marketing concepts with other business disciplines to affect a business strategy
- Perform human resources functions in the areas of selecting, training, and evaluating personnel and identify best practices in employee training, development, appraisal, and rewards
- Understand the basic operations, tools, and production functions of an organization involved in the efficient and effective production and delivery of goods and services
- Understand the genesis of project, program, and portfolio management and use the tools and techniques involved in initiating, planning, executing, monitoring, controlling, and closing projects
- Understand the key characteristics and terminology of the business disciplines of management, human resources, marketing, and finance and integrate these disciplines to develop and affect corporate strategies and plans

The normal number of credits required for the degree is 121.

| | Core Courses | Credits |
|-------------|------------------------------------|----------------|
| ACC 2121 | Financial Accounting | 4 |
| BUS 2020 | Principles of Management | 3 |
| BUS 2230 | Principles of Marketing | 3 |
| BUS 2260 | Principles of Financial Management | 3 |
| BUS 2410 | Human Resources Management | 3 |
| BUS 2440 | Intro to Business Law | 3 |
| BUS 3150 | Production & Operations Management | 3 |
| BUS 3250 | Organizational Behavior & Mgmt | 3 |
| BUS 3410 | Business Ethics | 3 |
| BUS 4080 | Business Policy & Strategy Dvlpmnt | 3 |
| BUS 4310 | Business Information Architecture | 3 |
| BUS 4530 | Technical Project Management | 3 |
| BUS 4730 | Senior Project | 3 |
| ELE XXXX | AH/SS elective | 3 |
| ELE XXXX | AH/SS elective | 3 |
| ELE 3/4XXX | Upper level AH/SS elective | 3 |
| ENG 106X | English | 3 |
| ENG 2080 | Technical Communication | 3 |
| INT 1005 | Self, Career, & Culture | 3 |
| MAT 1221 | Finite Mathematics | 3 |
| MAT 2021 | Statistics | 3 |
| SCI XXXX | Laboratory science elective | 4 |
| Select one: | | |
| ECO 2020 | Macroeconomics | 3 |
| ECO 2030 | Microeconomics | 3 |

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Note: all courses or equivalent coursework must be completed. All coursework from an accredited institution not used to meet the core requirement may be used toward the 120 credit minimum provided that it does not duplicate other coursework being used.

Architectural & Building Engineering Technology

Graduates of this program are prepared for a wide range of careers in the constructed-facilities industry, including those in sustainable, energy-efficient, and environmentally-conscious fields, at the technical and design support level. Graduates understand the importance of teamwork and of the economic, social, and environmental consequences of choices made in the exciting building industry. They typically enjoy positions with architects, engineers, and building contractors and provide all levels of support to the building industry in manufacturing, sale, and governmental administration. Graduates of the program are also prepared to advance to bachelor's degree programs in architecture or engineering to further enhance their abilities to affect positive change in the world.

Graduation from the program at the associate level allows students an ideal opportunity to make an informed decision relative to their career paths. This "decision platform" offered to students completing their associate degree is one of the program's greatest strengths. Students may continue on into a bachelor of science degree program in Architectural Engineering Technology, Construction Management, or Business Technology & Management. Some program graduates transfer to other schools of architecture or engineering to continue working toward a bachelor's or other degree in these fields.

Educational objectives for students with an Associate of Applied Science in Architectural and Building Engineering Technology include:

- **Graphic communication skills:** Graduates are able to use freehand sketches, board drafting, presentation graphics, and CAD as tools for design and communication
- **Communication skills:** Graduates are able to communicate technical information in writing, speaking, listening, and interpersonal skills to work effectively as part of a team and to interact effectively with clients, the public, and others
- **Technical skills:** Graduates understand residential and commercial building systems, materials, and regulations; apply that knowledge to site layout and material estimating; and use appropriate computer applications
- **Architectural design:** Graduates demonstrate knowledge of historical precedents and aesthetics and use design principles (including energy use, conservation, and sustainability concepts) as part of a process to create workable building designs
- **Engineering design:** Graduates understand design principles and apply procedures in the design of building engineering systems in the areas of building structures, HVAC, plumbing, electrical, and lighting with emphasis on energy use, conservation, and sustainability concepts

Students with an Associate of Applied Science in Architectural and Building Engineering Technology will be able to:

- Apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly-defined engineering technology activities
- Apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge
- Conduct standard tests and measurements and conduct, analyze, and interpret experiments
- Function effectively as a member of a technical team
- Identify, analyze, and solve narrowly-defined engineering technology problems
- Apply written, oral, and graphical communication in both technical and non-technical environments and identify and use appropriate literature
- Understand the need for and possess an ability to engage in self-directed continuing professional development
- Understand and commit to addressing professional and ethical responsibilities, including a respect for diversity
- Commit to quality, timeliness, and continuous improvement
- Utilize instruments, methods, software, and techniques that are appropriate to produce A/E documents and presentations
- Utilize measuring methods that are appropriate for field, office, or laboratory

- Apply fundamental computational methods and elementary analytical techniques in sub-disciplines related to architectural engineering

The program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

The normal number of credits required for the degree is 65.

First Year

| Fall Semester | | Spring Semester | | |
|----------------------|-------------------------------|------------------------|---|----------|
| ARE 1000 | ARE Freshman Seminar | 1 | ARE 1210 Construction Materials & Methods | 5 |
| ARE 1011 | Intro to Construction Drawing | 3 | INT 1005 Self, Career, & Culture | 3 |
| ARE 1220 | Architectural History | 3 | MAT 1312 Precalculus II | 3 |
| ENG 10XX | English | 3 | PHY 1042 Physics II | <u>4</u> |
| MAT 1311 | Precalculus I | 3 | | |
| PHY 1041 | Physics I | <u>4</u> | | |
| | | 17 | | 15 |

Second Year

| Fall Semester | | Spring Semester | | |
|----------------------|---------------------------------|------------------------|-------------------------------------|----------|
| ARE 2031 | Environmental Systems I | 3 | ARE 2032 Environmental Systems II | 3 |
| ARE 2040 | Construction Practices | 3 | ARE 2052 Architectural Design II | 3 |
| ARE 2051 | Architectural Design I | 3 | ARE 2720 Arc & Building Eng Seminar | 1 |
| CET 2040 | Statics & Strength of Materials | 4 | CET 2120 Structural Design | 3 |
| MAT 1520 | Calculus for Engineering | <u>4</u> | ELE XXXX AH/SS elective | 3 |
| | | | ENG 2080 Technical Communication | <u>3</u> |
| | | 17 | | 16 |

Architectural Engineering Technology

Graduates of this bachelor's program receive broad-based preparation to succeed in numerous challenging twenty-first century career opportunities in the building design and construction industries. Education in this area provides the opportunity to merge "green", environmentally sustainable, and socially conscious career aspirations with competitive salaries and the satisfaction of seeing creative, energy-efficient designs become reality. Within the scope of the discipline fall such diverse areas as structural engineering; HVAC design; electrical and lighting design; plumbing and fire protection; construction management; and facilities management.

Students may enroll as freshman candidates for the bachelor's degree or may choose to enroll first as associate degree candidates and defer a decision on bachelor's candidacy until the second year. Transfer students from other two- and four-year architecture and engineering programs are encouraged to apply.

The bachelor's program builds on the foundation established in the associate program in structures, HVAC, plumbing, electrical, and integrated sustainable design. The scope of the curriculum is also extended to include such fields as thermodynamics, fluid mechanics, electrical circuits, lighting systems, AE management, and advanced math. Advanced computer applications are included. Throughout the curriculum, teamwork, creativity, and "green" solutions to building needs complement rigorous traditional engineering-based instruction.

Graduates are allowed to sit for the Fundamentals of Engineering examination in many states and, after meeting state requirements for appropriate work experience, may also be examined for the Professional Engineer designation in many states.

Educational objectives for graduates with a Bachelor of Science in Architectural Engineering Technology that are demonstrated during their workforce careers (in addition to all of the outcomes included in the associate program) include:

- **Technical design:** Graduates are able to design and integrate complex systems into the building form, emphasizing human comfort and resource conservation, incorporating expertise in a single engineering discipline
- **Communication skills:** Graduates use computer-aided design and drafting to communicate complex building systems and exhibit expanded oral presentation skills to effectively explain technical designs; graduates have also improved their interpersonal skills for team efforts and for interacting with clients, the public, and others
- **Structural engineering design:** Graduates use principles and procedures to analyze and design structures in steel, concrete, and other materials while addressing sustainability issues
- **Mechanical engineering design (HVAC & plumbing systems):** Graduates use principles and procedures to analyze and design building mechanical systems, including the use of energy conservation and sustainability concepts
- **Electrical & lighting engineering design:** Graduates use principles and procedures to analyze and design energy efficient building electrical and lighting systems
- **Engineering management:** Graduates understand and apply the principles of management for engineering business and project administration

In addition to the student outcomes included in the associate program, students with a Bachelor of Science in Architectural Engineering Technology will be able to:

- Select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities
- Select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies
- Conduct standard tests and measurements and conduct, analyze, and interpret experiments and apply experimental results to improve processes
- Design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives
- Function effectively as a member or leader of a technical team
- Identify, analyze, and solve broadly-defined engineering technology problems

- Know the impact of engineering technology solutions in a societal and global context
- Create, utilize, and present design, construction, and operations documents
- Perform economic analyses and cost estimates related to design, construction, and maintenance of building systems
- Select appropriate materials and practices for building construction
- Apply principles of construction law and ethics in architectural practice
- Perform standard analysis and design in at least one recognized technical specialty within architectural engineering technology that is appropriate to the goals of the program

The program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

The normal number of credits required for the degree is 124.

Third Year

| Fall Semester | | | Spring Semester | | |
|----------------------|--------------------------------|----------|------------------------|-----------------------------|----------|
| ARE 3020 | Structural Analysis | 3 | ARE 2022 | Architectural CAD II | 3 |
| ARE 3111 | Codes & Loads: Structural | 1 | ARE 3010 | Design Systems Integration | 3 |
| ARE 3112 | Codes & Loads: Mech/Electrical | 1 | ARE 3030 | Steel Structures Design | 3 |
| CHE 1031 | General Chemistry I | 4 | ARE 3040 | Electrical/Lighting Systems | 3 |
| ELT 2071 | Basic Electricity | 3 | ARE 3050 | Fluids/Thermodynamics | <u>4</u> |
| MAT 2532 | Calculus II | <u>4</u> | | | |
| | | 16 | | | 16 |

Fourth Year

| Fall Semester | | | Spring Semester | | |
|----------------------|--------------------------------|----------|------------------------|--------------------|----------|
| ARE 4010 | Concrete Structures Design | 3 | ARE 4040 | Plumbing Systems | 3 |
| ARE 4020 | Architectural Engineering Mgmt | 3 | ARE 4720 | ARE Senior Project | 4 |
| ARE 4030 | HVAC Systems | 4 | ELE XXXX | AH/SS elective | 3 |
| ARE 4050 | FE Exam Survey | 1 | XXX XXXX | Technical elective | <u>3</u> |
| ELE 3XXX | Upper level AH/SS elective | <u>3</u> | | | |
| | | 14 | | | 13 |

Automotive Technology

Graduates of this program will have the knowledge and skills necessary to maintain, diagnose, and repair mechanical and electronic systems in any automobile or light/medium-duty truck. The comprehensive nature of the program ensures that graduates are prepared to solve problems on vehicles regardless of origin. The combination of technical knowledge, program philosophy, and emphasis on lifelong learning prepares the graduate with a solid foundation for success in all aspects of the automotive technology profession.

Throughout the curriculum, faculty and staff reinforce the principles of professional ethics, critical thinking, and problem solving as they are applied to the workplace. Students are also introduced to basic business management practices.

Students are required to wear black jeans and steel-toed leather work or hiking boots in all laboratory sections. The college will provide t-shirts.

Student learning outcomes for the Associate of Applied Science in Automotive Technology include:

- Understanding the theory of operation, plus diagnostic and service procedures of engines; brakes; suspension and steering systems; electrical and electronic systems; drive-train systems; engine performance; advanced technology vehicles; automatic transmissions; and automotive heating and air-conditioning systems
- Communicating effectively with customers and business relations
- Exhibiting the principles of professional conduct in all aspects of customer relations

Students must have in their possession a set of tools for use in the laboratory and during the summer cooperative work experience.

This program has been developed with the support and encouragement of the Vermont Automobile Dealer's Association.

The normal number of credits required for the degree is 65.

First Year

| Fall Semester | | | Spring Semester | | |
|------------------------|-----------------------------------|----------|-----------------|-----------------------------------|----|
| ATT 1010 | Suspension & Steering | 3 | ATT 1050 | Alignment & Brakes | 4 |
| ATT 1070 | Automotive Engine Laboratory | 1 | ATT 1110 | Automotive Electrical Systems Lab | 1 |
| ATT 1090 | Automotive Electronics Laboratory | 1 | CIS 1050 | Intro to Spreadsheets | 1 |
| ENG 10XX | English | 3 | ELE XXXX | AH/SS elective | 3 |
| GTS 1020 | Engine Diagnostics & Repair | 3 | GTS 1040 | Vehicle Electrical Systems | 3 |
| GTS 1120 | Vehicle Electronics | 3 | PHY 1030 | General Physics | 4 |
| MAT 1210 | Principles of Mathematics | <u>3</u> | | | |
| | | 17 | | | 16 |
| Summer Semester | | | | | |
| | | | ATT 2801 | ATT Summer Internship | 0 |

Second Year

| Fall Semester | | | Spring Semester | | |
|---------------|------------------------------|----------|-----------------|-------------------------------|----------|
| ATT 2010 | Engine Performance | 4 | ATT 2030 | Adv Engine Performance & Fuel | 4 |
| ATT 2020 | Body Electronics Systems | 4 | ATT 2040 | Automotive Drive Trains | 4 |
| ATT 2802 | ATT Summer Internship Review | 1 | ATT 2060 | Advanced Technology Vehicle | 4 |
| BUS 2210 | Small Business Management | 3 | ENG 2080 | Technical Communication | 3 |
| ELE XXXX | AH/SS elective | <u>3</u> | MEC 1020 | Manufacturing Processes I | <u>2</u> |
| | | 15 | | | 17 |

Business Technology & Management

Graduates of this program enjoy a wide range of career options in business, industry, government, and public institutions. They may be office managers; staff accountants; accounting specialists; marketing and communication coordinators; sales and customer service managers; project managers; or small business owners. As an alternative to immediate employment, graduates may choose to enroll in the bachelor's degree program at Vermont Tech or they may transfer to a bachelor's degree program elsewhere with majors such as marketing or accounting.

Highlights of the program include a formal business dinner where students dress in professional attire and learn the rules of formal dining. Students also learn resumé writing and job interview skills and attend a "mocktail" reception and interview. Seniors complete a capstone project which includes a team oral presentation judged by professionals from business and industry.

Students with an Associate of Applied Science in Business Technology & Management will be able to:

- Complete the steps of the accounting cycle, including processing and recording typical cash receipts, cash payments, sales, vendor, and payroll transactions; prepare and interpret financial statements for service and merchandising businesses on an accrual basis; and understand module integrated accounting software and use Peachtree software to record and process typical transactions and prepare financial statements
- Use Microsoft Word, Excel, PowerPoint, and Access to create business documents and use Microsoft Publisher to design and develop newsletters, brochures, and other promotional materials. Students will be introduced to additional document and communication collaboration systems
- Write business letters, memos, email messages, instant messages, and blog posts; create reports using accurate research methods and citations; and develop and deliver an effective oral presentation
- Understand the psychology of face-to-face communication and the role of non-verbal communication; demonstrate successful team skills, effective listening, and professional behavior; effectively utilize resume-writing, interviewing, and job-seeking skills to advance their career goals
- Understand the key characteristics and terminology of the business disciplines of management, human resources, marketing, and finance

The normal number of credits required for the degree is 61.

First Year

| Fall Semester | | | Spring Semester | | |
|----------------------|------------------------------|----------|------------------------|-------------------------------|------------|
| ACC 2121 | Financial Accounting | 4 | ACC 1010 | Computerized Accounting | 3 |
| BUS 1010 | Introduction to Business | 3 | BUS 1052 | Computer Apps for Business II | 3 |
| BUS 1051 | Computer Apps for Business I | 3 | ENG 2080 | Technical Communication | 3 |
| ENG 10XX | English | 3 | INT 1005 | Self, Career, & Culture | 3 |
| MAT 1210 | Principles of Mathematics | <u>3</u> | Select one: | | |
| | | | ACC 2122 | Managerial Accounting | 4 |
| | | | BUS 2210 | Small Business Management | 3 |
| | | | BUS 2440 | Introduction to Business Law | 3 |
| | | | CIS 1151 | Website Development | 3 |
| | | | XXX XXXX | Program elective | <u>3-4</u> |
| | | 16 | | | 15-17 |

Second Year

| Fall Semester | | | Spring Semester | | |
|----------------------|------------------------------------|------------|------------------------|---------------------------|------------|
| BUS 2020 | Principles of Management | 3 | BUS 2132 | Management Applications | 3 |
| BUS 2131 | Writing Electronic & Social Media | 3 | BUS 2230 | Principles of Marketing | 3 |
| BUS 2270 | Organizational Communication | 3 | BUS 2410 | Human Resource Management | 3 |
| ELE XXXX | AH/SS elective | 3 | Select two: | | |
| Select one: | | | BUS 2720 | Business Seminar | 3 |
| BUS 2041 | Entrepreneurship I | 3 | BUS 2721 | Business Planning Seminar | 3 |
| BUS 2210 | Small Business Management | 3 | XXX XXXX | Program elective | <u>3-4</u> |
| BUS 2260 | Principles of Financial Management | 3 | | | |
| BUS 2440 | Introduction to Business Law | 3 | | | |
| BUS 2820 | Business Intern & Career Seminar | 3 | | | |
| CIS 1151 | Website Development | 3 | | | |
| SCI XXXX | Science elective | 4 | | | |
| XXX XXXX | Program elective | <u>3-4</u> | | | |
| | | 15-16 | | | 15 |

Bachelor of Science in Business Technology & Management

Graduates of this program will possess high-tech applied skills combined with management and leadership skills directly related to the use of technology in business and industry. The course content and sequence link with functional management areas through case studies and real-world situations. The focus throughout is how technical skills, interpersonal skills, and technology help to build a competitive strength in business.

Students may enroll in the Business Technology and Management degree as freshman or they may enter as transfer students. Classes are offered in face-to-face format.

Students with a Bachelor of Science in Business Technology & Management will be able to:

- Understand the accounting cycle including the processing and recording of typical cash receipts, cash payments, sales, vendor, and payroll transactions on an accrual and cash basis; interpret financial statements and prepare budgets; and apply financial information to broad-based business decision making
- Write business letters, memos, email messages, instant messages, and blog posts; create reports using accurate research methods and citations; and develop and deliver an effective oral team presentation on a strategic business topic. Students will be introduced to additional document and communication collaboration systems
- Understand the structure and function of human behavior in organizations and how behavioral influences impact productivity, organizational effectiveness, and efficiency at the individual, small group, and organizational levels
- Develop marketing strategies to satisfy specific target audiences and create a marketing mix using the “4 Ps” of product, price, place, and promotion; apply and integrate marketing concepts with other business disciplines to affect a business strategy
- Perform human resources functions in the areas of selecting, training, and evaluating personnel; identify best practices in employee training, development, appraisal, and rewards
- Understand the basic operations, tools, and production functions of an organization involved in the efficient and effective production and delivery of goods and services
- Understand the genesis of project, program, and portfolio management; use the tools and techniques involved in initiating, planning, executing, monitoring, controlling, and closing projects
- Understand the key characteristics and terminology of the business disciplines of management, human resources, marketing, and finance and integrate these disciplines to develop and affect corporate strategies and plans

The normal number of credits required for the degree is 120.

| | Core Courses | Credits |
|--------------------|---|----------------|
| ACC 1010 | Computerized Accounting † | 3 |
| ACC 2121 | Financial Accounting | 4 |
| BUS 2020 | Principles of Management | 3 |
| BUS 2131 | Writing for Electronic & Social Media † | 3 |
| BUS 2132 | Management Applications † | 3 |
| BUS 2230 | Principles of Marketing | 3 |
| BUS 2260 | Principles of Financial Management | 3 |
| BUS 2270 | Organizational Communication † | 4 |
| BUS 2410 | Human Resources Management | 3 |
| BUS 2440 | Introduction to Business Law | 3 |
| BUS 3150 | Production & Operations Management | 3 |
| BUS 3250 | Organizational Behavior & Mgmt | 3 |
| BUS 3410 | Business Ethics | 3 |
| BUS 4080 | Business Policy & Strategy Dvlpmnt | 3 |
| BUS 4310 | Business Information Architecture | 3 |
| BUS 4530 | Technical Project Management | 3 |
| BUS 4730 | Senior Project | 3 |
| ELE XXXX | AH/SS elective | 3 |
| ELE XXXX | AH/SS elective | 3 |
| ELE 3XXX | Upper level AH/SS elective | 3 |
| ENG 106X | English Composition | 3 |
| ENG 2080 | Technical Communication | 3 |
| INT 1005 | Self, Career, & Culture | 3 |
| MAT 1221 | Finite Mathematics | 3 |
| MAT 2021 | Statistics | 3 |
| SCI XXXX | Science elective | 4 |
| Select one: | | |
| ECO 2020 | Macroeconomics | 3 |
| ECO 2030 | Microeconomics | 3 |
| Select one: | | |
| BUS 2720 | Business Seminar | 3 |
| BUS 2721 | Business Planning Seminar | 3 |

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Note: All core courses or equivalent coursework must be completed. The above courses marked with a † will be waived for students who have an associate degree or a minimum of 50 credits prior to entering the program.

All coursework from an accredited institution not used to meet the core requirement may be used toward the 120 credit minimum provided that it does not duplicate other coursework being used.

After completion of the BS.BUS degree, the graduate who meets the minimum standards as outlined in the Vermont Tech/Clarkson University articulation agreement for a one year Masters Degree in Business Administration (MBA) may be admitted into the Clarkson program.

Civil & Environmental Engineering Technology

Pursuing a degree in Civil & Environmental Engineering Technology will prepare students to help address the major infrastructure challenges of the 21st century. The Civil & Environmental Engineering Technology program prepares graduates for careers in civil engineering; surveying; materials testing; construction; structural design; water and wastewater treatment; storm water design; and solid waste management. Students are thoroughly prepared for opportunities to work outdoors on construction and surveying projects or indoors in design and estimating offices.

The hallmark of a degree in Civil & Environmental Engineering Technology is the applied learning gained from studying theory in the classroom and applying that knowledge in a laboratory setting. The program's laboratories are well-equipped and include modern surveying equipment; a high-tech stream table to study open channel flow; soils and material testing equipment; and state-of-the-art computer stations. Sophisticated computer-aided design (CAD) software is used extensively in the curriculum.

Graduates of this program are highly regarded and find work with engineering firms, government agencies, construction firms, and testing laboratories. Graduates also have the potential to obtain professional licensure as site designers, land surveyors, or engineers and may also obtain professional certification in erosion and sediment control.

Students who complete the Civil & Environmental Engineering Technology program are eligible to pursue a bachelor's degree in Vermont Tech's Architectural Engineering Technology or Construction Management programs.

The educational objectives of the Associate of Engineering in Civil & Environmental Engineering Technology program are for graduates to:

- Perform in the workforce with confidence in the use of CAD software and the ability to create site plans from raw survey data, design sewage disposal systems, and develop profiles and cross-sections for highway design
- Communicate technical information in writing, speaking, listening, and interpersonal skills to work effectively as part of a team in the workforce
- Understand the principles of plane surveying, water/wastewater treatment, engineering materials, and estimating quantities and, using appropriate computer applications, apply that knowledge as a consultant in the workforce
- Be able to understand design principles and function actively as part of a design team in the workforce with acquired skills and the knowledge of building materials and structures, site development, and estimating quantities
- Develop the skills and ability needed to continue learning through formal education or adapt to changing technologies in the workplace

Students with an Associate of Engineering in Civil & Environmental Engineering Technology will be able to:

- Apply the knowledge, techniques, skills, and modern tools in Civil & Environmental Engineering Technology to narrowly-defined engineering technology activities
- Apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited applications of principles but extensive practical knowledge
- Conduct standard tests and measurements and conduct, analyze, and interpret experiments
- Function effectively as a member of a technical team
- Identify, analyze, and solve narrowly defined engineering technology problems
- Apply written, oral, and graphical communication in both technical and non-technical environments and identify and use appropriate literature
- Understand the need for and have the ability to engage in self-directed continuing professional development
- Understand and commit to addressing professional and ethical responsibilities, including a respect for diversity
- Possess a commitment to quality, timeliness, and continuous improvement

The program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

The normal number of credits required for the degree is 65.

First Year

| Fall Semester | | | Spring Semester | | |
|----------------------|-------------------------------|----------|------------------------|--------------------------------|----------|
| CET 1000 | CET Freshman Orientation | 1 | CET 1020 | Engineering Materials | 3 |
| CET 1011 | Surveying I | 3 | CET 1032 | Eng/Surveying Computer Apps II | 2 |
| CET 1031 | Eng/Surveying Computer Apps I | 2 | ENG 2080 | Technical Communication | 3 |
| CHE 1031 | General Chemistry I | 4 | INT 1005 | Self, Career, & Culture | 3 |
| ENG 10XX | English | 3 | MAT 1312 | Precalculus II | 3 |
| MAT 1311 | Precalculus I | <u>3</u> | Select one: | | |
| | | | PHY 1041 | Physics I | 4 |
| | | | PHY 2041 | Physics I w/ Calculus | <u>4</u> |
| | | 16 | | | 18 |

Second Year

| Fall Semester | | | Spring Semester | | |
|----------------------|---------------------------------|----------|------------------------|------------------------------|----------|
| CET 2012 | Surveying II | 4 | CET 2030 | Environmental Eng & Science | 3 |
| CET 2020 | Hydraulics & Drainage | 3 | CET 2050 | Civil & Environmental Design | 4 |
| CET 2040 | Statics & Strength of Materials | 4 | CET 2110 | Mechanics of Soils | 3 |
| MAT 1520 | Calculus for Engineering | <u>4</u> | CET 2120 | Structural Design | 3 |
| | | | ELE XXXX | AH/SS elective | <u>3</u> |
| | | 15 | | | 16 |

Computer Engineering Technology

Graduates of this program possess an understanding and working knowledge of both computer hardware and software. With a command of the total environment, a computer engineering technician is able to relate to both programmers and hardware engineers. The theory developed in the classroom is reinforced with laboratory work, which allows students to develop confidence and skill in their newly acquired knowledge and to accurately report the results of their observations. Along with two networked computer labs, students also use the facilities available in three additional instrumented electronics labs.

Computer Engineering Technology students share many common first-semester courses with the Electrical Engineering Technology students. This first semester provides students with a firm base in fundamental principles. Subsequent semesters' offerings stress a systems approach, with students investigating computer-based applications from both a hardware and a software perspective. Interfacing computers with their peripherals and network applications are emphasized. Graduates are well prepared for admission to Vermont Tech's bachelor of science program in Computer Engineering Technology. With an extra year's work, students may pursue a dual associate degree with Electrical Engineering Technology.

The Associate of Engineering in Computer Engineering Technology program will:

- Provide students with the capabilities to be immediately employable and productive in the workplace
- Instill the necessary skills so that graduates are qualified for positions of responsibility
- Provide the education to mold graduates who are knowledgeable in both theory and application
- Provide the base of knowledge so that graduates are prepared for lifelong learning and can adapt to new and emerging technologies
- Provide the base of knowledge so that graduates can continue their formal education

Students with an Associate of Engineering in Computer Engineering Technology will be able to demonstrate:

- The ability to apply the knowledge, techniques, skills, and modern tools of computer engineering technology to narrowly-defined engineering technology activities
- The ability to apply a knowledge of mathematics, science, engineering, and technology to computer engineering technology problems that require limited application of principles but extensive practical knowledge
- The ability to conduct standard tests and measurements and to conduct, analyze, and interpret experiments related to computer engineering technology
- The ability to function effectively as a member of a technical team
- The ability to identify, analyze, and solve narrowly defined computer engineering technology problems
- The ability to apply written, oral, and graphical communication in both technical and non-technical environments and to identify and use appropriate technical literature
- An understanding of the need for engaging in self-directed continuing professional development
- An understanding of and a commitment to address professional and ethical responsibilities, including a respect for diversity
- A commitment to quality, timeliness, and continuous improvement

The program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

The normal number of credits required for the degree is 65.

First Year

| Fall Semester | | | Spring Semester | | |
|----------------------|------------------------------------|----------|------------------------|-------------------------------------|----------|
| ELT 1015 | Introduction to Engineering | 1 | ELT 1110 | Introduction to Digital Circuits | 4 |
| ELT 1031 | Electrical Circuits I | 4 | ELT 2015 | Introduction to Projects | 1 |
| MAT 1311 | Precalculus I | 3 | ELT 2041 | Electronic Circuits I | 4 |
| PHY 1041 | Physics I | 4 | ENG 10XX | English | 3 |
| Select one: | | | MAT 1312 | Precalculus II | <u>3</u> |
| CIS 2261 | Introduction to Java Programming I | 4 | If required: | | |
| CIS 2271 | Java Programming | <u>4</u> | CIS 2262 | Introduction to Java Programming II | 3 |
| | | 16 | | | 15-18 |

Second Year

| Fall Semester | | | Spring Semester | | |
|----------------------|--------------------------|----------|------------------------|-------------------------------|----------|
| CIS 1151 | Website Development | 3 | CIS 2010 | Computer Organization | 4 |
| ELE XXXX | AH/SS elective | 3 | CIS 2151 | Networks I | 4 |
| ELT 2050 | Microcomputer Techniques | 4 | ENG 2080 | Technical Communication | 3 |
| MAT 1520 | Calculus for Engineering | 4 | INT 1005 | Self, Career, & Culture | 3 |
| PHY 1042 | Physics II | <u>4</u> | Select one: | | |
| | | | CIS 2730 | Software Engineering Projects | 3 |
| | | | ELT 2720 | Electrical Project | <u>2</u> |
| | | 18 | | | 16-17 |

Bachelor of Science in Computer Engineering Technology

The Bachelor of Science in Computer Engineering Technology program begins where the associate degree program leaves off. Students will further expand their knowledge in hardware and software aspects of computer and embedded computer systems. They will delve deeper into digital circuits, computer architecture, signal processing, and network programming. When they graduate, they will have a diverse range of career options.

The field of Computer Engineering is constantly evolving. BS.CPE students can choose up to six technical elective courses that apply toward their degree. This allows them to keep pace with their primary areas of interest while still adhering to a core set of classes. In the full-year capstone project course, they plan, manage, and build a system that incorporates much of the hardware and software knowledge they have gained so far. This experience gives them a solid foundation for launching their careers.

The Bachelor of Science in Computer Engineering Technology program will:

- Provide students with the capabilities to be immediately employable and productive in the workplace
- Provide the educational foundation so that graduates are knowledgeable in both theory and application with the ability to analyze, design, and implement electrical and computer systems and products
- Qualify graduates for positions of responsibility with the ability to apply project management techniques to electrical/computer systems
- Instill the need for creativity in the design of systems, components, or processes by having the students research and develop multiple solutions to problems and use a variety of tools and techniques in their work
- Prepare graduates for lifelong learning and adaptation to new and emerging technologies
- Provide the base of knowledge so that the graduate can continue their formal education

Students with a Bachelor of Science in Computer Engineering Technology will be able to demonstrate:

- An ability to select and apply the knowledge, techniques, skills, and modern tools of computer engineering technology to broadly-defined engineering technology activities
- An ability to select and apply a knowledge of mathematics, science, engineering, and technology to computer engineering technology problems that require the application of principles and applied procedures or methodologies
- An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes
- An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to computer engineering technology educational objectives
- An ability to function effectively as a member or leader on a technical team
- An ability to identify, analyze, and solve broadly-defined engineering technology problems
- An ability to apply written, oral, and graphical communication in both technical and non-technical environments and to identify and use appropriate technical literature
- An understanding of the need for and an ability to engage in self-directed continuing professional development
- An understanding of and a commitment to address professional and ethical responsibilities, including a respect for diversity
- A knowledge of the impact of engineering technology solutions in a societal and global context
- A commitment to quality, timeliness, and continuous improvement

The program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

The normal number of credits required for the degree is 125.

Third Year

| Fall Semester | | | Spring Semester | | |
|----------------------|------------------------------|----------|------------------------|------------------------------|------------|
| CIS 3050 | Algorithms & Data Structures | 3 | ELT 3050 | Microprocessor Techniques II | 4 |
| CIS 4150 | Software Engineering | 3 | MAT 3720 | Topics in Discrete Math | 3 |
| ELE 3XXX | Upper level AH/SS elective | 3 | XXX 3XXX | Upper level program elective | 3-4 |
| ELT 3010 | Digital Circuits II | 3 | XXX 3XXX | Upper level program elective | <u>3-4</u> |
| MAT 2532 | Calculus II | <u>4</u> | | | |
| | | 16 | | | 13-15 |

Fourth Year

| Fall Semester | | | Spring Semester | | |
|----------------------|------------------------------|------------|------------------------|------------------------------|------------|
| CIS 4020 | Operating Systems | 4 | CIS 4722 | CIS Senior Project II | 3 |
| CIS 4721 | CIS Senior Project I | 2 | ELE XXXX | AH/SS elective | 3 |
| ELT 4010 | Computer Architecture | 3 | ELT 4020 | Digital Signal Processing | 4 |
| XXX 4XXX | Upper level program elective | 3-4 | XXX 4XXX | Upper level program elective | 3-4 |
| XXX 4XXX | Upper level program elective | <u>3-4</u> | XXX 4XXX | Upper level program elective | <u>3-4</u> |
| | | 15-17 | | | 16-18 |

Computer Information Technology

Graduates of this program are prepared to understand the organization and technology of computers, databases, networking, and other information technologies. Students are introduced to the breadth of technologies and to the basics of the business world.

Because of the broad technological background this program provides, students are well-prepared to enter new technical areas as the field expands and evolves.

Students with an Associate of Science in Computer Information Technology will be able to:

- Demonstrate fluency in multiple programming languages
- Be able to develop and manage complete websites
- Understand the design and implementation of computer networking
- Understand basic principles for developing and deploying high quality software systems
- Understand how to manage systems, including UNIX-based computers
- Demonstrate a solid background in business processes
- Understand the historical and social context of information technology

Vermont Tech offers a series of certificates in Web Development, Networking, and Software Development for students who have already completed a degree. For more information, go to <http://www.vtc.edu/academics/majors>

The normal number of credits required for the degree is 60.

First Year

| Fall Semester | | | Spring Semester | | |
|--------------------|------------------------------------|----|---------------------|-------------------------------------|-------|
| CIS 1120 | Intro to Information Technology | 3 | CIS 1152 | Advanced Website Development | 3 |
| CIS 1151 | Website Development | 3 | CIS 2151 | Networks I | 4 |
| ENG 10XX | English | 3 | Select one: | | |
| MAT 1311 | Precalculus I | 3 | ELE XXXX | AH/SS elective | 3 |
| Select one: | | | ENG 2080 | Technical Communication | 3 |
| CIS 2261 | Introduction to Java Programming I | 4 | Select one: | | |
| CIS 2271 | Java Programming | 4 | MAT 1312 | Precalculus II | 3 |
| | | | MAT 2120 | Discrete Structures | 3 |
| | | | If required: | | |
| | | | CIS 2262 | Introduction to Java Programming II | 3 |
| | | 16 | | | 13-16 |

Second Year

| Fall Semester | | | Spring Semester | | |
|--------------------|-------------------------------|-------|--------------------|--------------------------------|-------|
| BUS 2270 | Organizational Communication | 3 | CIS 2235 | Advanced System Administration | 4 |
| CIS 2230 | System Administration | 4 | CIS 23XXX | Upper level computer elective | 3-4 |
| CIS 2320 | Software QA & Testing | 3 | SCI XXXX | Science elective | 4 |
| Select one: | | | Select one: | | |
| CIS 23XXX | Upper level computer elective | 3-4 | MAT 2021 | Statistics | 3 |
| MAT 1520 | Calculus for Engineering | 4 | MAT 2120 | Discrete Structures | 3 |
| Select one: | | | | | |
| ELE XXXX | AH/SS elective | 3 | | | |
| ENG 2080 | Technical Communication | 3 | | | |
| | | 16-17 | | | 14-15 |

Bachelor of Science in Computer Information Technology

Graduates of this program are prepared to understand the organization and technology of computers, databases, networking, and other information technologies. Students are introduced to the breadth of technologies and to the basics of the business world.

Because of the broad technological background this program provides, students are well prepared to enter new technical areas as the field expands and evolves.

Students with a Bachelor of Science in Computer Information Technology should be able to meet all of the outcomes of the associate degree program as well as:

- Design and architect systems that utilize computer networking
- Understand the requirements for developing and deploying high-quality, large-scale software systems
- Design, implement, and evaluate a user interface for a computer system
- Understand the concepts and practice of relational databases
- Understand the security issues surrounding information technology and the appropriate tools and techniques to safeguard that security
- Understand the professional, historical, and social context of information technology and be able to make reasoned judgments about the social and ethical implications of their actions

In addition, all students must actively participate in the design, development, and evaluation of a sizable software system and present the results of that effort.

Students, in conjunction with the department chair, may develop a sequence of courses to best meet their backgrounds and needs that still satisfies the degree requirements. A typical curriculum taken by students is shown here.

Vermont Tech offers a series of certificates in Web Development, Networking, and Software Development for students who have already completed a degree. For more information, go to <http://www.vtc.edu/academics/majors>

The normal number of credits required for the degree is 122.

Third Year

| Fall Semester | | | Spring Semester | | |
|----------------------|-------------------------------|-------|------------------------|-------------------------------|------------|
| BUS 2440 | Introduction to Business Law | 3 | CIS 3010 | Database Systems | 4 |
| CIS 4150 | Software Engineering | 3 | CIS 4120 | Systems Analysis & Design | 3 |
| ELE 3XXX | Upper level AH/SS elective | 3 | ELE XXXX | AH/SS elective | 3 |
| HUM 3060 | Cyberethics | 3 | Select one: | | |
| Select one: | | | BUS 2230 | Principles of Marketing | 3 |
| CIS 3/4XXX | Upper level computer elective | 3-4 | CIS 3/4XXX | Upper level computer elective | 3-4 |
| ELE XXXX | AH/SS elective | 3 | Select one: | | |
| MAT 1520 | Calculus for Engineering | 4 | BUS3/4XXX | Business elective | 3 |
| | | | CIS 3/4XXX | Upper level computer elective | <u>3-4</u> |
| | | | | | |
| | | 15-16 | | | 16-18 |

Fourth Year

| Fall Semester | | | Spring Semester | | |
|----------------------|-------------------------------|----------|------------------------|-------------------------------|----------|
| CIS 3/4XXX | Upper level computer elective | 3-4 | CIS 3/4XXX | Upper level computer elective | 3 |
| CIS 3/4XXX | Upper level computer elective | 3-4 | CIS 4040 | Computer Security | 4 |
| CIS 4721 | CIS Senior Project I | 2 | CIS 4722 | CIS Senior Project II | 3 |
| SCI XXXX | Science elective | 4 | Select one: | | |
| Select one: | | | BUS 3041 | Entrepreneurship II | 3 |
| BUS 2041 | Entrepreneurship I | 3 | BUS 4530 | Technical Project Management | 3 |
| ELE XXXX | AH/SS elective | <u>3</u> | If Required: | | |
| | | | ELE XXXX | AH/SS elective | <u>3</u> |
| | | 15-17 | | | 16 |

Computer Software Engineering

Graduates of this program are prepared to make meaningful contributions to a software development group. Typical jobs for graduates might include test engineer, release engineer, or customer support engineer. Students may continue on to a Bachelor of Science in Software Engineering, which adds an understanding of software development and significantly more technical depth.

Students with an Associate of Science in Computer Software Engineering will be able to:

- Demonstrate fluency in multiple languages, including one object-oriented language and one scripting language
- Understand the fundamentals of computer hardware, including understanding assembly language
- Develop complete websites
- Understand the behaviors and implementation of computer networking
- Understand basic principles for developing and deploying high-quality software systems
- Understand how to manage systems, including UNIX-based computers
- Work effectively in a group software development effort
- Understand the historical and social context of information technology

In addition, all graduates must actively participate in the design and development of a software system and present the results of that effort.

Students, in conjunction with the department chair, may develop a sequence of courses to best meet their backgrounds and needs that still satisfies the degree requirements. A typical curriculum taken by students is shown here.

Vermont Tech offers a series of certificates in Web Development, Networking, and Software Development for students who have already completed a degree. For more information, go to <http://www.vtc.edu/academics/majors>

The normal number of credits required for the degree is 60.

First Year

| Fall Semester | | | Spring Semester | | |
|----------------------|------------------------------------|----|------------------------|-------------------------------------|-------|
| CIS 1120 | Intro to Information Technology | 3 | CIS 1152 | Advanced Website Development | 3 |
| CIS 1151 | Website Development | 3 | CIS 2151 | Networks I | 4 |
| ENG 10XX | English | 3 | Select one: | | |
| MAT 1311 | Precalculus I | 3 | ELE XXXX | AH/SS elective | 3 |
| Select one: | | | ENG 2080 | Technical Communication | 3 |
| CIS 2261 | Introduction to Java Programming I | 4 | Select one: | | |
| CIS 2271 | Java Programming | 4 | MAT 1312 | Precalculus II | 3 |
| | | | MAT 2120 | Discrete Structures | 3 |
| | | | If required: | | |
| | | | CIS 2262 | Introduction to Java Programming II | 3 |
| | | 16 | | | 13-16 |

Second Year

| Fall Semester | | | Spring Semester | | |
|----------------------|-----------------------------|-------|------------------------|-------------------------------|----|
| CIS 2230 | System Administration | 4 | CIS 2010 | Computer Organization | 4 |
| CIS 2260 | Object-Oriented Programming | 3 | CIS 2730 | Software Engineering Projects | 3 |
| CIS 2320 | Software QA & Testing | 3 | SCI XXXX | Science elective | 4 |
| Select one: | | | Select one: | | |
| ELE XXXX | AH/SS elective | 3 | MAT 2021 | Statistics | 3 |
| ENG 2080 | Technical Communication | 3 | MAT 2120 | Discrete Structures | 3 |
| Select one: | | | | | |
| BUS 2020 | Principles of Management | 3 | | | |
| MAT 1520 | Calculus for Engineering | 4 | | | |
| | | 16-17 | | | 14 |

Bachelor of Science in Computer Software Engineering

Graduates of this program develop programming expertise and experience significant technical depth in multiple areas. Typical jobs for graduates include test engineer, release engineer, or customer support engineer.

Students with a Bachelor of Science in Computer Software Engineering should be able to meet all the outcomes of the associate degree program as well as:

- Understand the behaviors and implementation of computer networking and be able to develop systems that utilize computer networking
- Understand the requirements for developing and deploying high-quality, large-scale software systems
- Design, implement, and evaluate a user interface for a computer system
- Understand the concepts and practice of relational databases
- Understand the security issues surrounding information technology and the appropriate tools and techniques to safeguard that security
- Understand the workings of modern operating systems, both in theory and in practice, and be able to work with an operating system using administrative tools
- Develop significant technical depth in additional areas approved by the department chair
- Understand the professional, historical, and social context of information technology and be able to make reasoned judgments about the social and ethical implications of their actions

In addition, all graduates must actively participate in the design, development, and evaluation of a sizable software system and present the results of those efforts.

Students, in conjunction with the department chair, may develop a sequence of courses to best meet their backgrounds and needs that still satisfies the degree requirements. A typical curriculum taken by students is shown here.

Vermont Tech offers a series of certificates in Web Development, Networking, and Software Development for students who have already completed a degree. For more information, go to <http://www.vtc.edu/academics/majors>

The normal number of credits required for the degree is 125.

Third Year

| Fall Semester | | | Spring Semester | | |
|--------------------|-------------------------------|----------|--------------------|-------------------------------|------------|
| CIS 3030 | Programming Languages | 3 | CIS 3010 | Database Systems | 4 |
| CIS 3050 | Algorithms & Data Structures | 3 | CIS 3/4XXX | Upper level computer elective | 3-4 |
| CIS 4150 | Software Engineering | 3 | CIS 4120 | Systems Analysis & Design | 3 |
| SCI XXXX | Science elective | 4 | ELE XXXX | AH/SS elective | 3 |
| Select one: | | | Select one: | | |
| BUS XXXX | Business elective | 3 | BUS 2230 | Principals of Marketing | 3 |
| CIS 2XXX | Upper level computer elective | 3-4 | BUS 2440 | Introduction to Business Law | 3 |
| MAT 2532 | Calculus II | <u>4</u> | CIS 3/4XXX | Upper level computer elective | <u>3-4</u> |
| | | 16-17 | | | 16-18 |

Fourth Year

| Fall Semester | | | Spring Semester | | |
|--------------------|-------------------------------|------------|--------------------|-------------------------------|----------|
| CIS 4020 | Operating Systems | 4 | CIS 3/4XXX | Upper level computer elective | 3-4 |
| CIS 4721 | CIS Senior Project I | 2 | CIS 3/4XXX | Upper level computer elective | 3-4 |
| HUM 3060 | Cyberethics | 3 | CIS 4722 | CIS Senior Project II | 3 |
| Select two: | | | ELE 3XXX | Upper level AH/SS elective | 3 |
| BUS 2041 | Entrepreneurship I | 3 | Select one: | | |
| CIS 3/4XXX | Upper level computer elective | 3-4 | BUS 3041 | Entrepreneurship II | 3 |
| ELT 3/4XXX | Upper level ELT elective | <u>3-4</u> | BUS 4530 | Technical Project Management | 3 |
| | | | Select one: | | |
| | | | MAT 2120 | Discrete Structures | 3 |
| | | | MAT 3720 | Topics in Discrete Math | <u>3</u> |
| | | 15-17 | | | 18-20 |

Construction Management

This program is designed to serve both recent high school graduates with limited experience in the construction field and adults already employed in the building industry who want to prepare themselves for project management and supervisory roles.

The first year of the program focuses on the skills entailed in the practice of building construction. In addition to the materials and methods of residential and light commercial construction, students study drafting; print reading; electrical and mechanical systems; math; and physics.

In the second year of the program, students acquire the management skills needed for supervisory positions in the building industry. Second-year students take courses in construction project management; estimating; field engineering and surveying; small business management and business law; and basic structural engineering and safety.

Graduates of the program qualify for a range of positions in the construction field: small business owners, building materials representatives, construction supervisors, estimators, and entrepreneurs. Some students may decide to further their education in management, architectural, or civil engineering. Graduates who expect to run their own construction companies are encouraged to explore continuing their educational path in Vermont Tech's bachelor's degree program.

Students with an Associate of Applied Science in Construction Management will be able to:

- Communicate construction materials and methods using graphical symbols, drafting practice, and CAD
- Effectively communicate technical instructions and building details using written and spoken English
- Use computers for computation, research, documentation, and communication
- Identify building components and materials
- Demonstrate and model industry-accepted (OSHA) safety practices
- Understand a load table and choose proper materials for structural members
- Create and administer construction schedules
- Operate a TotalStation to establish points, elevations, survey distances, building, and road layout
- Write a business plan
- Complete quantity takeoffs in residential and commercial construction

The normal number of credits required for the degree is 66.

**Students who have completed MAT 1420 do not have to take MAT 1100 or MAT 1210*

Note: Students in this program are required to have safety glasses; work boots; speed or combo square; chalk line; tool belt; tape measure; utility knife; and pencils.

First Year

| Fall Semester | | | Spring Semester | | |
|----------------------|----------------------------------|----------|------------------------|---------------------------------|----------|
| CPM 1000 | CPM Freshman Seminar | 1 | CPM 1010 | Electrical/Mechanical Systems | 3 |
| CPM 1021 | Construction Graphics I | 2 | CPM 1022 | Construction Graphics II | 2 |
| CPM 1031 | Residential Construction Systems | 3 | CPM 1111 | Commercial Construction Systems | 4 |
| CPM 1032 | Construction Laboratory | 2 | MAT 1100 | Mathematics for Technology | 3 |
| ELE XXXX | AH/SS elective | 3 | PHY 1030 | General Physics | <u>4</u> |
| ENG 10XX | English | 3 | | | |
| Select one: | | | | | |
| MAT 1210 | Principles of Mathematics | 3 | | | |
| MAT 1311 | Precalculus I | <u>3</u> | | | |
| | | 17 | | | 16 |

Summer Semester

| | | |
|----------|-------------------------|---|
| CPM 2801 | Construction Internship | 0 |
|----------|-------------------------|---|

Second Year

| Fall Semester | | | Spring Semester | | |
|----------------------|---------------------------------|----------|------------------------|---------------------------------|----------|
| ACC 1020 | Survey of Accounting | 3 | BUS 2210 | Small Business Management | 3 |
| BUS 2440 | Introduction to Business Law | 3 | CPM 2030 | Elementary Theory of Structures | 4 |
| CPM 2010 | Construction Estimates I | 3 | CPM 2730 | Construction Seminar & Project | 3 |
| CPM 2020 | Construction Project Management | 3 | ELE XXXX | AH/SS elective | 3 |
| CPM 2050 | Construction Mgmt Software | 1 | ENG 2080 | Technical Communication | <u>3</u> |
| CPM 2060 | Field Engineering | 3 | | | |
| CPM 2802 | Construction Internship Review | <u>1</u> | | | |
| | | 17 | | | 16 |

Bachelor of Science in Construction Management

We offer a 2+2 Construction Management baccalaureate program for graduates from the Vermont Tech Architectural & Building Engineering Technology, Civil & Environmental Engineering Technology, and Construction Management programs. Graduates of other similar programs may request a transcript review during the application process.

A baccalaureate degree in Construction Management will meaningfully synthesize prior experiences, education, business management skills, construction techniques, resource allocation, asset management, and human resource management. Students entering from AET, CET, and CPM will arrive with a solid understanding of the foundations of engineering, management, and/or design and will leave with the ability to manage the planning and implementation of a construction project as principal or employee of a construction business. Because of demographics and economics, motivated graduates will enjoy rapid ascent of the management career ladder.

This program is designed to better meet the needs of the construction industry. Rapid technological advances in this field, combined with an aging workforce, present opportunities for recent college graduates. With additional field experience, graduates will assume positions of superintendent, project manager, estimator, or field engineer in commercial, institutional, industrial, residential, or civil construction.

Specific program objectives, including career and learning outcomes for students include:

- Preparing students with strong technical and problem-solving backgrounds for management level positions
- Enabling students to control or contribute to a profitable construction-related business
- Equipping future employees with the skills necessary to adapt to technological and process changes in a rapidly developing field
- Instilling resiliency, lifelong learning, and a “no excuses” mentality
- Creating and implementing a company safety plan
- Creating, estimating, condensing, and graphically communicating Gantt, Network Diagram, and Activity on Node project management charts
- Estimating and submitting competitive construction bids
- Managing a construction project, including materials and resources, from design phase to close out
- Interpreting construction drawings, specifications, and permits for implementation of Best Management Practices
- Properly laying out and siting buildings, bridges, and roads from designs
- Managing documentation for payments, inspections, as-built drawings, and progress submittals
- Providing immediate first aid and live saving care (CPR) to other employees
- Evaluating multiple choices in the means and methods of construction for fiscal decision-making and planning

The normal number of credits required for the degree is 123.

Third Year

For Students from Construction Track

| Fall Semester | | | Spring Semester | | |
|--------------------|---------------------------------|----------|-----------------|---------------------------|----------|
| CPM 3130 | Construction Soils | 3 | BUS 2410 | Human Resource Management | 3 |
| CPM 4030 | Construction Safety & Risk Mgmt | 3 | CPM 3010 | Construction Estimates II | 3 |
| ELE 3XXX | Upper level AH/SS elective | 3 | CPM 3020 | Construction Documents | 3 |
| MAT 1311 | Precalculus I | <u>3</u> | CPM 3030 | Concrete & Steel Lab | 2 |
| Select one: | | | | | |
| | | | CHE 1020 | Introduction to Chemistry | 4 |
| | | | PHY 1041 | Physics I | <u>4</u> |
| | | 12 | | | 15 |

For Students from Civil or Architectural Tracks

| Fall Semester | | | Spring Semester | | |
|---------------|---------------------------------|----------|-----------------|----------------------------|----------|
| ACC 2121 | Financial Accounting | 3 | BUS 2410 | Human Resource Management | 3 |
| BUS 2210 | Small Business Management | 3 | CPM 3010 | Construction Estimates II | 3 |
| BUS 2440 | Introduction to Business Law | 3 | CPM 3020 | Construction Documents | 3 |
| CPM 2010 | Construction Estimates I | 3 | CPM 3030 | Concrete & Steel Lab | 2 |
| CPM 2020 | Construction Project Management | 3 | ELE 3XXX | Upper level AH/SS elective | <u>3</u> |
| CPM 4030 | Construction Safety & Risk Mgmt | <u>3</u> | | | |
| | | 18 | | | 14 |

Summer Semester (optional)

| | | |
|----------|------------------------------|---|
| CPM 4801 | CPM Senior Summer Internship | 0 |
|----------|------------------------------|---|

Fourth Year

| Fall Semester | | | Spring Semester | | |
|---------------|------------------------------------|----------|-----------------|------------------------------|----------|
| AHS 2035 | First Aid & CPR | 2 | BUS 2230 | Principles of Marketing | 3 |
| BUS 2260 | Principles of Financial Management | 3 | CPM 4120 | Project Planning & Finance | 3 |
| CPM 4010 | Contract Negotiations | 3 | CPM 4130 | Construction Superintendency | 3 |
| CPM 4040 | Construction Scheduling | 3 | CPM 4140 | Construction Contracts | 3 |
| CPM 4802 | CPM Senior Internship Review | 1 | MAT 1312 | Precalculus II | <u>3</u> |
| ELE XXXX | AH/SS elective | <u>3</u> | | | |
| | | 15 | | | 15 |

Dairy Farm Management Technology

Graduates of this program possess the skills and knowledge needed to operate a modern dairy farm. They frequently return to their home farms, are employed as herd managers, or work as breeding technicians, DHIA testers, and Peace Corps volunteers.

The college's 500-acre working farm and registered Holstein and Brown Swiss herd are integrated into all facets of the program and students are active participants in the management and operation of the farm. Practical experience at the farm is an especially valuable aspect of the program for students who lack a farm background. Additional coursework in accounting, finance, and computer applications help broaden students' understanding of Dairy Farm Management.

Students may also apply for admission to the Farm and Agricultural Resource Management Stewards (FARMS) program offered in cooperation with the University of Vermont. FARMS students make a seamless transition from Dairy Farm Management at Vermont Tech to a second two years at the College of Agriculture & Life Sciences at UVM. Full-tuition scholarships are available to Vermont students in the FARMS program.

Students who complete a degree in Dairy Farm Management Technology can transfer seamlessly into bachelor's programs in Business or Diversified Agriculture.

Students with an Associate of Applied Science in Dairy Farm Management Technology will be able to:

- Understand dairy cow nutrition and the ration formulation process
- Understand dairy cow reproduction and genetics and be able to implement a breeding program
- Competently milk and feed cows
- Understand heifer-raising and successfully and competently raise heifers
- Manage dairy cow transition from dry to lactating
- Understand the dairy industry and represent it knowledgeably
- Raise and store common New England forages
- Manage a dairy operation budget
- Assess a dairy business and recognize potential improvements
- Write a business plan for a dairy operation

The normal number of credits required for the degree is 63.

First Year

| Fall Semester | | Spring Semester | |
|----------------------|----------------------------------|------------------------|---|
| ACC 1020 | Survey of Accounting | 3 | AGR 1030 Animal Reproduction/Genetics 3 |
| AGR 1011 | Agricultural Techniques I | 2 | AGR 2030 Animal Nutrition 4 |
| AGR 1050 | Livestock Production | 3 | ELE XXXX AH/SS elective 3 |
| CIS 1080 | Intro Spreadsheets/Database Mgmt | 2 | ENG 2080 Technical Communication 3 |
| ENG 10XX | English | 3 | LAH 1050 Introduction to Soils 4 |
| Select one: | | | |
| MAT 1210 | Principles of Mathematics | 3 | |
| MAT 1311 | Precalculus I | 3 | |
| | | 16 | 17 |

Second Year

| Fall Semester | | Spring Semester | |
|----------------------|------------------------------------|------------------------|--------------------------------------|
| AGR 2011 | Dairy Herd Management I | 4 | AGR 2012 Dairy Herd Management II 1 |
| AGR 2040 | Forage Production | 3 | AGR 2050 Large Animal Diseases 3 |
| BUS 2260 | Principles of Financial Management | 3 | BUS 2210 Small Business Management 3 |
| SSC 2720 | The Social Ecology of Food | 3 | BUS 2230 Principles of Marketing 3 |
| Select one: | | ELE XXXX | AH/SS elective 3 |
| CHE 1020 | Introduction to Chemistry | 4 | |
| CHE 1031 | General Chemistry I | 4 | |
| | | 17 | 13 |

Dental Hygiene

The Vermont Tech entry-level Dental Hygiene program consists of a 3-year Commission on Dental Accreditation (CODA)-approved associate degree followed by a final year accredited by the New England Association of Schools and Colleges (NEASC), resulting in a bachelor of science degree in Dental Hygiene. Upon successful completion of either the associate or bachelor's degree, the student is eligible for application for dental hygiene licensure.

Graduates of this program work directly with dental patients to promote optimum oral health. The dental hygiene profession is primarily educational and preventative in nature and offers opportunities to work in a variety of healthcare settings, including general and specialty dental practices, community health agencies, and public schools. In addition, graduates may wish to pursue a bachelor's degree, which will provide opportunities to work in alternative settings such as public health, education, research, and dental sales.

All dental hygiene professional courses must be taken in the prescribed six semester sequence. The curriculum is time-intensive and the required courses are rigorous. Complete dedication to coursework is required for successful completion of the program.

Graduates will:

- Competently perform the role of a dental hygienist in varied situations and settings
- Have the functional acuity and rationale for performing dental hygiene clinical techniques
- Continually promote the most current concepts of disease control and prevention
- Emphasize and promote ethical and responsible considerations in patient care
- Make an essential and unique contribution as an integral member of a healthcare team
- Have a basic knowledge of legal responsibilities and ethical considerations of patient care
- Develop a commitment to continuous and lifelong learning

The normal number of credits required for the associate degree is 93; for the bachelor's degree, 120 credits is required.

First Year

| Fall Semester | | Spring Semester | | |
|----------------------|------------------------------|------------------------|--|----------|
| BIO 1030 | Nutrition | 3 | BIO 2012 Human Anatomy & Physiology II | 4 |
| BIO 2011 | Human Anatomy & Physiology I | 4 | DHY 1012 Clinical Dental Hygiene I | 4 |
| DHY 1011 | Pre-clinical Dental Hygiene | 5 | DHY 1022 Oral Tissues II/Medical Emergencies | 3 |
| DHY 1021 | Oral Tissues I | 3 | PSY 1010 Introduction to Psychology | <u>3</u> |
| ENG 10XX | English | <u>3</u> | | |
| | | 18 | | 14 |

Second Year

| Fall Semester | | Spring Semester | | |
|----------------------|----------------------------|------------------------|---|----|
| BIO 2120 | Elements of Microbiology | 4 | DHY 2010 Dental Materials | 3 |
| DHY 1030 | Dental Radiology | 3 | DHY 2020 General Pathology/Pharmacology | 3 |
| DHY 2030 | Periodontics | 3 | DHY 2722 Clinical Dental Hygiene III | 5 |
| DHY 2721 | Clinical Dental Hygiene II | <u>5</u> | ENG 2080 Technical Communication | 3 |
| | | | MAT 1040 Mathematics for Allied Health | 2 |
| | | 15 | | 16 |

Third Year

| Fall Semester | | Spring Semester | | |
|----------------------|----------------------------|------------------------|------------------------------------|----------|
| CIS XXXX | Computer elective | 3 | CHE 1020 Introduction to Chemistry | 4 |
| DHY 2210 | Community Oral Health I | 2 | DHY 2211 Community Oral Health II | 1 |
| DHY 3821 | Clinical Dental Hygiene IV | 6 | DHY 2220 Oral Pathology | 2 |
| HUM 2020 | Bioethics | 3 | DHY 3822 Clinical Dental Hygiene V | <u>6</u> |
| Select one: | | | | |
| MAT 1221 | Finite Mathematics | 3 | | |
| MAT 2021 | Statistics | <u>3</u> | | |
| | | 17 | | 13 |

Fourth Year

| Fall Semester | | Spring Semester | | |
|----------------------|--------------------------------|------------------------|---|----------|
| DHY 3010 | Evidence-Based Decision Making | 3 | DHY 3020 Advanced Periodontics | 3 |
| DHY 3015 | Contemporary Issues in DHY | 3 | DHY 4010 Advanced Community Oral Health | 3 |
| DHY 3030 | DHY Methodology & Leadership | 3 | DHY 4213 Practice Management | 3 |
| ELE XXXX | AH/SS elective | <u>3</u> | DHY 4237 Intro to DHY Research Methods | 3 |
| | | | ELE 3XXX Upper level AH/SS elective | <u>3</u> |
| | | 12 | | 15 |

Note: All DHY/BIO course must be completed with a grade of C or better to continue in the program

Bachelor of Science in Dental Hygiene

Graduates of this bachelor of science degree completion program have access to more educational and career opportunities than students who have only completed an associate degree in Dental Hygiene. Career areas where the advanced degree would be advantageous include jobs in dental hygiene research, sales, public health, and education.

All courses are completed online and no campus visits are required.

Students have six years to complete the required courses for the bachelor's degree.

The Vermont Tech bachelor of science degree program holds articulation agreements with Quinsigamond Community College, Community College of Rhode Island, Tunxis Community College, Mount Wachusett Community College, Bristol Community College, Middlesex Community College, and the New Hampshire Technical Institute associate degree dental hygiene programs. These agreements are designed to maximize the number of credits students will be able to transfer to Vermont Tech. Specific details regarding these agreements can be obtained by contacting Vermont Tech's Department of Dental Hygiene at (802) 879-5643.

Intended outcomes for the Dental Hygiene degree completion program are to:

- Provide a vehicle in which graduates of the associate degree program may earn a bachelor's degree while employed as practitioners or full-time students
- Provide opportunities for students to explore various occupational settings such as public health, education, sales, and research
- Prepare graduates for further study at the graduate level
- Broaden the student's knowledge base and education experience in dental hygiene and general education courses
- Provide students with knowledge to develop skills in critical thinking and evidence-based research while fostering lifelong learning

The normal number of credits required for the degree is 120.

Third Year

| Fall Semester | | Spring Semester | |
|---------------|--------------------------------|-----------------|--|
| DHY 3010 | Evidence-Based Decision Making | 3 | CHE 1020 Introduction to Chemistry 4 |
| DHY 3015 | Contemporary Issues in DHY | 3 | CIS XXXX Computer elective 2-4 |
| ELE XXXX | AH/SS elective | 3 | DHY 3020 Advanced Periodontics 3 |
| PSY 1050 | Human Growth & Development | <u>3</u> | DHY 3030 DHY Methodology & Leadership <u>3</u> |
| | | 12 | 12-14 |

Fourth Year

| Fall Semester | | Spring Semester | |
|--------------------|--------------------------------|-----------------|--|
| DHY 4010 | Advanced Community Oral Health | 3 | DHY 4213 Practice Management 3 |
| ELE XXXX | AH/SS elective | 3 | DHY 4237 Intro to DHY Research Methods 3 |
| Select one: | | ELE 3XXX | Upper level AH/SS elective 3 |
| HUM 2020 | Bioethics | 3 | POS 1020 American Politics & Government <u>3</u> |
| PHI 1040 | Introduction to Ethics | 3 | |
| Select one: | | | |
| MAT XXXX | Mathematics elective | 3 | |
| XXX XXXX | Critical thinking elective | <u>3</u> | |
| | | 12 | 12 |

Note: In addition to the associate requirements, bachelor's students must complete a minimum of two Arts and Humanities (AH) or Social Sciences (SS) courses, including one at the 3000 level.

All DHY and BIO courses must be completed with a grade of C or better to continue in the program

Diesel Power Technology

The associate degree program in Diesel Power Technology answers an increasing need for skilled diesel service technicians for the growing agricultural, heavy-duty truck, and earth-moving equipment service industry. Graduates are prepared to enter the repair, parts, or management aspects of the diesel power service industry. Job categories include general repair technician, parts professional, service advisor, and, with experience, specialty or lead technician, parts manager, or service manager. Self-employment is also possible and a small business management course is included in the curriculum. Graduates are currently or have been previously employed by Milton CAT, Ryder Truck Rental Systems, Woods CRW, Sheldon Mack/Volvo, Champlain Valley Equipment, R.R. Charlebois Inc., Clarke's Truck Center, J & B International, VTrans, DATTCO Transportation, Casella Waste Management, and many independent repair facilities, fleets, and farms. Several graduates are self-employed.

The program covers all significant skill areas of the repair industry and includes modules on parts and supplies acquisition, record keeping, customer relations, and preventive maintenance. Electronic control of mechanical systems, system design considerations, and the analysis and diagnosis of system failures are examined through the coursework. Students are exposed to agricultural equipment, earth-moving equipment, and heavy-duty trucks and have the opportunity to work part-time at local service providers. A 400-hour summer internship is included which provides students with production experience and an opportunity to assess future employment possibilities.

The coursework covers all systems down to the component level on agricultural equipment, earth-moving equipment, and heavy-duty trucks. All mechanical systems are covered in the curriculum. Electrical, electronic, and hydraulic systems maintenance, diagnosis, and repair are emphasized. A combination of classroom instruction and hands-on laboratory practical experience is used at a one-to-one ratio. Students must possess their own set of hand tools for use in the laboratory and for the summer internship program. A tool list is available from the Office of Admissions or the DPT department.

Basic electrical and engine diagnosis and repair lecture courses are shared with Automotive Technology faculty; the lab content for these courses is diesel-specific.

The curriculum uses the NATEF (National Technician's Education Foundation) and AED (Associated Equipment Distributors) diesel task mastery specifications to assess successful learning outcomes.

Students with an Associate of Applied Science in Diesel Power Technology should be able to:

- Demonstrate the ability to use the principles of critical thinking in the diagnostic process
- Understand, maintain, and repair advanced electronic systems on trucks, agricultural, and earth-moving equipment
- Perform successfully as an entry to B-level heavy-duty service technician

Coursework in English and technical communication, computer software skills, technical math, physics, small business management, and general education are also included. The program is delivered in a well-equipped, 10,000 square foot industrial space within walking distance of the Randolph Center campus. A shuttle bus is used to transport students between the main campus and the Diesel facility.

The normal number of credits required for the degree is 62.

Diversified Agriculture

Graduates of this program will be well-prepared to own or manage small farms with diverse operations such as dairy, livestock (e.g. beef, sheep, and goats), succession grazing, market gardening, greenhouse production, and maple sugaring or to be consultants to agricultural organizations looking to diversify their operations and opportunities.

The Diversified Agriculture program combines animal, plant, and soil sciences with a knowledge and understanding of business and management. The program emphasizes the use of synergistic biological processes to foster a reduction in the need for, and subsequent use of, off-farm inputs. Instruction focuses on practical application of agricultural science in Vermont.

Today's farmers and agricultural industries must compete for customers on an international level while simultaneously meeting an increased demand for locally grown products. Training farmers to develop and synergize diverse agriculture operations on the same farmstead will make them stronger all-around competitors in the food production market, as well as more economically sound.

Students with a Bachelor of Science in Diversified Agriculture will be able to:

- Understand livestock nutrition and the ration formulation process
- Understand reproduction and genetics and be able to implement a breeding program
- Design, plan, and implement a garden
- Balance a nutrient budget
- Competently identify and treat common New England weeds and pests
- Understand the operational details of two forms of New England agriculture
- Competently recognize livestock disease
- Understand the agriculture industry and represent it knowledgeably
- Raise and store common New England forages
- Manage an agriculture operation budget
- Assess an agricultural business and recognize potential investors
- Write a business plan for an agricultural operation

The normal number of credits required for the degree is 120.

First Year

| Fall Semester | | Spring Semester | | | |
|--------------------|----------------------------------|-----------------|--------------------|--------------------------------|----------|
| ACC 1020 | Survey of Accounting | 3 | AGR 2030 | Animal Nutrition | 4 |
| AGR 1011 | Agricultural Techniques I | 2 | ELE XXXX | AH/SS elective | 3 |
| AGR 1050 | Livestock Production | 3 | ENG 2080 | Technical Communication | 3 |
| CIS 1080 | Intro Spreadsheets/Database Mgmt | 2 | LAH 1050 | Introduction to Soils | 4 |
| ENG 10XX | English | 3 | Select one: | | |
| Select one: | | | AGR 1030 | Animal Reproduction & Genetics | 3 |
| MAT 1210 | Principles of Mathematics | 3 | ENG 10XX | English | 3 |
| MAT 1311 | Precalculus I | <u>3</u> | MAT 1210 | Principles of Mathematics | <u>3</u> |
| | | 16 | | | 17 |

Second Year

| Fall Semester | | | Spring Semester | | |
|----------------------|---------------------------------|------------|------------------------|---------------------------------|------------|
| BUS 2260 | Principles Financial Management | 3 | BUS 2210 | Small Business Management | 3 |
| CHE 1031 | General Chemistry I | 4 | BUS 2230 | Principles of Marketing | 3 |
| SSC 2720 | The Social Ecology of Food | 3 | ELE XXXX | AH/SS elective | 3 |
| Select two: | | | Select one: | | |
| AGR 2011 | Dairy Herd Management I | 3 | CHE 2060 | Principles of Organic Chemistry | 4 |
| AGR 2040 | Forage Production | 3 | MAT 2021 | Statistics | 3 |
| AGR XXXX | Agriculture elective | <u>2-4</u> | Select two: | | |
| | | | AGR 2012 | Dairy Herd Management II | 3 |
| | | | AGR 2050 | Large Animal Diseases | 3 |
| | | | AGR XXXX | Agriculture elective | <u>2-4</u> |
| | | 17 | | | 17-20 |

Third Year

| Fall Semester | | | Spring Semester | | |
|----------------------|------------------------------|------------|------------------------|---------------------------------|----------|
| LAH 1020 | Introduction to Horticulture | 3 | AGR 3050 | Advanced Nutrient Management | 3 |
| AGR XXXX | Agriculture elective | 2-4 | AGR 3111 | Vegetable & Fruit Production | 3 |
| AGR XXXX | Agriculture elective | 2-4 | AGR XXXX | Agriculture elective | 2-4 |
| AGR XXXX | Agriculture elective | 2-4 | BIO 1220 | Botany | 4 |
| AGR XXXX | Agriculture elective | <u>2-4</u> | Select one: | | |
| | | | CHE 2060 | Principles of Organic Chemistry | 4 |
| | | | MAT 2021 | Statistics | <u>3</u> |
| | | 10-19 | | | 15-18 |
| | | | Summer Semester | | |
| | | | AGR 4801 | AGR Senior Summer Internship | 0 |

Fourth Year

| Fall Semester | | | Spring Semester | | |
|----------------------|---------------------------------|------------|------------------------|---------------------------|------------|
| AGR 4040 | Agricultural Products | 3 | BUS 2410 | Human Resource Management | 3 |
| AGR 4802 | AGR Sr Summer Internship Review | 1 | BUS 2721 | Business Planning Seminar | 3 |
| ELE 3XXX | Upper level AH/SS elective | 3 | ELE XXXX | AH/SS elective | 3 |
| AGR XXXX | Agriculture elective | 2-4 | AGR XXXX | Agriculture elective | 2-4 |
| AGR XXXX | Agriculture elective | <u>2-4</u> | AGR XXXX | Agriculture elective | <u>2-4</u> |
| | | 11-15 | | | 13-17 |

Electrical Engineering Technology

Graduates of this program are able to work in any number of challenging positions. As engineering technicians, they may participate in such varied activities as research, development, design, production, or manufacturing of complex electrical, electronic, or electromechanical products. Testing, quality control, marketing, installation, and customer service are among the job opportunities available.

Students may also pursue a dual major with Computer Engineering Technology or Mechanical Engineering Technology. Upon completion of a two-year associate degree in Electrical Engineering Technology, students may pursue a bachelor's degree in Electrical Engineering, Electromechanical Engineering, or Business Technology & Management.

The Associate of Engineering in Electrical Engineering Technology program will:

- Provide students with the capabilities to be immediately employable and productive in the workplace
- Provide the education so that graduates are knowledgeable in both theory and application
- Instill the necessary skills so that graduates are qualified for positions of responsibility
- Provide the base of knowledge so that graduates are prepared for lifelong learning and can adapt to new and emerging technologies
- Provide the base of knowledge so that graduates can continue their formal education

Students with an Associate of Engineering in Electrical Engineering Technology should be able to demonstrate:

- The ability to apply the knowledge, techniques, skills, and modern tools of electrical engineering technology to narrowly-defined engineering technology activities
- The ability to apply knowledge of mathematics, science, engineering, and technology to electrical engineering technology problems that require limited application of principles but extensive practical knowledge
- The ability to conduct standard tests and measurements and to conduct, analyze, and interpret experiments related to electrical engineering technology
- The ability to function effectively as a member of a technical team
- The ability to identify, analyze, and solve narrowly-defined engineering technology problems
- The ability to apply written, oral, and graphical communication in both technical and non-technical environments and to identify and use appropriate technical literature
- An understanding of the need for and ability to engage in self-directed continuing professional development
- An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity
- A commitment to quality, timeliness, and continuous improvement

The program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

The normal number of credits required for the degree is 64.

First Year

| Fall Semester | | Spring Semester | | | |
|----------------------|-----------------------------|------------------------|----------|----------------------------------|----------|
| ELT 1015 | Introduction to Engineering | 1 | CIS 2025 | C Programming | 3 |
| ELT 1031 | Electrical Circuits I | 4 | ELE XXXX | AH/SS elective | 3 |
| ENG 10XX | English | 3 | ELT 1110 | Introduction to Digital Circuits | 3 |
| Select one: | | | ELT 2041 | Electronic Circuits I | 4 |
| MAT 1311 | Precalculus I | 3 | MAT 1312 | Precalculus II | <u>3</u> |
| MAT 1520 | Calculus for Engineering | 4 | | | |
| Select one: | | | | | |
| PHY 1041 | Physics I | 4 | | | |
| PHY 2041 | Physics I w/ Calculus | <u>4</u> | | | |
| | | 15-16 | | | 16 |

Second Year

| Fall Semester | | Spring Semester | | | |
|----------------------|--------------------------|------------------------|----------|-------------------------|----------|
| ELT 1032 | Electrical Circuits II | 4 | ELE XXXX | AH/SS elective | 3 |
| ELT 2015 | Introduction to Projects | 1 | ELT 2042 | Electronic Circuits II | 4 |
| ELT 2050 | Microcomputer Techniques | 4 | ELT 2130 | Industrial Electronics | 4 |
| MAT 1520 | Calculus for Engineering | 4 | ELT 2720 | Electrical Project | 2 |
| Select one: | | | ENG 2080 | Technical Communication | <u>3</u> |
| PHY 1042 | Physics II | 4 | | | |
| PHY 2042 | Physics II with Calculus | <u>4</u> | | | |
| | | 17 | | | 16 |

Bachelor of Science in Electrical Engineering Technology

Electrical Engineering Technology is a degree recognized both locally and nationally. Engineering graduates are involved in a wide spectrum of activities, from software design to the assembly of complex control systems. Graduates of this program will have the technical and managerial skills necessary to enter careers in design, application, installation, manufacturing, operation, and/or maintenance of electrical/electronic systems. In addition to having strengths in the building, testing, operation, and maintenance of existing electrical systems, graduates will be well-prepared for development and implementation of electrical/electronic systems. They will be able to take on the role of engineers and senior technicians in the design and manufacture of complex systems, as well as field support and customer service inquiries. Graduates will have the skills, technical experience, and capabilities necessary to succeed in the workplace.

Recent Vermont Tech graduates are involved in alternative energy, chip production/design, aviation, and many other fields.

For the first two years of the program, students will follow the same curriculum as the associate degree. For the +2 portion of the curriculum, students will broaden and deepen their knowledge in the areas of mathematics; physics; arts and humanities; social sciences; electromechanical systems; programming; and advanced electrical design.

The Bachelor of Science in Electrical Engineering Technology program will:

- Provide students with the capability to be immediately employable and productive in the workplace
- Provide the educational foundation so that graduates are knowledgeable in both theory and application, with the ability to analyze, design, and implement electrical and electronic systems and products
- Qualify graduates for positions of responsibility with the ability to apply project management techniques to electrical/electronic systems
- Instill the need for creativity in the design of systems, components, or processes by having students research and develop multiple solutions to problems and use a variety of tools and techniques in their work
- Prepare graduates for lifelong learning and adaptation to new and emerging technologies
- Provide the base of knowledge so that graduates can continue their formal education

Students with a Bachelor of Science in Electrical Engineering Technology should be able to demonstrate:

- The ability to select and apply the knowledge, techniques, skills, and modern tools of electrical engineering technology to broadly-defined engineering technology activities
- The ability to select and apply a knowledge of mathematics, science, engineering, and technology to electrical engineering technology problems that require limited application of principles and applied procedures or methodologies
- The ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes
- The ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to Electrical Engineering Technology educational objectives
- The ability to function effectively as a member or leader of a technical team
- The ability to identify, analyze, and solve broadly-defined engineering technology problems
- The ability to apply written, oral, and graphical communication in both technical and non-technical environments and to identify and use appropriate technical literature
- An understanding of the need for and ability to engage in self-directed continuing professional development
- An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity
- A knowledge of the impact of engineering technology solutions in a societal and global context
- A commitment to quality, timeliness, and continuous improvement

The program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

The normal number of credits required for the degree is 123.

Third Year

| Fall Semester | | | Spring Semester | | |
|----------------------|----------------------------|----------|------------------------|------------------------------|----------|
| ELE 3XXX | Upper level AH/SS elective | 3 | ELT 2061 | Electromechanical Systems I | 4 |
| ELM 3015 | Sensors & Instrumentation | 3 | ELT 3050 | Microprocessor Techniques II | 4 |
| ELT 3010 | Digital Circuits II | 3 | MAT 3170 | Applied Math for Engineering | 3 |
| ELT 3053 | Electronics III | 4 | PHY 3121 | Modern Physics | <u>3</u> |
| MAT 2532 | Calculus II | <u>4</u> | | | |
| | | 17 | | | 14 |

Fourth Year

| Fall Semester | | | Spring Semester | | |
|----------------------|---------------------------------|----------|------------------------|----------------------------------|----------|
| ELE XXXX | AH/SS elective | 3 | ELM 4232 | Control Systems II | 3 |
| ELM 4015 | Electromechanical Power Systems | 3 | ELM 4242 | Senior Laboratory II | 1 |
| ELM 4231 | Control Systems I | 3 | ELM 4702 | Electromechanical Project II | 3 |
| ELM 4241 | Senior Laboratory I | 1 | ELT 3040 | Electronic & Data Communications | 3 |
| ELM 4701 | Electromechanical Project I | 2 | ELT 4020 | Digital Signal Processing | <u>3</u> |
| XXX 3XXX | Upper level technical elective | <u>3</u> | | | |
| | | 15 | | | 13 |

Note: General education requirements for the program include 24 credits minimum, nine of which must contain a strong writing component. Three of these credits are included in ELM 4701 and 4702.

Electromechanical Engineering Technology

Graduates of this program bridge the traditional gap between engineering disciplines via an interdisciplinary program that emphasizes problem-solving in a design and manufacturing environment where the challenges are both mechanical and electrical. Successful students are prepared to bring this broader understanding to the design, development, manufacturing, and technical support of emerging products, integrating and improving both the product and the process. In larger firms, this might be as a member of the design or manufacturing team, while smaller companies might assign this role to a single individual.

The ELM program is the second leg of a 2+2 curriculum. The junior year offers courses in advanced math, science, and sensor technology, along with “crossover” courses that vary according to a student’s prior educational background.

The Bachelor of Science in Electromechanical Engineering Technology program will:

- Provide students with the capabilities to be immediately employable and productive in the workplace
- Provide the education so that graduates are knowledgeable in both theory and application with the ability to analyze, design, and implement electrical/electromechanical systems and products
- Qualify graduates for positions of responsibility with the ability to apply project management techniques to electrical/electromechanical systems
- Instill the need for creativity in the design of systems, components, or processes by having students research and develop multiple solutions to problems and use a variety of tools and techniques in their work
- Prepare graduates for lifelong learning and adaptation to new and emerging technologies
- Provide the base of knowledge so that graduates can continue their formal education

Students with a Bachelor of Science in Electromechanical Engineering Technology should be able to demonstrate:

- The ability to select and apply the knowledge, techniques, skills, and modern tools of electromechanical engineering technology to broadly-defined engineering technology activities
- The ability to select and apply a knowledge of mathematics, science, engineering, and technology to electromechanical engineering technology problems that require the application of principles and applied procedures or methodologies
- The ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes
- The ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to Electromechanical Engineering Technology educational objectives
- The ability to function effectively as a member or leader on a technical team
- The ability to identify, analyze, and solve broadly-defined engineering technology problems
- The ability to apply written, oral, and graphical communication in both technical and non-technical environments and to identify and use appropriate technical literature
- An understanding of the need for and an ability to engage in self-directed continuing professional development
- An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity
- A knowledge of the impact of engineering technology solutions in a societal and global context
- A commitment to quality, timeliness, and continuous improvement

The program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

The minimum number of credits required in the junior and senior years is 61 (125 total).

Third Year EET

| Fall Semester | | Spring Semester | | |
|----------------------|----------------------------------|------------------------|--|----|
| ELM 3015 | Sensors & Instrumentation | 3 | ELT 2061 Electromechanical Systems I | 4 |
| MAT 2532 | Calculus II | 4 | MAT 3170 Applied Math for Engineering | 3 |
| MEC 1011 | Design Communication I | 2 | MEC 1021 Manufacturing Processes I Lab | 1 |
| MEC 2010 | Fluid Mechanics & Fluid Systems | 4 | MEC 2065 Kinematics & Dynamics | 4 |
| MEC 2035 | Statics & Strengths of Materials | 3 | MEC 2071 Machine Design | 2 |
| | | | PHY 3121 Modern Physics | 3 |
| | | 16 | | 17 |

Third Year MEC

| Fall Semester | | Spring Semester | | |
|----------------------|---------------------------|------------------------|---------------------------------------|----|
| CIS 2025 | C Programming | 4 | ELT 2041 Electronic Circuits I | 4 |
| ELM 3015 | Sensors & Instrumentation | 3 | ELT 2050 Microcomputer Techniques | 4 |
| ELT 1032 | Electrical Circuits II | 4 | ELT 2061 Electromechanical Systems I | 4 |
| MAT 2532 | Calculus II | 4 | MAT 3170 Applied Math for Engineering | 3 |
| | | | PHY 3121 Modern Physics | 3 |
| | | 15 | | 18 |

Fourth Year

| Fall Semester | | Spring Semester | | |
|----------------------|---------------------------------|------------------------|---|----|
| ELE XXXX | AH/SS elective | 3 | ELE 3XXX Upper level AH/SS elective | 3 |
| ELM 4015 | Electromechanical Power Systems | 3 | ELM 4232 Control Systems II | 3 |
| ELM 4231 | Control Systems I | 3 | ELM 4242 Senior Laboratory II | 1 |
| ELM 4241 | Senior Laboratory I | 1 | ELM 4702 Electromechanical Project II | 3 |
| ELM 4701 | Electromechanical Project I | 2 | ELT 3040 Electronic & Data Communications | 3 |
| XXX XXXX | Technical elective** | 3-4 | | |
| | | 15-16 | | 13 |

*General Education requirements for this program include a cumulative 24 credits, nine of which must contain a strong writing component. Some of these credits may have been earned in previous degree studies. Three of these credits are included in the ELM Senior Project courses (ELM 4701 and 4702), and three credits must be at a 3000 level.

**Technical electives may be selected from several areas, including computer science, mathematics, and business: CHE 1031, MAT 2533, 2021, 2533, BUS 2210, 2440 and, for EET>ELM track students only, MEC 2050 or 2130.

Note: EET to ELM track courses required of students with two-year electrical/electronic coursework; MEC to ELM track courses required of students with two-year mechanical coursework

Equine Studies

The program is designed for students who are passionate about working with and learning about horses and who want the flexibility to pursue a variety of careers in the broader equine industry. In addition to the traditional careers (barn manager, assistant trainer, or riding instructor), the opportunities for employment are limited only by graduates' imaginations and interests. Providing a solid foundation of professional skills, theory, and equine knowledge, this program prepares students for success on whatever path they choose to follow.

The core Equine Studies program is a combination of theory and hands-on experience working with horses and clients. Specific equine topics include stable management; equine anatomy and health; nutrition; genetics and reproduction; training; riding instruction techniques; equine massage; equine lameness; and equitation courses in both English and Western disciplines. The depth and breadth of topics is vast in relation to other comparable two year programs. Independent study and internships are actively encouraged and facilitated.

Students with an Associate in Applied Science in Equine Studies will be able to:

- Demonstrate fundamentals of equine care and facility management by utilizing knowledge to satisfactorily complete a predetermined set of skills with a minimum of 80% success
- Assess, critique, devise, and implement plans for using both teaching and training techniques, including their application in hands-on lab settings
- Demonstrate their understanding of issues in the equine industry, eventually presenting their appraisal of and recommendations about a defined area of the industry
- Review, examine, and draw conclusions about scientific theories concerning equine health, behavior, and care

Equine Studies students must provide or arrange for their own transportation to and from the equine facility, which is located seven miles from campus. The program does encourage students to carpool whenever possible.

The normal number of credits required for the degree is 62.

First Year

| Fall Semester | | Spring Semester | | |
|----------------------|----------------------------------|-----------------------------------|--|----|
| BIO 2320 | Zoology | 4 | EQS 1012 Introduction to Equine Studies II | 2 |
| ENG 10XX | English | 3 | EQS 1032 Stable Management | 3 |
| EQS 1010 | Introduction to Equine Studies I | 4 | EQS 2025 Equitation* | 1 |
| EQS 2011 | Equine Training I | 3 | INT 1005 Self, Career, & Culture | 3 |
| EQS 2025 | Equitation* | 1 | VET 1020 Animal Anatomy & Physiology | 4 |
| | | Select one: | | |
| | | | MAT 1210 Principles of Mathematics | 3 |
| | | | MAT 1221 Finite Mathematics | 3 |
| | | 15 | | 16 |
| | | Summer Semester (optional) | | |
| | | | EQS 2801 EQS Summer Internship | 0 |

Second Year

| Fall Semester | | Spring Semester | | |
|----------------------|-------------------------|------------------------|--|----|
| ELE XXXX | AH/SS elective | 3 | AGR 2030 Animal Nutrition | 4 |
| ENG 2080 | Technical Communication | 3 | CIS 1050 Introduction to Spreadsheets | 1 |
| EQS 2020 | Equine Lameness | 3 | EQS 2025 Equitation* | 1 |
| EQS 2025 | Equitation* | 1 | EQS 3032 Riding Instruction II | 3 |
| EQS 3012 | Equine Training II | 3 | EQS 4110 Equine Health & Diseases | 3 |
| EQS 3031 | Riding Instruction I | 3 | EQS 4610 Equine Studies Senior Seminar | 3 |
| | | 16 | | 15 |

* Students must complete a minimum of four semesters of EQS 2025, two in the freshman year, unless the department approves an alternate schedule.

Fire Science

The curriculum includes coursework in fire behavior; emergency care; hazardous materials chemistry; incident strategy and tactics; administration of emergency services; fire prevention; education; and building construction. The program will also prepare students for certification in both firefighting (Vermont Firefighter I and II) and emergency medicine (EMT). As well as preparing students for the fire service, the program will provide strong leadership skills and instill graduates with a sense of community service.

Successful completion of AHS 2011 and licensure as an Emergency Medical Technician through the National Registry of Emergency Medical Technicians (NREMT) is required for graduation from the Fire Science program. EMT licensure is a prerequisite for licensure as an Advanced EMT and for admission into paramedic training programs. The cost of the exam is covered by the State of Vermont the first time. Students who fail the exam are responsible for the fees for the retake. Retakes are available monthly. Students must pass the exam by the end of the sophomore year in order to graduate that year. Otherwise, the student will not be able to graduate until the following May. For more details, see AHS 2011 under *Course Descriptions*.

Students with an Associate of Applied Science in Fire Science will be able to:

- Demonstrate technical skills needed for firefighting, emergency medical services, and critical thinking skills used for fire prevention, control, suppression, and extinguishment
- Provide ethical leadership in their community, fire department, and personal lives
- Deliver professional presentations concerning fire safety in the public sector and produce clear, concise, and accurate written reports required by the profession
- Understand scientific principles of fire and combustion, chemicals in hazardous materials, fire control, and extinguishment
- Recognize the importance of building construction concepts and materials in fire safety; the effects of heat and fire on buildings; and the impact of fire to the personal safety of building occupants
- Understand the science of hydraulics by demonstrating analytical skills needed for water system design including supply and suppression systems, community, and fire ground needs
- Understand the concepts of wellness and the CPAT

The normal number of credits required for the degree is 65.

First Year

| Fall Semester | | | | Spring Semester | |
|---------------|-------------------------------------|---|----------|---------------------------|----|
| CIS 1050 | Introduction to Spreadsheets | 1 | ELE XXXX | AH/SS elective | 3 |
| ENG 10XX | English | 3 | ENG 2080 | Technical Communication | 3 |
| FSC 1010 | Construction & Fire Protection | 3 | FSC 1022 | Firefighting Services II | 4 |
| FSC 1021 | Firefighting Services I | 6 | FSC 1220 | Fire Service Leadership | 3 |
| FSC 1030 | History & Impact of Fire in America | 3 | MAT 1210 | Principles of Mathematics | 3 |
| | | | | 16 | 16 |

Second Year

| Fall Semester | | | | Spring Semester | | |
|---------------|---------------------------------|---|----------|-------------------------------|----------------------------|---|
| AHS 2011 | Emergency Medical Service | 5 | ELE XXXX | AH/SS elective | 3 | |
| CHE 1020 | Introduction to Chemistry | 4 | FSC 2020 | Hydraulics & Water Supply | 3 | |
| FSC 2220 | Firefighting Strategy & Tactics | 3 | FSC 2210 | Fire Administration | 3 | |
| FSC 2250 | Fire & Life Safety Educator | 3 | FSC 2230 | HazMat Chemistry & Operations | 3 | |
| | | | | FSC 2240 | Fire Protection Systems | 3 |
| | | | | FSC 2260 | Career Wellness: CPAT Prep | 3 |
| | | | | 15 | 18 | |

Internships may be available for qualified students as either residential or day programs.

General Engineering Technology

Graduates of this program are generally already employed by a variety of companies and industries seeking workforce development opportunities. Administered by the college's Continuing Education & Workforce Development office, GET degree programs are industry-sponsored and offered primarily at the facilities of sponsoring organizations. The curriculum consists of initial courses common to all GET degree programs, as well as a sequence of technology foundation and technical emphasis courses specific to the workforce education needs being served. These industry-specific technical courses are developed by a curriculum development team comprised of Vermont Tech faculty and representatives from the sponsoring organizations. The goal is to offer students a flexible, interdisciplinary path to the acquisition of basic engineering concepts and specific job-related skills needed to excel in their current positions and prepare for career growth.

The minimum number of credits for the degree is 60.

General Education

| | | |
|----------|-------------------------|-------|
| ELE 2XXX | AH elective | 3 |
| ELE 2XXX | SS elective | 3 |
| ENG 1061 | English Composition | 3 |
| ENG 2080 | Technical Communication | 3 |
| MAT XXXX | Mathematics elective | 3-5 |
| SCI XXXX | Science elective | 4 |
| | | 19-21 |

Foundation Courses

These courses provide a general educational foundation appropriate to the particular technical emphasis. Foundation courses should satisfy the following requirements and cannot be used to satisfy a general education or technical emphasis course requirement:

| | | |
|--------------|--------------------------------|-------|
| CIS XXXX | Computer elective | 3 |
| CIS XXXX | Computer elective | 3 |
| MAT/SCI XXXX | Advanced math/science elective | 3-5 |
| XXX XXXX | Communications elective | 3 |
| XXX XXXX | Communications elective | 3 |
| XXX XXXX | Technical elective | 3 |
| | | 18-20 |

Technical Emphasis Courses

A combination of technical courses based on the degree emphasis will be required. These courses must have the following characteristics:

- Most will have laboratory or hands-on components; these experiences will build troubleshooting and problem-solving skills as well as provide exposure to the course topics
- At least one multi-course sequence will be included; the program should not contain only introductory courses. Typically, there will be a 1000-level courses followed by 2000-level courses which lead to more advanced issues. Prerequisites will be established and reinforced
- There will be a capstone experience (typically a senior project course) which requires students to call upon the comprehensive skills/knowledge gained in the program
- All will integrate theoretical topics with practical skills

Landscape Design & Sustainable Horticulture

The Landscape Design & Sustainable Horticulture program is a diverse program in which students gain scientific, creative, technical, and business skills necessary to grow a variety of plant crops and to design and manage landscapes that enhance the environment and peoples' lives. Students develop skills in design practices such as analyzing a site for the best design fit; taking site measurements and creating base maps; developing conceptual design ideas; and designing planting plans for real-world projects. Students also develop a wide range of horticultural skills, including identifying and propagating woody and herbaceous ornamental plants; diagnosing and creating preventive plans for insect and disease problems; and managing nutrients and water for plant crops.

Graduates of this program pursue careers in the fields of landscape design and plant science, obtaining positions as landscape designers; contractors; greenhouse managers; perennial growers; plant propagators; nursery and garden center operators; arborists; technicians for state and federal agencies; and horticulture supply representatives. Those who complete the associate degree may continue seamlessly into the bachelor's degree program in Business Technology & Management or Diversified Agriculture.

Students with an Associate of Applied Science in Landscape Design & Sustainable Horticulture learn the following competencies:

- **Graphic Communication Skills:** demonstrate an appropriate mastery of freehand sketching, presentation graphics, presentation layout, and CAD as effective tools for the formulation, exploration, communication, and presentation of design ideas
- **Communication Skills:** demonstrate a high level of ability to communicate technical and theoretical information effectively to clients, customers, and coworkers, both through the written and spoken word; demonstrate excellent listening and interpersonal skills; demonstrate the principles of professional conduct in all aspects of client/customer and employee/employer relations
- **Technical Skills:** demonstrate a high level of comprehension and the ability to analyze, solve, and apply the following: materials and methods of construction; site engineering issues such as grading and drainage; the creation and maintenance of healthy plant environments; the installation, operation, advantages, and disadvantages of greenhouse and nursery environmental systems; integrated pest management; and the use of appropriate computer applications
- **Design Skills:** integrate fundamental design principles and practice, including site analysis; base plan measurements and preparation; and study of historic precedent in order to analyze, create, and apply these concepts to comprehensive and holistic landscape designs. This includes working drawings, presentation drawings, client/jury evaluations, and write-up. This course of study culminates in a proposed master plan project that integrates all aspects of design study
- **Horticultural Skills:** demonstrate a high level of comprehension and the ability to analyze, solve, and apply the following: identification, production, and use of herbaceous and woody ornamental plants; propagation; diagnosis of insect and disease problems and the assimilation of integrated, environmentally safe, and sustainable approaches for their management; soil properties; and landscape applications such as plant selection; planting and pruning practices; cultural requirements and practices; and maintenance
- **Business Skills:** examine and analyze: practical aspects of organizing and managing a small business; marketing (product, place, pricing, and promotion); and management skills. Demonstrate a working knowledge of generally-accepted accounting practices as they apply to the horticultural/design industry. Demonstrate a high level of ability in such essential "soft skills" as interpersonal communication, professionalism, and teamwork

The normal number of credits required for the degree is 63.

First Year

| Fall Semester | | Spring Semester | | |
|----------------------|------------------------------|------------------------|---|----------|
| CIS 1050 | Introduction Spreadsheets | 1 | BIO 1220 Botany | 4 |
| ENG 10XX | English | 3 | ELE XXXX AH/SS elective | 3 |
| LAH 1020 | Introduction to Horticulture | 3 | LAH 1031 CAD for Landscape Applications | 2 |
| LAH 1021 | Landscape Graphics | 3 | LAH 1050 Introduction to Soils | 4 |
| LAH 1030 | Woody Ornamentals † | 3 | LAH 2011 Introduction to Landscape Design | <u>3</u> |
| MAT 1210 | Principles of Mathematics | <u>3</u> | | |
| | | 16 | | 16 |

Summer Semester

| | | |
|----------|------------------------|---|
| LAH 2801 | LDSH Summer Internship | 0 |
|----------|------------------------|---|

Second Year

| Fall Semester | | Spring Semester | | |
|----------------------|----------------------------------|------------------------|----------------------------------|----------|
| BIO 2040 | Entomology/Ecological Pest Mgmt | 3 | BIO 2030 Plant Pathology | 3 |
| BUS 2210 | Small Business Management | 3 | ELE XXXX AH/SS elective | 3 |
| LAH 2010 | Landscape Construction Practices | 3 | ENG 2080 Technical Communication | 3 |
| LAH 2020 | Plant Propagation | 3 | LAH 1040 Greenhouse Management | 3 |
| LAH 2030 | Herbaceous Plant Materials † | 3 | LAH 2012 Landscape Design II | <u>3</u> |
| LAH 2802 | LDSH Summer Internship Review | <u>1</u> | | |
| | | 16 | | 15 |

† Courses are offered every other year

Manufacturing Engineering Technology

The objective of this bachelor of science degree program is to prepare graduates with technical and leadership skills necessary for manufacturing competitiveness. Graduates will fill the needs of production managers, quality assurance engineers, product designers, maintenance engineers, and process engineers.

Students with a Bachelor of Science in Manufacturing Engineering Technology should be able to demonstrate:

- Knowledge of and experience with materials and manufacturing processes
- Knowledge of and experience with product design process, tooling, and assembly
- An understanding of manufacturing systems, automation, and operations
- The ability to select and apply knowledge of statistics; quality and continuous improvement; and industrial organization and management

The minimum number of credits required for the degree is 122.

First Year

| Fall Semester | | | Spring Semester | | |
|----------------------|---------------------------------|----------|------------------------|-------------------------|----------|
| ENG 1060 | Freshman Composition | 3 | ENG 2080 | Technical Communication | 3 |
| MAT 1311 | Precalculus I | 3 | INT 1005 | Self, Career, & Culture | 3 |
| MEC 1010 | Intro to Mechanical Engineering | 1 | MAT 1312 | Precalculus II | 3 |
| MEC 1011 | Design Communication I | 2 | MEC 1012 | Design Communication II | 3 |
| MEC 1020 | Manufacturing Processes I | 2 | PHY 1042 | Physics II | <u>4</u> |
| PHY 1041 | Physics I | <u>4</u> | | | |
| | | 15 | | | 16 |

Second Year

| Fall Semester | | | Spring Semester | | |
|----------------------|----------------------------------|----------|------------------------|-----------------------------------|----------|
| ELE XXXX | AH/SS elective | 3 | CHE 1031 | General Chemistry I | 4 |
| ELT 2071 | Basic Electricity | 3 | ELT 2072 | Electronics | 3 |
| MAT 1520 | Calculus for Engineering | 4 | MAT 2021 | Statistics | 3 |
| MEC 1060 | Metrolgy & Inspection Techniques | 3 | MEC 1040 | Intro to Materials Science/Engrng | 3 |
| MEC 2040 | Computer-Aided Technology | <u>2</u> | MEC 2071 | Machine Design | <u>2</u> |
| | | 15 | | | 15 |

Third Year

| Fall Semester | | | Spring Semester | | |
|----------------------|----------------------------------|----------|------------------------|--------------------------------|----------|
| BUS 2020 | Principles of Management | 3 | ELE XXXX | AH/SS elective | 3 |
| MEC 1080 | Intro to GMAW (MIG) Welding | 3 | MEC 2050 | Thermodynamics & Heat Transfer | 3 |
| MEC 2010 | Fluid Mechanics & Fluid Systems | 3 | MEC 3021 | Manufacturing Processes II | 3 |
| MEC 2035 | Statics & Strengths of Materials | 4 | MEC 3041 | Advanced CNC Machining | 3 |
| MEC 3031 | Materials Processes | <u>3</u> | XXX XXXX | Elective | <u>3</u> |
| | | 16 | | | 15 |

Fourth Year

| Fall Semester | | | Spring Semester | | |
|----------------------|------------------------------------|----------|------------------------|------------------------------|----------|
| BUS 2260 | Principles of Financial Management | 3 | BUS 4530 | Technical Project Management | 3 |
| BUS 3150 | Production & Operations Mgmt | 3 | MEC 4010 | Lean Manufacturing | 3 |
| ELE 3XXX | Upper level AH/SS elective | 3 | MEC 4721 | Capstone Design Project I | 3 |
| MEC 4020 | Quality Assurance | 3 | XXX XXXX | Elective | 3 |
| XXX XXXX | Elective | <u>3</u> | XXX XXXX | Elective | <u>3</u> |
| | | 15 | | | 15 |

Mechanical Engineering Technology

Graduates of this program are involved in the design, testing, manufacture, installation, maintenance, distribution, and documentation of mechanical systems and devices. They are also well prepared for admission to Vermont Tech's Bachelor of Science in Manufacturing Engineering Technology; Electromechanical Engineering Technology, Renewable Energy Technology; or Business Technology & Management.

The educational objectives of the program are:

- Help graduates to develop a successful career in the manufacturing, design, specification, installation, testing, operation, maintenance, sales, or documentation of mechanical systems
- Train students to employ strong communication and teamwork skills and participate productively on professional teams of engineers, technicians, managers, and skilled production workers
- Assist students to utilize technical knowledge and skills to effectively design, fabricate, manufacture, and maintain industrial and consumer systems and products
- Show students how to continuously develop as a professional, adapting and staying current in their field

Students with an Associate of Engineering in Mechanical Engineering Technology will be able to:

- Apply the knowledge, techniques, skills, and modern tools of mechanical engineering technology to areas such as design and solid modeling; materials and structures; machines and mechanisms; fluids systems; thermal systems; and manufacturing
- Apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge
- Conduct standard tests and measurements and conduct, analyze, and interpret experiments
- Apply creativity in the design of systems, components, or processes appropriate to program objectives
- Function effectively as a member of a technical team
- Identify, analyze, and solve narrowly-defined engineering technology problems
- Apply written, oral, and graphical communication in both technical and non-technical environments and identify and use appropriate technical literature
- Understand the purpose of and engage in self-directed continuing professional development
- Recognize the importance of and have a commitment to addressing professional and ethical responsibilities, including a respect for diversity
- Demonstrate a commitment to quality, timeliness, and continuous improvement

The program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>

The normal number of credits required for the degree is 66.

First Year

| Fall Semester | | | Spring Semester | | |
|----------------------|---------------------------------|----------|------------------------|-----------------------------------|----------|
| ENG 10XX | English | 3 | ENG 2080 | Technical Communication | 3 |
| MAT 1311 | Precalculus I | 3 | INT 1005 | Self, Career, & Culture | 3 |
| MEC 1010 | Intro to Mechanical Engineering | 1 | MAT 1312 | Precalculus II | 3 |
| MEC 1011 | Design Communication I | 2 | MEC 1012 | Design Communication II | 3 |
| MEC 1020 | Manufacturing Processes I | 2 | MEC 1040 | Intro to Materials Science/Engrng | 3 |
| PHY 1041 | Physics I | <u>4</u> | PHY 1042 | Physics II | <u>4</u> |
| | | 15 | | | 19 |

Second Year

| Fall Semester | | | Spring Semester | | |
|----------------------|----------------------------------|----------|------------------------|--------------------------------|----------|
| ELT 2071 | Basic Electricity | 3 | ELE XXXX | AH/SS elective | 3 |
| MAT 1520 | Calculus for Engineering | 4 | ELT 2072 | Electronics | 3 |
| MEC 2010 | Fluid Mechanics & Fluid Systems | 3 | MEC 2050 | Thermodynamics & Heat Transfer | 3 |
| MEC 2035 | Statics & Strengths of Materials | 4 | MEC 2065 | Kinematics & Dynamics | 4 |
| MEC 2040 | Computer-Aided Technology | <u>2</u> | MEC 2720 | Mechanical Projects | <u>3</u> |
| | | 16 | | | 16 |

Note: Students desiring PHY 2041/2042 instead of PHY 1041/1042 must make specific arrangements with the department chair.

Nursing

Vermont Tech offers a career ladder progression approach for students to enter and advance in a nursing career. The career ladder approach is provided in a 1+1+2 model which allows for the completion of the Practical Nursing (PN) certificate, followed by the completion of the Associate of Science in Nursing (ADN) leading to eligibility for RN licensure, and culminating with the Bachelor of Science in Nursing (BSN). Qualified students may be accepted into Vermont Tech's Nursing program at any point (pre-PN, ADN, or BSN) and may progress through the bachelor's degree or may choose to stop after receiving the PN or ADN credentials. If so, students may re-enter the program at a later time. The PN and ADN programs are offered at four locations across the state with campuses in Bennington, Brattleboro, Randolph Center, and Williston and at distance education sites in Lyndonville, Middlebury, Newport, St. Albans, Springfield, and White River Junction. The BSN program is offered exclusively online.

Vermont Tech also offers an LPN and an RN re-entry program. These programs are provided for LPNs and RNs whose licenses have lapsed and would like to have them reinstated. The LPN and RN re-entry programs update the nurse's credentials, allowing them eligibility to return to a nursing position upon completion of the program. For further information about these programs, contact the Nursing department.

To progress directly from the PN to the ADN level, students must:

- Declare their intent to progress on a Change of Program form no later than January 31 of the year in which they wish to progress
- Receive a minimum grade point average (GPA) of 3.0 during each of the PN semesters
- Obtain the Practical Nursing License (LPN) during the summer between the PN and ADN years

To progress directly from the ADN to the BSN level, students must:

- Declare their intent to progress on a Change of Program form no later than March 31 of the year in which they wish to progress
- Maintain a minimum cumulative 2.5 GPA through the ADN program
- Obtain licensure as a Registered Nurse during the summer after completing the ADN degree

While Vermont Tech guarantees direct progression from the PN to the ADN program for qualified students, it cannot guarantee direct progression at the same site at which the PN certificate was obtained. Because of the competitive demand for ADN slots and the limitations of clinical ADN placements in some areas of the state, some students may have to continue their nursing studies at a site other than their first choice or the site at which the PN certificate was obtained.

Students progressing directly from the PN to the ADN level must request their first, second, and third site preference for the ADN education on their Nursing Direct Progress form.

Vermont Tech will assign first priority to students requesting to remain at their PN site in order of GPA. Once the ADN slots are filled for any site, Vermont Tech will try to place students in the ADN site of their next highest stated preferences if seats are available. Students whose first preference is to attend an ADN site other than the one where they took their PN program will be considered for the preferred site after qualified students attending that site for their PN have been offered a seat in that ADN program.

Students wishing to take off a semester or more after completing the PN or ADN program may apply for re-admittance to the nursing program through the regular nursing program admissions process, but will not be guaranteed admittance.

PN and ADN students must receive a grade of C+ or more in all NUR courses and a C in BIO and PSY courses in order to progress in the program. If a student in the last semester of the program does not achieve these grades, s/he will not be allowed to graduate.

Grades lower than the required 75 or 77 will be reflected on the transcript with the corresponding letter grade, so credits may be awarded for any grade above an F, but students will not continue to progress or graduate from the Nursing programs unless their grades conform with the standards stated here.

The normal number of credits required for the PN certificate is 47. For the ADN, the normal number of credits is 70. The normal number of credits required for the BSN is 120.

Certificate in Practical Nursing

The PN program extends over three semesters, August through June. Students learn PN skills through independent study, lectures, demonstrations, and practice in a nursing skills lab. Under instructor supervision, students also provide patient care in a variety of healthcare settings in neighboring healthcare agencies.

Upon completion of the program, PN graduates are awarded certificates and are eligible to apply to take the NCLEX for Practical Nursing Licensure. The Vermont State Board of Nursing application requires information regarding past history of substance abuse, prior felony convictions, and failure to pay child support and/or taxes for all graduates. Other states may ask similar questions. It is the Board's responsibility to determine eligibility to sit for the licensure examination and to issue the license to practice. For more information, please refer to <http://vtprofessionals.org/opr1nurses>

After licensure, PN graduates typically find employment in long-term care, outpatient clinics, physicians' offices, and other healthcare agencies and work under the supervision of a registered nurse, physician, or dentist. With experience, they can assume increasing responsibilities in the nursing field.

Students with a Certificate in Practical Nursing will be able to:

- Employ the nursing process for select clients to maintain, achieve, or regain their optimal level of self-care
- Integrate knowledge of scientific, behavioral, and cultural principles in the care of clients in a variety of settings
- Establish collaborative relationships with members of the nursing and health team
- Maintain confidentiality in a clinical setting and support the use of legal and ethical standards
- Assume the role of a member of an interdisciplinary team
- Provide care which maximizes the self-care potential of individuals across the lifespan in a variety of healthcare settings
- Contribute to the development of a teaching plan for the client with an alteration in basic self-care needs
- Assume responsibility for self-directed, goal-oriented growth

| Fall Semester | | | Spring Semester | | |
|----------------------|-------------------------------------|----------|---------------------------|---------------------------------------|----------|
| BIO 1030 | Nutrition* | 3 | BIO 2012 | Human Anatomy & Physiology II* | 4 |
| BIO 2011 | Human Anatomy & Physiology I* | 4 | NUR 0121 | Principles & Practices II Lab | 4 |
| NUR 0111 | Principles & Practices I Lab | 4 | NUR 1010 | Pharmacology for Nursing | 3 |
| NUR 1020 | The Nurse-Client Relationship | 3 | NUR 1121 | Principles & Practices of Nursing II | 5 |
| NUR 1111 | Principles & Practices of Nursing I | <u>5</u> | PSY 1050 | Human Growth & Development | <u>3</u> |
| | | 19 | | | 19 |
| | | | Spring2 Semester** | | |
| | | | NUR 0131 | Principles & Practices III Lab | 4 |
| | | | NUR 1131 | Principles & Practices of Nursing III | <u>5</u> |
| | | | | | 9 |

* Prerequisite courses required at all sites except Randolph and Williston

PN students may not enroll in spring or summer courses until after Spring2 courses are complete (see VSC Enrollment Consortium Agreement).

The certificate program includes 495 hours of theory and 630 hours of clinical/lab.

Associate Degree in Nursing

The ADN program articulates with the PN program and requires two further semesters of full-time study. Additionally, the twelve clinical credits earned in the PN program do not transfer to the ADN program.

ADN graduates are prepared to work in a healthcare setting under the supervision of more experienced practitioners. With experience, they can assume increasing responsibilities and may be responsible for supervising others.

ADN program graduates are awarded an Associate of Science in Nursing and are eligible to apply to take the NCLEX for Registered Nurses. The Vermont State Board of Nursing application requires information regarding past history of substance abuse, prior felony convictions, and failure to pay child support and/or taxes for all graduates. Other states may ask similar questions. It is the Board's responsibility to determine eligibility to sit for the licensure examination and to issue the license to practice. For more information, please refer to <http://vtprofessionals.org/opr1/nurses>

Students with an Associate of Science in Nursing will be able to:

- Evaluate the plan of care to assist clients with complex healthcare needs to maintain, achieve, or regain their optimal level of self-care
- Select appropriate scientific, behavioral, and cultural principles for the care of clients with complex needs in diverse settings
- Evaluate interpersonal skills in professional practice
- Incorporate behaviors consistent with legal and ethical standards of professional practice
- Assume the role of manager of care within the interdisciplinary team
- Competently deliver nursing care which maximizes the self-care potential of individuals with complex health needs in diverse settings
- Evaluate a comprehensive teaching plan to meet the physical and emotional needs of individuals and groups with common and complex healthcare needs
- Demonstrate accountability for growth as individuals, as members of society, and as professional nurses

| Fall Semester | | Spring Semester | | |
|----------------------|--------------------------------------|------------------------|--|---|
| BIO 2120 | Elements of Microbiology | 4 | ENG 2080 Technical Communication | 3 |
| ELE XXXX | AH elective | 3 | MAT 1040 Mathematics for Allied Health | 2 |
| ENG 10XX | English | 3 | NUR 2011 Advanced Pharmacology | 1 |
| NUR 2010 | LPN to RN Transition/Trends in NUR | 2 | NUR 2130 Principles & Practices of Nursing V | 5 |
| NUR 2030 | Principles & Practices of Nursing IV | 3 | NUR 2140 Principles & Practices V Lab | 4 |
| NUR 2040 | Principles & Practices IV Lab | 2 | PSY 1010 Introduction to Psychology | 3 |
| | | 17 | 18 | |

The associate degree program includes 420 hours of theory and 315 hours of clinical/lab.

Bachelor's Degree in Nursing

The Bachelor of Science in Nursing at Vermont Tech is fully online. Students currently enrolled in the Vermont Tech ADN program may continue directly in the BSN program if they maintain a minimum 2.50 GPA and obtain a Registered Nurse license prior to beginning NUR courses in the BSN program.

Admission to the program requires the following:

1. Unencumbered active license as a Registered Nurse within the United States
2. RN graduate of an accredited nursing program
3. Completion of prerequisite courses (below) or equivalent with a minimum grade of C

Requirements must be maintained throughout enrollment in the BSN program.

BSN students must receive a grade of C in all NUR courses. If a BSN student receives a grade of less than 75, that student will be considered on probation, but can continue to take classes. They may retake the course once within a one-year period and will be removed from probation if they receive a C or greater in that repeated course. Receiving a grade of C- or less in the same course twice, or once in two separate courses, will be grounds for dismissal from the BSN program. The Nursing Director will review such cases for mitigating circumstances and make final decisions regarding dismissal.

Prerequisites

| | | |
|----------|-------------------------------|--------------|
| BIO 1030 | Nutrition | 3 |
| BIO 2011 | Human Anatomy & Physiology I | 4 (with lab) |
| BIO 2012 | Human Anatomy & Physiology II | 4 (with lab) |
| BIO 2120 | Elements of Microbiology | 4 (with lab) |
| ENG 1060 | English Composition | 3 |
| MAT 1040 | Mathematics for Allied Health | 2 |
| PSY 1010 | Introduction to Psychology | 3 |
| PSY 1050 | Human Growth & Development | 3 |

Students with a Bachelor of Science in Nursing will be able to:

- Collaborate with clients, the interdisciplinary team, and multiple care providers when planning care to establish client-centered goals to optimize wellness outcomes and evaluate care plan effectiveness for the individual and community
- Engage applied sciences including scientific, behavioral, psychological, and cultural principles for the care of complex clients that incorporates global appreciation, understanding, and tolerance; design evidence-based practice care, incorporating and participating in qualitative research to generate theory and/or quantitative research to test theory
- Distinguish between experimental positivistic empirical approaches and non-experimental research designs; define strengths, weaknesses, the importance of rigor and replicable findings; statistical analysis; and threats to validity, such as bias
- Determine utilization of collaborative relationships with the health team and the community to facilitate communication of team members to enhance care, promote mentorship, and strategize utilization of technology, embracing diversity while evolving therapeutic communication techniques of presencing and dialogical exchange
- Integrate legal and ethical standards that encompass consideration of potential ethical dilemmas and promote self-integrity as well as consideration of benefit to the community
- Coordinate and co-lead the interdisciplinary team; advocate for clients by compassionately caring for people and families using the art and science of nursing in theoretically-based practice
- Help people flourish and find optimal meaning in their lived experiences, demonstrate sound nursing judgement, utilize critical thinking, develop scholarship, and ascertain how to promote the healthiest possible community

- Maximize patient-centered care by co-creating health with clients, empowering people, facilitating comfort, and incorporating health promotion by synthesizing integration of the simultaneity and totality paradigm
- Design a holistic teaching plan with understanding of the person, health, environment, and nursing
- Continually strive for excellence through ongoing engagement in self-directed lifelong learning with participation as an active member of society in their community; working with or becoming leaders; and developing their professional identity and ability to work with teams to create innovative or evidence-based solutions to problems

Third Year

| Fall Semester | | Spring Semester | | |
|---------------|-------------------------------|-----------------|---|----|
| MAT 2021 | Statistics | 3 | NUR 3210 Healthcare Systems | 3 |
| NUR 3100 | RN to BSN: Online Transition | 1 | PSY 3070 Abnormal Psychology | 3 |
| NUR 3110 | Nursing Informatics | 3 | SOC XXXX Sociology elective | 3 |
| NUR 3120 | Palliative & End-of-Life Care | 2 | Select one: | |
| NUR 3140 | Pathophysiology & Assessment | 4 | NUR 4011 Teaching/Learning in Healthcare | 3 |
| | | | NUR 4012 Health Promotion Across the Lifespan | 3 |
| | | 13 | | 12 |

Fourth Year

| Fall Semester | | Spring Semester | | |
|------------------|------------------------------------|-----------------|--|----|
| HUM 2020 | Bioethics | 3 | HUM 4010 East & West Holistic Healing | 3 |
| NUR 4110 | Research & Evidence-Based Practice | 4 | NUR 4210 Global Health/Population Healthcare | 3 |
| NUR 4130 | Nursing Leadership & Management | 6 | NUR 4410 Community Health | 6 |
| Optional: | | | | |
| NUR 4120 | Guided Research | 1 | | |
| | | 13-14 | | 12 |

The BSN program includes 675 hours of theory and 225 hours of precepted time that can be completed in the student's community or work setting.

All BIO and NUR courses and PSY 1050 must be completed with a grade of C or better to continue in any program; only 35 credits from the PN program will count toward cumulative credits. Only non-clinical hours/courses count toward GPA.

Any student who fails to receive a passing grade in the clinical and/or didactic portion of their final semester Nursing and/or Allied Health course is considered to have failed the program and is not eligible to participate in commencement activities.

Paramedicine

Vermont Tech offers a Paramedic certificate program at the Bennington and Williston campuses utilizing hybrid and interactive classroom learning formats. The program classroom and laboratory time extends over three semesters (fall, spring, and summer) and is followed by a cumulative field internship.

Students learn paramedic skills through independent study, online discussions, lectures, demonstrations, and practice in an Emergency Medical Services (EMS) lab. Under preceptor supervision, students also provide patient care in a variety of pre-hospital and in-hospital health care settings.

Upon completion of the program, Paramedicine graduates are awarded certificates and are eligible to apply to take the National Registry of EMTs' Paramedic examination. After licensure/certification, Paramedicine graduates typically find employment in pre-hospital or in-hospital care settings working as a member of the health care team.

Students with a Certificate in Paramedicine will be able to:

- Demonstrate proper affective behaviors when interacting with patients, the public, and member of the health care team
- Perform a comprehensive history and physical examination to identify factors affecting the health and health needs of a patient
- Formulate a field impression based on analysis of comprehensive assessment findings, anatomy, physiology, pathophysiology, and epidemiology
- Relate assessment findings to underlying pathological and physiological changes in the patient's condition
- Integrate and synthesize the multiple determinants of health and clinical care
- Perform health screenings and referrals
- Effectively communicate in a manner that is culturally sensitive and intended to improve patient outcome
- Safely and effectively perform all psychomotor skills within the National EMS Scope of Practice Model and State Scope of Practice at the Paramedic level
- Anticipate and prospectively intervene to improve patient outcome
- Act as a role model of exemplary professional behavior
- Perform basic and advanced interventions as part of a treatment plan intended to mitigate the emergency, provide symptom relief, and improve overall health of the patient
- Evaluate the effectiveness of interventions and modify treatment plans accordingly
- Report and document assessment findings and interventions
- Collect and report data to be used for epidemiological and research purposes
- Perform a patient assessment, develop a treatment plan, and develop a disposition plan for a patient with a variety of medical and traumatic complaints
- Function as the team leader of a routine, single-patient advanced life support emergency call
- Ensure the safety of the rescuer and others during an emergency
- Assume responsibility for self-directed, goal-oriented growth

The normal number of credits required for the certificate is 40.

| Fall Semester | | | Spring Semester | | |
|------------------------|--------------------------------------|----|--------------------------|-------------------------------------|----|
| BIO 2011 | Human Anatomy & Physiology I | 4 | BIO 2012 | Human Anatomy & Physiology II | 4 |
| EMS 1020 | The Art of Paramedicine | 2 | EMS 1210 | Medical Emergencies | 4 |
| EMS 1030 | Pharmacology & Medication | 3 | EMS 1220 | Cardiology | 3 |
| EMS 1040 | Airway Management | 1 | EMS 1240 | Paramedic Principles & Practices II | 2 |
| EMS 1050 | Paramedic Principles & Practices I | 2 | EMS 1802 | Paramedic Field Experience II | 1 |
| EMS 1801 | Paramedic Field Experience I | 1 | | | |
| | | 13 | | | 14 |
| Summer Semester | | | Fall (2) Semester | | |
| EMS 1310 | OB/GYN & Pediatrics | 3 | EMS 1804 | Paramedic Field Internship | 0 |
| EMS 1320 | Trauma Management | 3 | | | |
| EMS 1330 | Emergency Medical Services Ops | 2 | | | |
| EMS 1340 | Special Considerations | 2 | | | |
| EMS 1350 | Paramedic Principles & Practices III | 2 | | | |
| EMS 1803 | Paramedic Field Experience III | 1 | | | |
| | | 13 | | | |

Professional Pilot Technology

Graduates of this program are prepared for a variety of career opportunities in aviation. Students attain necessary flight credentials for numerous cockpit positions including flight education, corporate flying, charter operations, commuter airlines, and, ultimately, positions with domestic and international air carriers. In addition, students may also qualify for employment in many other aviation industry positions such as managers, dispatchers, simulator trainers, and marketers for aviation or related companies.

The Professional Pilot Technology program provides flight training courses in cooperation with Vermont Flight Academy at Burlington International Airport. Offered FAA certificates and ratings include: Private, Instrument, Commercial (Single-Engine Land & Sea), Multi-Engine (Land & Sea), and Certified Flight Instructor (Airplane, Instrument, & Multi-Engine). The coursework combines basic and advanced airmanship skills to provide safe operations for all types of flying.

The Bachelor of Science in Professional Pilot Technology program will:

- Provide graduates with the academic and professional tools needed to achieve success in the constantly changing aviation industry
- Provide knowledge of contemporary world-wide aviation industry issues
- Provide specific flying skills to attain FAA certificates and ratings that allow for success in all segments of the international aviation industry
- Enhance critical thinking and decision-making skills necessary for safe and effective flying
- Provide professional preparation and a zeal for lifelong learning, with a focus on the development of professional skills enhanced by the technology of aviation and integrated safety practices

Students with a Bachelor of Science in Professional Pilot Technology will

- Demonstrate the theoretical knowledge and flight skills necessary to attain FAA certificates and ratings in Private, Instrument, Commercial, Flight Instructor, and Multi-Engine as well as training or endorsements in taildragger (conventional gear), aerobatic, high performance, high altitude, complex, and seaplane aircraft
- Understand and interpret meteorological data to ensure safe and efficient flight operations
- Operate as a crew member in an aircraft cockpit and function and communicate effectively with precision and clarity as part of a multi-disciplinary team with peers, instructors, superiors, subordinates, and government agencies
- Understand the technological, political, and historical developments constituting the evolution of modern aviation
- Accurately analyze and interpret data from aerodynamic, mathematical, and scientific principles to ensure safe and efficient flight operations in all types of flying

Completion of the aviation degree entails intensive motivation and commitment. Most pilot certificates or ratings are completed in a 14 week semester. This requires the necessity to fly 4-5 times *minimum* each week to complete the courses. As an FAA-approved 141 flight school, the FAA requires Stage Checks and short written exams for each stage in every course. The flight school also has milestones in each week of training for every course. The Chief Flight Instructor and assistants are dedicated to following the published milestones and stage checks for every student to ensure proper completions. Students will be called upon to make up cancellations or delays on weekends and during scheduled breaks if necessary. Students must be available to fly seven days per week, including some flights at night.

Be aware that consequences will incur for noncompliance of all scheduling requests, milestones, and Stage Check failures. Consequences include, but are not limited to, charges for lateness, unpreparedness, or failure to show up for flights. If continuous interventions in published milestones occur, students can expect grade reductions or dismissal from the program for poor attendance or failure to progress properly.

Compliance with all schedules, FAA regulations, and course syllabi is a major part of the training for a career in the field of aviation.

The normal number of credits required for the degree is 121.

First Year

| Fall Semester | | Spring Semester | | |
|----------------------|----------------------------------|------------------------|--|----------|
| AER 1005 | Introduction to Aviation Careers | 3 | AER 1032 Aviation Meteorology II | 4 |
| AER 1010 | Private Pilot: Ground | 3 | AER 1110 Pilot Instrument Rating: Ground | 3 |
| AER 1020 | Private Pilot: Flight | 2 | AER 1120 Pilot Instrument Rating: Flight | 2 |
| AER 1031 | Aviation Meteorology I | 3 | INT 1005 Self, Career, & Culture | 3 |
| ENG 10XX | English | <u>3</u> | MAT 1100 Mathematics for Technology | <u>3</u> |
| | | 14 | | 15 |

Second Year

| Fall Semester | | Spring Semester | | |
|----------------------|----------------------------------|------------------------|--|----------|
| AER 2010 | Commercial Pilot: Ground | 3 | AER 2032 Commercial Pilot: Flight Phase II | 2 |
| AER 2031 | Commercial Pilot: Flight Phase I | 2 | AER 2110 Safety & Accident Investigation | 3 |
| AER 2130 | Aviation History | 3 | BUS 2020 Principles of Management | 3 |
| AER 2330 | Aviation Physiology & Psychology | 3 | CIS 1080 Intro Spreadsheets/Database Mgmt | 2 |
| AER 2610 | Aviation Project I | 2 | ELE XXXX AH/SS elective | 3 |
| PHY 1041 | Physics I | <u>4</u> | ENG 2080 Technical Communication | <u>3</u> |
| | | 17 | | 16 |

Third Year

| Fall Semester | | Spring Semester | | |
|----------------------|-------------------------------------|------------------------|--|----------|
| AER 3010 | Certified Flight Instructor: Ground | 6 | AER 3110 Aviation Law | 3 |
| AER 3020 | Certified Flight Instructor: Flight | 2 | BUS 3250 Organizational Behavior & Mgmt | 3 |
| AER 3030 | Human Factors, Risk Mgmt, CRM | 3 | ELE XXXX Upper level AH/SS elective | 3 |
| AER 3040 | Aircraft Maintenance for Pilots | 3 | MAT 2021 Statistics | 3 |
| BUS 3080 | Airline Operations & Management | <u>3</u> | 3 credits: | |
| | | | AER 4010 Multi-Engine Land Ground/Flight | .5 |
| | | | AER 4011 Multi-Engine Sea Ground/Flight | .5 |
| | | | AER 4020 CFI: Instrument Ground/Flight | 1 |
| | | | AER 4030 CFI: Multi-Engine Ground/Flight | 1 |
| | | | ELE XXXX AH/SS elective | <u>3</u> |
| | | 17 | | 15 |

Fourth Year

| Fall Semester | | Spring Semester | | |
|----------------------|------------------------------------|------------------------|---|----------|
| AER 4040 | Corporate Flying/Business Aviation | 3 | AER 4050 Training & Flying Adv Airplanes | 3 |
| AER 4060 | Unmanned Aerial Systems | 3 | AER 4110 Adv Transport Category Systems | 3 |
| AER 4610 | Aviation Senior Project II | 3 | AER 4130 High Alt Nav/Internat'l Flight Ops | 3 |
| ELE XXXX | AH/SS elective | 3 | ELE XXXX AH/SS elective | <u>3</u> |
| ELE XXXX | AH/SS elective | <u>3</u> | | |
| | | 15 | | 12 |

Renewable Energy

The Renewable Energy degree integrates the study of engineering, technology, science, and business to prepare graduates to design, implement, and manage renewable energy systems and similar technologies. Students learn to evaluate renewable resources, complete site assessments, design systems, and model performance.

Students enrolled in the Bachelor of Science in Renewable Energy will:

- Design and manage renewable energy systems and related technologies
- Develop a career path that employs knowledge of science, technology, and management to address energy needs and challenges
- Work as an effective member of a multidisciplinary team using strong graphic and verbal skills to present ideas
- Learn to integrate state-of-the-art knowledge in this rapidly evolving profession

Renewable energy courses offer hands-on experiences that include design, site assessment, systems installation, biomass processing, system performance monitoring, and troubleshooting. Students also develop and apply theoretical tools to predict system performance and utilize computer-aided technology for design. Technologies covered include solar PV, renewable heating, wind, and biomass.

The Renewable Energy degree program begins with foundation courses to build a broad base of knowledge and skills in science, engineering, technology, design, analysis, and communication. The program curriculum also offers hands-on experience with solar, wind, biomass, and other working renewable energy systems on our Randolph Center campus. Student experiences include solar and wind resource assessment; biomass processing and characterization; system design and installation; and performance estimation and monitoring.

Our graduates have gone on to be systems designers, systems technicians, field operations technologists, technical managers, and sales technicians employed by renewable energy manufacturers; energy project developers; manufacturing and technology companies; and energy consulting and management firms.

The normal number of credits required for the degree is 121.

First Year

| Fall Semester | | Spring Semester | | |
|----------------------|---------------------------|------------------------|----------------------------------|----|
| ENG 1060 | Freshman Composition | 3 | CHE 1031 General Chemistry I | 4 |
| MAT 1311 | Precalculus I | 3 | INT 1005 Self, Career, & Culture | 3 |
| MEC 1010 | Introduction to MEC | 1 | MAT 1312 Precalculus II | 3 |
| MEC 1011 | Design Communication I | 2 | MEC 1012 Design Communication II | 2 |
| MEC 1020 | Manufacturing Processes I | 2 | PHY 1042 Physics II | 4 |
| PHY 1041 | Physics I | 4 | | |
| | | 15 | | 16 |

Second Year

| Fall Semester | | Spring Semester | | |
|----------------------|---------------------------------|------------------------|---|----|
| BIO 1020 | Intro to Environmental Biology | 4 | ELT 2072 Electronics | 3 |
| BUS 2020 | Principles of Management | 3 | ENG 2080 Technical Communication | 3 |
| ELT 2071 | Basic Electricity | 3 | MAT 2021 Statistics | 3 |
| MAT 1520 | Calculus for Engineering | 4 | MEC 2150 Intro to Solar Photovoltaic Tech | 3 |
| SSC 2030 | Energy Systems & Sustainability | 3 | MEC 2170 Renewable Energy Heating | 3 |
| | | 17 | | 15 |

Third Year

| Fall Semester | | Spring Semester | | |
|----------------------|----------------------------------|------------------------|---|----|
| ARE 2031 | Environmental Systems I | 3 | ARE 2032 Environmental Systems II | 3 |
| MEC 2035 | Statics & Strengths of Materials | 4 | ARE 3050 Fluids & Thermodynamics | 4 |
| MEC 3010 | Wind Power | 3 | BUS 3250 Organizational Behavior & Mgmt | 3 |
| MEC 3040 | Bioenergy | 3 | ELE XXXX AH/SS elective | 3 |
| XXX XXXX | Technical elective | 3 | XXX XXXX Technical elective | 3 |
| | | 16 | | 16 |

Summer Semester

| | | |
|----------|----------------|---|
| MEC 4801 | MEC Internship | 0 |
|----------|----------------|---|

Fourth Year

| Fall Semester | | Spring Semester | | |
|----------------------|----------------------------|------------------------|---------------------------------------|----|
| ARE 4030 | HVAC Systems | 4 | BUS 4530 Technical Project Management | 3 |
| ELE 3XXX | Upper level AH/SS elective | 3 | ELE XXXX AH/SS elective | 3 |
| MEC 4721 | Capstone Design Project I | 3 | MEC 4722 Capstone Design Project II | 3 |
| MEC 4802 | MEC Internship Review | 1 | XXX XXXX Technical elective | 3 |
| XXX XXXX | Technical elective | 3 | | |
| | | 14 | | 12 |

Respiratory Therapy

Graduates of this program work to apply scientific principles to prevent, identify, and treat acute or chronic dysfunction of the cardiopulmonary system. Respiratory care includes the assessment, treatment, management, control, diagnostic evaluation, education, and care of patients with deficiencies of the cardiopulmonary system. About 75% of all respiratory therapists work in hospitals or other acute care settings. However, many therapists are employed in clinics, physicians' offices, and skilled nursing facilities.

The Respiratory Therapy program is offered in a distance learning format in two locations in Vermont in collaboration with CCV and healthcare providers at various locales. Under instructor supervision, students provide patient care in a variety of healthcare settings in Vermont, New York, and New Hampshire. All students are required to travel to hospital sites at a distance from their local site.

Graduates are eligible to apply to take the Therapist Multiple-Choice Examination offered by the National Board for Respiratory Care.

Students with an Associate of Science in Respiratory Therapy will be able to:

- Meet respiratory care needs in the healthcare community
- Demonstrate the attitudes, skills, and knowledge relevant to their role as registered respiratory therapists
- Decide whether care is needed, administer the care competently, and determine whether the care provided was effective
- Think critically, use strong communication skills, and demonstrate the leadership required of today's respiratory therapists

The normal number of credits required for the degree is 69.

First Year

| Fall Semester | | | Spring Semester | | |
|----------------------|---------------------------------|----------|------------------------|----------------------------------|----------|
| BIO 2011 | Human Anatomy & Physiology I | 4 | BIO 2012 | Human Anatomy & Physiology II | 4 |
| ENG 10XX | English* | 3 | ELE XXXX | AH/SS elective | 3 |
| RSP 1000 | RSP Freshman Orientation | 1 | RSP 1012 | Respiratory Care II | 4 |
| RSP 1010 | Foundations of Respiratory Care | 3 | RSP 1210 | Respiratory Anatomy & Physiology | 3 |
| RSP 1011 | Respiratory Care I | 4 | RSP 1601 | RSP Clinical Field Experience I | <u>2</u> |
| Select one: | | | | | |
| MAT 1210 | Principles of Mathematics** | 3 | | | |
| MAT 1221 | Finite Mathematics** | 3 | | | |
| MAT 2021 | Statistics** | <u>3</u> | | | |
| | | 18 | | | 16 |

Summer Course

| | | |
|----------|------------------------|---|
| RSP 2801 | Respiratory Internship | 0 |
|----------|------------------------|---|

Second Year

| Fall Semester | | | Spring Semester | | |
|----------------------|----------------------------------|----------|------------------------|-----------------------------------|----------|
| BIO 2120 | Elements of Microbiology | 4 | ELE XXXX | AH/SS elective | 3 |
| RSP 2011 | Cardiopulmonary Disease I | 5 | ENG 2080 | Technical Communication | 3 |
| RSP 2013 | Respiratory Care III | 4 | RSP 2012 | Cardiopulmonary Disease II | 5 |
| RSP 2602 | RSP Clinical Field Experience II | <u>4</u> | RSP 2603 | RSP Clinical Field Experience III | 6 |
| | | | RSP 2802 | Respiratory Internship Review | <u>1</u> |
| | | 17 | | | 18 |

* Students must place into ENG 1060 or 1061 and achieve a level 2 math placement in order to be accepted into the program

** Choose from: MAT 1210, 1221, 2021, or others with permission of department; availability depends on scheduling. Students must complete a minimum of one placement level 2 math elective (may be taken in fall or spring)

Note: All BIO and RSP courses must be completed with a grade of C or better to continue in the program

Technical Education Program

The Career & Technical Teacher Education Program is an approved Vermont Agency of Education (AOE) alternative educational licensing route for trades and industry teachers at Vermont's secondary regional career and technical centers.

Typically, once a teacher is hired at a regional career and technical center, s/he enters this three-year program to complete the qualifications for a Vermont Level I Educator License. The teacher-candidate first obtains an apprenticeship license from the AOE, which requires at least a high school diploma and six years of experience in the trades or industry, or an associate degree and at least four years of experience. The teacher-candidate takes education courses and receives support during the next three years from the Career & Technical Teacher Education Program.

The program courses are:

| | | |
|----------|--|----------|
| EDU 2051 | Teaching Methods I | 3 |
| EDU 2052 | Teaching Methods I (continued) | 3 |
| EDU 2061 | Teaching Methods II | 3 |
| EDU 2062 | Teaching Methods II (continued) | 2 |
| EDU 2115 | Issues & Trends in Technical Education | 3 |
| EDU 2135 | Instruction for Special Needs | 3 |
| EDU 2802 | Externship I | 1 |
| EDU 3550 | Technology in the Classroom | 1 |
| PSY 2110 | Educational Psychology | <u>3</u> |
| | | 24 |

Note: Enrollment in these courses requires the permission of the Program Director.

Undeclared Major

Students who have not decided on a specific program of study and who have met the acceptance requirements of Vermont Tech may be admitted to the college in an undeclared status. Enrollment as undeclared may begin in either the fall or spring semester.

Students who might be interested in this program who are uncertain about a major, want to begin college mid-year, would like a lighter credit load, would like a slower pace, or have other plans for subsequent semesters should discuss this with their academic advisors.

Students who matriculate as undeclared will be expected to select a degree program by the end of their second term at Vermont Tech. When ready to declare, students will apply for a change of program during the pre-registration cycle for the following term. Acceptance into a degree program is contingent upon space availability and department approval and is through the Office of Admissions for "capped" programs. Once in the program, students are expected to meet all the requirements of that program for graduation.

Enrollment as undeclared is based on placement, student desires, and class availability. Undeclared status will also increase the time it takes to complete a degree. Students are not eligible to graduate as undeclared and will not have scheduling priority over degree-seeking students.

A minimum of 12 credits are required for full-time status and on-campus residency. Subsequent terms may be scheduled as necessary.

Sample Semesters:

| Fall Semester | | Spring Semester | | | |
|---------------|----------------------|-----------------|----------|----------------------|------------|
| CIS XXXX | Computer elective | 2 | CIS XXXX | Computer elective | 2 |
| ELE XXXX | AH/SS elective | 3 | ELE XXXX | AH/SS elective | 3 |
| ENG 10XX | English | 3 | ENG 10XX | English | 3 |
| MAT XXXX | Mathematics elective | 2-5 | MAT XXXX | Mathematics elective | 2-5 |
| SCI XXXX | Science elective | 3-4 | SCI XXXX | Science elective | <u>3-4</u> |
| XXX 1000 | Freshman Seminar | 1 | | | |
| | | 14-18 | | | 13-17 |

Veterinary Technology

Graduates of this program have various employment opportunities including veterinary practices, universities, pharmaceutical/biological research companies, diagnostic labs, feed companies, zoos, and government veterinary facilities.

The college farm gives students excellent exposure to dairy cattle and horses. The facility on the main campus provides a modern setting for experience with dogs, cats, rodents, reptiles, and birds. Basic restraint and handling is also taught on sheep, chickens, and rabbits.

All students are required to adhere to the policies and procedures set forth in the Vermont Tech Veterinary Technology Student Handbook. These policies include safety issues related to pregnancy, immunizations, and substance abuse. The college strongly recommends that Vet Tech students receive human prophylactic rabies vaccine, which is available through the college (at the students' expense) in the fall semester.

Students with an Associate of Applied Science in Veterinary Technology will be able to:

- Demonstrate competence in veterinary facility management utilizing appropriate professional and client communication skills and maintaining ethical standards according to applicable laws and codes of the veterinary technology field
- Exhibit a technical level of competency in the safe and effective preparation, administration, and dispensation of medications (including controlled drugs) using proper dosage calculations, labeling, and record-keeping
- Demonstrate entry-level skills in patient nursing care for both companion and food animals including husbandry; nutrition; restraint techniques; patient data and sample collection; administration of therapeutics; and basic dental prophylaxis
- Safely and effectively manage patients and the associated equipment in all phases of anesthetic procedures
- Integrate all aspects of patient, environment, and equipment management for common surgical procedures in a variety of animal species
- Handle, store, ship, and properly analyze laboratory specimens
- Safely and effectively produce diagnostic radiographic and non-radiographic images as well as operate and maintain the associated equipment
- Safely and effectively handle and provide care for laboratory, avian, and exotic animals

Students must satisfactorily complete all AVMA-required tasks for each course to receive a grade in the course.

The normal number of credits required for the degree is 64.

First Year

| Fall Semester | | Spring Semester | | |
|----------------------|---------------------------|------------------------|---|----|
| BIO 2320 | Zoology | 4 | CIS 1050 Intro Spreadsheets/Database Mgmt | 1 |
| ENG 10XX | English | 3 | VET 1020 Animal Anatomy & Physiology | 4 |
| MAT 1210 | Principles of Mathematics | 3 | VET 1040 Animal Diseases | 4 |
| VET 1030 | Animal Care & Restraint | 3 | VET 1052 Animal Care II* | 1 |
| VET 1051 | Animal Care I* | 1 | VET 1060 Laboratory Techniques | 4 |
| | | 14 | | 14 |

Summer Course

| | | |
|----------|-----------------------|---|
| VET 2801 | VET Summer Externship | 0 |
|----------|-----------------------|---|

Second Year

| Fall Semester | | Spring Semester | | |
|----------------------|----------------------------------|------------------------|--|-------|
| ELE XXXX | AH/SS elective | 3 | ELE XXXX AH/SS elective | 3 |
| VET 2011 | Veterinary Clinical Techniques I | 4 | ENG 2080 Technical Communication | 3 |
| VET 2030 | Animal Nutrition | 2 | VET 2012 Veterinary Clinical Techniques II | 3 |
| VET 2050 | Applied Laboratory Methods | 4 | VET 2040 Reproduction & Genetics | 3 |
| VET 2070 | Pharmacology & Toxicology | 3 | VET 2060 Veterinary Office Procedures | 3 |
| VET 2720 | Veterinary Supervisor* | 1 | VET 2080 Animal Behavior | 2 |
| VET 2802 | VET Summer Externship Review | 1 | VET 2090 Vet Tech National Exam Seminar | 1 |
| | | Optional: | | |
| | | VET 2720 | Veterinary Supervisor* | 1 |
| | | 18 | | 18-19 |

**Must be taken at least once; may be repeated for credit*

BIO 2320 and all VET courses must be completed with a grade of C- or better to graduate from the program. Students who fail to achieve a C- or better in any core VET/BIO course after two attempts will be dropped from the program

Returning students who need to repeat courses will be placed in them on a space-available basis

Key to Course Subject Abbreviations

| | |
|---|--|
| ACC Accounting | EQS Equine Studies |
| AER Aviation | FSC Fire Science |
| AGR Agriculture & Animal Science | GRS Graduation Standards |
| AHS Allied Health Sciences | GTS Ground Transportation Services |
| ARE Architectural Engineering Technology | HIS History |
| ATT Automotive Technology | HUM Humanities |
| BIO Biological Sciences | INT Interdisciplinary |
| BUS Business | LAH Landscape |
| CED Continuing Education | MAT Mathematics |
| CET Civil & Environmental Engineering Technology | MEC Mechanical Engineering Technology |
| CHE Chemistry | MUS Music |
| CIS Computer Science | NUR Nursing |
| CPM Construction | PHI Philosophy |
| DHY Dental Hygiene | PHY Physics |
| DSL Diesel | POS Political Science |
| ECO Economics | PSY Psychology |
| EDU Education | RSP Respiratory Therapy |
| ELM Electromechanical Engineering Technology | SDT Sustainable Design |
| ELT Electrical Engineering Technology | SSC Social Science |
| EMS Emergency Medical Services | VET Veterinary Technology |
| ENG English | XXX Special Topics |

Students without the prerequisites for any course must obtain the permission of the instructor prior to enrollment.

Course Descriptions

Accounting (ACC)

ACC 1010 Computerized Accounting (3)

spring

This course demonstrates how various accounting systems are implemented and integrated on a microcomputer. Students will become proficient with applications in general ledger, receivables, payables, inventory, fixed assets, and the preparation of financial statements; 1 hour of lecture, 4 hours of laboratory per week. Prerequisite: ACC 1020 or 2121

ACC 1020 Survey of Accounting (3)

fall/spring

This class is designed for non-business majors. Students will identify accounts and process and record typical cash receipts, cash payments, and payroll transactions for a service business and a merchandising business. Students will complete a worksheet and prepare and interpret financial statements. Students will prepare adjusting and closing entries and understand inventory valuation and depreciation of plant assets; 3 hours of lecture per week.

ACC 2121 Financial Accounting (4)

fall

This course covers the basics of generally accepted accounting principles, terminology and accounting cycle. Students will learn to prepare financial statements and become familiar with special journals, receivables, payables, control accounts, inventory, depreciation, deferrals, accruals, and payroll; 3 hours of lecture, 2 hours of laboratory per week.

ACC 2122 Managerial Accounting (4)

spring

This course explores internal accounting systems and the uses of internally generated data in management. Topics include the use of financial accounting data; cost-volume-profit analysis; budgets and responsibility accounting; and cost allocations; 4 hours of lecture per week. Prerequisite: ACC 2121

ACC 2201 Intermediate Accounting I (4)

as required

This course provides an in-depth examination of accounting theory for assets, liabilities, and stockholders' equity which is essential for the understanding and analysis of financial statements. The accounting cycle is reviewed and other topics include temporary investments, receivables, inventories, and fixed and intangible assets; 4 hours of lecture per week. Prerequisite: ACC 2121

ACC 2202 Intermediate Accounting II (4)

as required

This is a continuation of Intermediate Accounting I. Emphasis is placed on problem solving and topics covered include long-term investments; liabilities; matching revenue and expenses for the determination of net income; income taxes; non-operational revenue; and financial statement analysis; 4 hours of lecture per week. Prerequisite: ACC 2201

ACC 2210 Cost Accounting (4)

as required

This course examines in-depth concepts used in recording, classifying, and reporting cost data. Students will understand costs as related to management in the planning and control process. Topics include budgeting, job order, and job process; 4 hours of lecture per week. Prerequisite: ACC 2122

Aviation (AER)

AER 1005 Introduction to Aviation Careers (3)

fall

Anyone who can complete high school can build a career in aviation that will be exciting and rewarding. This course demystifies obstacles and presents an overview of the aviation career options and related programs available at VTC. Students of any discipline can explore the varieties and types of material, instruction, certification, and hands-on experiences from faculty experts who teach courses in the aviation program. Students will understand how they are prepared to earn FAA certifications and endorsements required for employment in a number of aviation-related career specialties. The course explains how fees meet FAA requirements. Students will experience simulator time and may arrange an observation flight of an actual flight lesson. Students also have the option to receive an actual first "Discovery Flight" lesson with an instructor for an optional flight fee.

AER 1010 Private Pilot: Ground (3)

fall

This course enables the student to gain the necessary aeronautical knowledge to pass the FAA test and oral exams for Private Pilot Certificate with an Airplane category rating and a Single-Engine Land class rating. The course runs concurrently with AER 1020, in which flight skills are learned in simulators and training aircraft; 3 hours of lecture per week. Prerequisite: Permission of program director, Corequisite: AER 1020

AER 1020 Private Pilot: Flight (2)

fall

This course is one of two courses that enable students to gain the necessary aeronautical knowledge, skill, and experience to meet the FAA requirements for a Private Pilot Certificate with an Airplane category and Single-Engine Land class rating. The second course, "Private Pilot: Ground," must be completed simultaneously with this course. Flight training is on-on-one with a Certified Flight Instructor who teaches basic flight maneuvers, solo flight, navigation with cross-country flying, and preparing for the FAA oral exam and flight test in accordance with all facets of the FAA Private Pilot Practical Test Standards (PTS). Flight training includes the number of minimum FAA Part 141 FAA-approved flight school simulator and aircraft flight hours to meet performance requirements for an FAA Private Pilot Certificate. The course includes 55 flight hours and all students pay flight fees for each flight course based on the number of hours of the course. After the final hour of flight training, students will receive a grade based on evaluations throughout, including four FAA required Stage Checks (written tests and flight tests) and recorded attendance throughout the semester. The published flight fees do not include the FAA flight test nor the examiner's fees. Prerequisite: Permission of program director, Corequisite: AER 1010 [Course fee: \$13,303]

AER 1031 Aviation Meteorology I (3)

fall

Meteorology is the scientific study of the atmosphere and weather events that interact with temperature, air pressure, water vapor, and time change across local, regional, and intercontinental geographies. This course provides students with a foundation for understanding and applying weather factors to the safe operation of aircraft in preparation for the FAA knowledge exam for safe operation and for earning a Private Pilot Certificate; 3 hours of lecture per week.

AER 1032 Aviation Meteorology II (4)

spring

A deep understanding of hazardous and potentially hazardous weather conditions and how it impacts aircraft operation is essential to accurately analyze, plan and safely react to changes in weather. This course builds on Meteorology I foundations with those aspects of weather that are essential for being certified by the FAA Instrument Flight Rules (IFR) operation, including: Air masses & fronts, turbulence, icing, thunderstorms, IFR approach & departure procedures, arctic & tropical weather, and soaring. During the Instrument Ground, Instrument Flight, and Meteorology courses, students will be routinely challenged to analyze hazardous meteorological conditions; Instructors and students will provide feedback on the effectiveness of interpretations; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: AER 1031 and a Private Pilot certificate or instructor permission, Corequisite: AER 1110, 1120

AER 1110 Pilot Instrument Rating: Ground (3)

spring

This course provides the required knowledge and training for a pilot to obtain an instrument rating which qualifies operations under Instrument Flight Rules (IFR). The ground course enables the student to gain the necessary knowledge to meet the requirements to pass the FAA Instrument rating knowledge exam based on Airplane category and a Single-Engine Land class rating. The course focuses on aeronautical knowledge, full procedural aspects of published instrument navigation, and instrument approaches. Topics included relate to attitude flying, radio navigation aids, IFR systems, IFR meteorology, and partial panel exercises for approaches. Students review all FAA test questions to prepare for the required FAA Instrument Rating knowledge exam and the FAA oral exam for the Instrument rating; 3 hours of lecture per week. Prerequisite: AER 1020 or permission of program director, Corequisite: AER 1120

AER 1120 Pilot Instrument Rating: Flight (2)

spring

This course provides training for the aeronautical skill, knowledge, and procedures, using both ATD simulators and airplanes, to acquire the FAA Instrument Rating: Airplane. It is most successfully offered commensurate with AER 1110, with both ground and flight training coinciding to the best extent possible for optimal learning. The course builds skills with basic attitude flying, using radio navigation aids, air traffic control phraseology in the instrument (IFR) environment; students experience flight solely by reference to instruments by first training in ATD simulators maximally, followed by airplane training either by wearing a vision-limited hood or by flying in actual instrument conditions with their instructors. Full training in instrument navigation on cross-country trips with multiple instrument approaches are conducted. The ultimate goal is to achieve an FAA Instrument: Airplane rating added on to their airplane category and Single-Engine Land class rating. All training is conducted in flight stages with stage exams until graduation from the course, whereby applicants are evaluated for a course grade when flight training is completed, based on four Stage Checks (written tests and flight tests) and recorded attendance throughout the semester. The course includes 52 flight hours and all students pay the same flight fees, which are based on the number of flight hours. After completion of the course, students are recommended for an FAA instrument rating oral and flight test and their final grades are then submitted. Prerequisite: AER 1020 or permission of program director, Corequisite: AER 1110 or permission of program director [Course fee: \$12,722]

AER 2010 Commercial Pilot: Ground (3)

fall

This course is the first of three courses that enable the student to gain the necessary aeronautical knowledge, skill, and experience to meet the FAA requirements of a Pilot Commercial certificate with an Airplane category and a Single-Engine Land class rating. The second course, AER 2031, must be completed simulta-

neously with this Ground course with no exceptions. The third course, AER 2032, must be completed in the subsequent semester to earn the FAA Commercial Pilot certificate. In this course, the emphasis is on the advanced knowledge, regulations, and performance expectations for these higher level flight skills; 3 hours of lecture per week. Prerequisite: AER 1020 with FAA Instrumentation Rating certificate, Corequisite: AER 2031

AER 2031 Commercial Pilot: Flight Phase I (2)

fall

This course is the second of three courses that enable the student to gain the necessary aeronautical skill, knowledge, and experience to meet the requirements of a Commercial Pilot certificate with an Airplane category and a Single-Engine Land class rating. The first course, AER 2010, must be completed simultaneously with this course with no exceptions. The third course, AER 2032, must be completed the subsequent semester to earn the FAA Commercial Pilot certificate. In this course, the application focus is on dual flight with an instructor, while AER 2032 rehearses prior knowledge while being intensively focused on training for successful and safe solo flights. The subject material in both courses is essentially identical, the difference being comprised of where and how the student learns or applies content and the minimum hours required by Federal Aviation Regulations of 123 hours total after completion of Private and Instrument courses. This course consists of 85 flight hours of the full Commercial syllabus. At the end of the flight hours, the student will be fully evaluated on two Stage Checks (written exams and flight tests) and given a grade on their skills and performance prior to proceeding to the next half of the Commercial Pilot training in the following semester. Prerequisite: AER 1020, 1120 Corequisite: AER 2010 [Course fee: \$20,689]

AER 2032 Commercial Pilot: Flight Phase II (2)

spring

This course is the final of two flight courses that enable the student to gain the necessary aeronautical knowledge, skill, and experience to meet the requirements of a Commercial Pilot certificate with an Airplane category and a Single-Engine Land and Sea class rating. This course must be completed this semester and immediately following the first two to earn the FAA Commercial Pilot certificate. This course is practice-intensive to build skills, with 35 total flight hours, to complete Phase II of the Commercial Pilot syllabus. The applicant's cumulative flight time for the separate commercial courses must be 120 total flight hours minimum to be eligible for a Commercial Certificate under Part 141 regulations. Flight fees are based on the number of flight hours for each flight course. Prerequisite: AER 2031 [Course fee: \$7,320]

AER 2110 Aviation Safety & Accident Investigation (3)

spring

Safety factors permeate virtually all aspects of the aviation industry and all FAA certifications. This course provides students with a fundamental understanding of safety factors in aviation operations and sufficient knowledge to prepare for safety components of advanced FAA certifications throughout their careers. Students will use actual NTSB accident reports to explore, analyze, and discuss the complex and interacting factors involved with aircraft accidents and incidents, as well as the methodology of subsequent investigation. The course gives particular attention to safe operation of small aircraft, managing distractions, communications, attitudes towards safety, and cultivating a firm commitment to safe operations at all times. Students will attend at least two FAA Team Safety Seminars during the semester; 3 hours of lecture per week. Prerequisite: Private Pilot certificate or instructor permission

AER 2130 Aviation History (3)

fall

This course will explore the history of aviation from its earliest concepts and first practical flying machines to war birds, airliners, and present day aircraft. Students will learn about the evolution of aviation technology such as engines, aircraft materials, and aerodynamics. In addition to technical aspects, this course will cover important historical figures, explore their personalities, and explain why and how they became fixtures in history. General world history will also be covered to provide a contextual background and to further enhance student understanding of how aviation has shaped our world. Course material will be presented by lecture; group discussions; presentation of movies, documentaries and other media; student presentations; team based historical knowledge games; field trips; and hands-on examination of primary documents and artifacts; 3 hours of lecture per week.

AER 2330 Aviation Physiology & Psychology (3)

fall

Aviation crew members have unique mental and physical demands that are critical for their safety-sensitive roles in ensuring passenger safety and comfort. This course will focus on the need for awareness and understanding of these demands as well as the responsibility to ensure compliance from both a regulatory and ethical standpoint. The physiological component will focus on general health with emphasis on altitude physiology, vision, hearing, medications, and fitness. The psychological component will emphasize aeronautical decision-making (ADM); risk management; sleep and fatigue; and fitness. Both will be integrated into a discussion of the FAA medical certification process and pilot duties and responsibilities of compliance. Students will be required to select an aviation accident or incident and lead a class discussion that applies these concepts to a specific actual event; 3 hours of lecture per week. Prerequisite: Matriculation or experience in aviation or instructor permission

AER 2610 Aviation Project I (2)

fall

This supervised learning activity provides students with an opportunity to explore a specialty in the aviation

field which applies to their career interests. Students are encouraged to take advantage of current events, find an internship in an aviation-related enterprise, investigate the job market in a potential specialty of interest, or do research on emerging technology in materials, fuels, alternative designs (particularly of wings & body shapes), or software applications. Prior to project implementation, students will prepare a proposal which outlines goals, a plan of study, and a documented means to measure learning and conduct an assessment; 2 hour of lecture per week. Prerequisite: ENG 1060 or equivalent

AER 3010 Certified Flight Instructor: Ground (6)

fall

This intensive course focuses on building skills necessary to pass the FAA Certified Flight Instructor's knowledge exam and prepare for the CFI-Airplane course. The course will build on the students extensive knowledge of technical aspects of being a professional aviator by adding knowledge and skills of an expert trainer. All weekly sessions will start by introducing concepts, techniques, procedural training methods, and science behind instructional technology and adult learning, but will end with applied activities for practicing new methods to observe how learning works. Expert coaching with peer observation and critique will create an environment where performance feedback, both formative and summative, is both a routine and highly valued experience. Students should come away knowing that improving one's instructional skills is a challenging, lifelong endeavor that always needs improvement, but along with that they will also be skilled at the methods needed to continuously build on the art of instruction; 6 hours of lecture per week. Prerequisite: FAA Commercial Pilot certificate with Instrument Rating; both FAA written exams (*Fundamental of Instruction* and *Flight Instructor-Airplane*) must be passed prior to admission to the first class with a minimum score on both of 80% [Course fee: \$300]

AER 3020 Certified Flight Instructor: Flight (2)

fall

This hands-on capstone course results in a Certified Flight Instructor: Airplane certificate issued by the FAA and authorizes the student to train pilots as a professional while receiving income and building Pilot-in-Command flight time simultaneously. The student can expect at least two flight-related events every week. AER 3010 runs commensurate with this course and brings students to an expert instructional delivery level through practice and perfection of skills needed to teach others to fly. Instructor training sessions will include peers flying as observers with a fellow trainee and fully certified and experienced CFI role-playing as the trainee. Flight training consisting of 25 flight hours total as required by FAA 141 standards and gives all students ample time for knowledge, rehearsal, and practice in applying their skills through observation and critique. Published flight fees are based on the number of flight hours for all flight courses and all students. Prerequisite: FAA Pilot, Instrument, & Commercial Pilot certificates; AER 3010 [Course fee: \$6,628]

AER 3030 Human Factors, Risk Management, Crew Resource Management (3)

fall

Students will learn and apply concepts and principles related to the most critical resource in aviation: people. A successful pilot has a capacity to analyze situations, make decisions, and perform well individually and in teams under both routine and crisis conditions while flying complex automated aircraft. In this course, students will learn how to assess situations, risk factors, and the capabilities of all available resources in order to execute a plan of action during each phase of flight under a variety of operational and environmental conditions. The course covers crew resource management (CRM) and human factors essential to flight operations and dangers inherent with crews not trained to perform delegated responsibilities or to challenge inappropriate actions. The course structure will build toward implementing Line Oriented Flight Training (LOFT) using real life scenarios. Students must attain an FAA CRM certification to get credit for this course; 3 hours of lecture per week. Prerequisite: Commercial Pilot certificate, Instrument Rating

AER 3040 Aircraft Maintenance for Pilots (3)

fall

Students get an in-depth, hands-on understanding of the mechanics of aircraft systems and relevant components in order to be very familiar with how they operate, their operating limits, thresholds, and capabilities. Through hands-on practice in a shop setting, they will become familiar with the tools for performing various pilot maintenance tasks that the FAA permits for pilot-owned aircraft. The class covers the specific Flight Aviation Regulations (FARs) which govern pilot maintenance, and students will keep an up-to-date logbook to maintain legal entries and pass an FAA audit. Student will explore maintenance-symptom recognition for these systems, as well as when, where, and how to repair and write up their maintenance logs. This in-depth knowledge will help the students become better pilots and it will enable them to communicate effectively with mechanics as they manage the maintenance and repair of the aircraft for which they are responsible; 1 hour of lecture, 6 hours of laboratory per week. Prerequisite: Private Pilot certificate [Course fee: \$100]

AER 3110 Aviation Law (3)

spring

This course provides a professional guide to aviation law for managers, pilots, mechanics, aircraft owners, air traffic controllers, air safety investigators by focusing on the basic knowledge and perspective to understand how the legal system works in relation to aviation. Anyone involved with aviation as a professional will deal with administrative agency regulations sooner or later will be confronted with decision making based on Federal Aviation Regulations (FARs) frequently, or they will be dealing with the FAA and other administrative agencies. FARs, in particular, establishes standards of legal behavior to which professionals are held accountable, and virtually all aspects of aviation are affected by FARs. In addition, given the ease with which

civil aircraft cross national borders and the key role of air transportation's key role in the global economy, the regulation and development of civil aviation will cover both national and international concerns. To be competent as a professional, every student needs to be able to recognize and avoid common legal pitfalls, and be able to discern when they need to call a lawyer. Emphasis in the course is given on current statutory and regulatory changes. This course will take students through many real-life scenarios and discussions to give a vivid experiential basis for decision-making; 3 hours of lecture per week. Prerequisite: Commercial Pilot and Instrument rating

AER 4010 Multi-Engine Land Ground/Flight (0.5) spring

An FAA multi-engine land (MEL) rating gives a competitive advantage for those seeking employment within any commercial aviation sector. The course includes the fundamentals of flying multi-engine land aircraft and the aerodynamic laws that govern such multi-engine aircraft. Students will become safe, proficient, and aeronautically knowledgeable multi-engine land pilots. The course is all hands-on ground and flight time, tutoring with expert flight instructors, and observing peers in the cockpit or in a simulator. The Multi-Engine Land Ground/Flight course consists of 25 total flight hours of multi-engine training. Flight fees are based on hours of flight time and are the same for all students. The course adds the Multiengine Land rating to the student's Commercial Pilot Certificate. Prerequisite: AER 3020, Corequisite: AER 4020 [Course fee: \$12,228]

AER 4011 Multi-Engine Sea Ground/Flight (0.5) spring

An FAA multi-engine sea (MES) rating gives a further competitive advantage for seeking employment within any commercial aviation that operates seaplanes or amphibians. From the fundamentals of flying multi-engine aircraft and the aerodynamic laws that govern multi-engine flight to the challenging task of learning the related aeronautical knowledge, students will become proficient and knowledgeable multi-engine sea pilots. The instruction of this course takes students up to the skill levels necessary to earn a multi-engine rating sea rating. The Ground/Flight course is all hands-on ground and flight time in the cockpit or in a simulator. The course is 25 flight hours of multi-engine sea training. All flight fees are based on flight hours of training and are the same for all students. The Multi-engine Sea rating is added to the student's Commercial Pilot Certificate. Prerequisite: AER 3020 [Course fee: \$13,630]

AER 4020 Certified Flight Instructor: Instrument Ground/Flight (1) spring

Students will apply the pilot skills gathered throughout the program and learn how to become an "instrument instructor", using their skills as a flight instructor to teach instrument flying to students who will attain instrument ratings. This Ground/Flight course consists of 25 hours of flight training, which, after completion, adds the instrument instructor rating to their Certified Flight Instructor Certificate. All flight fees are based on hours of flying and are the same for all students. Prerequisite: AER 3020 [Course fee: \$6,545]

AER 4030 Certified Flight Instructor: Multi-Engine Ground/Flight (1) spring

Students apply their pilot skills gathered throughout the program and learn how to instruct a private pilot through the requirements necessary to train pilots up to a Multi-Engine Rating for both Land & Sea. The emphasis is on honing the instructional skills learned during all of their pilot courses to now enable applicants to train pilots on multi-engine aircraft. The Ground/Flight training consists of 25 hours of flight training in multi-engine aircraft. The flight fees are based on the hours of flying and are the same for all students. As one of the final capstone skill sets and certifications, the course gives students important advantages in landing a job as a fully-qualified Flight Instructor. At the end of the course, students will receive their CFI: Multi-Engine rating. Prerequisite: AER 3020, Corequisite: AER 4010 [Course fee: \$11,049]

AER 4040 Corporate Flying & Business Aviation (3) fall

Students will get a broad perspective on the aviation business, commercial and corporate flying (including equipment choices and operations), support services and airports. The focus is on the politics, culture, and operational differences in aviation businesses, such as small charters, corporate fleets, freight, international carriers and airports. Students study the impact of global competition, operational costs, and slim margins on both career stability and safety. Students get a perspective on the opportunities and methods for pursuing a career within the array of options available. Students will experience the steps needed to apply for jobs, network, customize resumes, and complete job applications. The instructor provides ongoing guidance on the job-application processes and job survival methods for an unpredictably cyclical business. Students discover the kinds of ethical dilemmas they may face in their careers along with tips on how to respond effectively to pressure to compromise safety, personal values, or income; 3 hours of lecture per week. Prerequisite: Senior program standing or instructor permission

AER 4050 Training & Flying Advanced Airplanes (3) spring

Students complete an in-depth study of the aerodynamics of flight, flight systems, and aircraft design in this course. By understanding design, students will better understand the forces acting on an airplane, how the characteristics of different systems affect performance in each phase of flight. Students discover how the aerodynamic characteristics of a given design, including the physical limits of each system, always play an integral part in a pilot's decision-making process. Anything that flies has design compromises; a student needs to understand the "whys" underlying design compromises in order to learn new technology. Students

also study the historical evolution of aerodynamics and systems as they apply to greater stability and controllability of aircraft to better understand the interacting technical issues and trade-offs made in a design. Students gain insight on the rapidly accelerating pace of change, including advanced wing design, computerized engine and flight control systems, as well as the FAA requirements and standards for systems; 3 hours of lecture per week. Prerequisite: Senior standing or instructor permission

AER 4060 Unmanned Aerial Systems (3)

spring

This course provides a general understanding of Unmanned Aircraft Systems (UAS), the components of those systems, how they interact, and how they are used. It will include a comprehensive introduction to all of the elements of a complete UAS. Topics addressed include the air vehicle, planning and control, mission payloads, data links, launch and recovery concepts, and ethical and legal issues associated with UAS operations; 3 hours of lecture per week. Prerequisite: Private Pilot certificate

AER 4110 Advanced Transport Category Systems (3)

spring

A prospective airline pilot will go through extensive screening in the employment process that proves their potential to command an aircraft and demonstrate maturity and adaptability across three challenging dimensions: a) weather & meteorological phenomena, b) navigating and operating an aircraft smoothly and safely, c) complex systems and operational limits of each aircraft they operate. The student's senior year is designed to prepare for these challenges, this course specifically deals with the technology of flight found in modern advanced commercial airline aircraft and related operational principles that must factor into risk assessment, crew resource management and decision-making; 3 hours of lecture per week.

AER 4130 High Altitude Navigation/International Flight Operations (3)

spring

At the high altitudes used by commercial carriers in international operations, unique rules and navigation requirements apply to the highways, or tracks, in the sky. This course prepares students to apply for international operation First Officer positions. Toward this end, students will explore standard airline operations in the North Atlantic (NAT) and Pacific Track systems, including flight planning, oceanic control sectors, clearance communications, plotting, track entry/exit, and required position or event reports. Students will learn how to use plotting charts and Atlantic and Pacific Navigation charts, how to respond to changes in the tracks due to weather, and techniques to react to weather changes within a track within operational rules. Students will also learn the special requirements governing communications, operations, and reporting related to emergency and diversion procedures in the NAT system. They will practice by flying in simulators with scenarios that deploy international flight operation rules under normal and emergency conditions; 3 hours of lecture per week. Prerequisite: AER 3020, 4050

AER 4610 Aviation Senior Project II (3)

fall

In this capstone experience, students apply what they have learned in the Professional Pilot Program to a project selected, proposed, planned, implemented, and presented by specific project team(s). Under the guidance and supervision of skilled faculty and community experts, the students will augment their experience with new learning in group-based project-management skills, including planning, teamwork, problem solving, leadership, and time management. Each student will have the opportunity to assume different roles and responsibilities on the project, and they will be graded by participating in a rigorous evaluation process that includes criterion referenced peer reviews and a project performance assessment; 3 hours of lecture per week. Prerequisite: Senior program standing or instructor permission

Agriculture & Animal Science (AGR)

AGR 1011 Agricultural Techniques I (2)

fall

This course is designed to facilitate a successful transition to college and focuses on four primary areas: orientation to the college and academic programs; development of basic agricultural skills; interpersonal development; and an introduction to agriculture-related careers. In an informal laboratory, students will be exposed to the practical skills necessary to succeed within the agricultural curriculum under the supervision of experienced farm staff. Students will be introduced to student rights & responsibilities, will learn how to interact with faculty and classmates, will explore agricultural careers, will learn good time management, and will learn how to enhance academic performance; 1 hour of lecture, 2 hours of laboratory per week, plus two weeks of farm work experience.

AGR 1012 Agricultural Techniques II (1)

spring

This is a continuation of AGR 1011 in which the student must select an area for independent study through a work experience project. Students work closely with the farm staff to complete their selected topics during the semester; 2 hours of laboratory per week, plus one week of required farm work experience.

AGR 1030 Animal Reproduction & Genetics (3)

spring

Students are expected to develop knowledge of the anatomy and physiology of the male and female reproductive systems and the estrous cycle in farm animals. The course includes an understanding of simple Mendelian and quantitative genetic principles. Students are expected to develop sound breeding and selec-

tion systems; 3 hours of lecture per week.

AGR 1050 Livestock Production (3)

fall

This course focuses on the study and discussion of livestock applicable to the New England agricultural industry. Cell biology, beef cattle, sheep, swine, poultry, and horses are covered. Breeding, feeding, and management topics are presented in a technical and practical manner; 3 hours lecture per week.

AGR 1061 Burls to Boards (3)

fall

Students will understand the principles of tree harvesting for wood product production. The choosing, cutting, skidding, and milling of common types of lumber in Vermont will be discussed and practiced. Successful students will be able to manage small woodlots for efficient personal production of lumber products upon completion; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: AGR 1011 or instructor permission

AGR 2011 Dairy Herd Management I (4)

fall

This course covers the skill sets necessary for the operation and construction of a modern dairy farm. Students will evaluate facilities and operations for performance. Students will learn the environmental, biological, and physical factors necessary for the production of high quality milk. Students will evaluate milk harvesting equipment and practices and make recommendations. Students will discuss the materials used for animal housing and all of the aspects of a highly functional animal environment; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: AGR 1030, 2030; LAH 1050 or instructor permission

AGR 2012 Dairy Herd Management II (2)

spring

This course covers the soft skill sets necessary for the operation of a modern dairy farm. Students will synthesize specific dairy knowledge into farm operational plans using multiple case studies and models. Students will learn and discuss the habits necessary for the operation of a modern dairy farm. Youngstock rearing is discussed in detail; 4 hours of laboratory per week. Prerequisite: AGR 2011

AGR 2020 Farm Buildings (2)

fall

Farmstead planning and basic structural concepts for farm buildings are emphasized. Subtopics include construction materials and methods, environmental issues, waste management, feeding systems, and housing systems. 2 hours of lecture per week.

AGR 2030 Animal Nutrition (4)

spring

This is a course in the fundamentals of livestock feeding. It includes the study of the nutritive characteristics of forages, grains, and grain products as feeds for different farm animals. Students will be asked to develop livestock rations and feeding programs based on the available feedstuffs and needs for maintenance, growth, and production. Typical applications may center on the college's dairy herd and/or the student's home farm; 3 hours of lecture, 2 hours of laboratory per week for the first half of the term.

AGR 2040 Forage Production (3)

fall

In this course, emphasis is given to the production of forage and pasture crops for New England dairy farms. Topics include the selection of adapted crops, varieties, seed mixtures, and soil sites, along with soil preparation, seeding methods, and crop management. Harvesting for best digestible energy and protein is stressed as is the growing of alfalfa and corn; 2 hours of lecture, 2 hours of laboratory per week for the first half of the semester.

AGR 2050 Large Animal Diseases (3)

spring

This course includes discussion of those diseases which are of major importance in the husbandry of food animals, with special emphasis on herd and flock health. To further students' understanding of diseases and disease prevention, basic pathological changes and immunological processes involved in the occurrence and prevention of disease are described; 3 hours of lecture per week.

AGR 2060 Beef Production (2)

spring

In this course, students will learn the technical skills needed to be a successful vegetable and fruit producer. Most students will take this course after their first year of agricultural education. If students take this course prior to their first year, it will inspire their classroom learning experience. This summer course will give students the opportunity to put academic knowledge to work. Students will learn about organic management of fruits and vegetables ranging from pest and disease control to washing and handling practices. Student will be introduced to field cultivation and management techniques and will be given the opportunity to use and be introduced to the appropriate equipment used on vegetable and fruit farms. Students will also have hands-on experience with managerial aspect of farming.; 8.5 hours of laboratory per week.

AGR 2070 Sustainable Vegetable & Fruit Production (4)

summer

An introductory course in beef production that addresses topics including: marketing and price-making forces; the biological cycle of the beef cow; beef genetics; and the application of genetic principles to beef herd breeding programs. Reproductive management of cows, bulls, and heifers; principles of nutrition; and animal

Course Descriptions

health issues will also be discussed; 1 hour of lecture, 2 hours of laboratory per week.

AGR 2110 Sheep Production (2)

as required

This is an introductory course in sheep production, including a presentation of intensive and extensive production models; life cycle management of the ewe; flock health and parasite control; ram health and fertility; and management of reproduction. Methods for measuring and monitoring flock performance will also be presented; 1 hour of lecture, 2 hours of laboratory per week.

AGR 2720 Issues & Trends in Agriculture (2)

as required

This course emphasizes new ideas in agriculture and some of the primary issues impacting animal agriculture. Students investigate new and/or alternative production methods with emphasis on sustainable agriculture and work to ably represent agricultural strategies both in oral and written forms. Field trips and guest speakers provide students with the opportunity to evaluate societal concerns about various aspects of modern production agriculture; 2 hours of lecture per week. Prerequisite: Sophomore standing

AGR 3020 Advanced Livestock Production (3)

spring

In this course, students learn the reproduction, nutrition, house, and financial requirements of profitable Vermont livestock operations. Swine, poultry, and small ruminant dairy will be covered in detail. Emerging livestock production including camelids, meat goats, ostriches, and emus will be covered; 3 hours of lecture per week. Prerequisite: AGR 1030, 1050, 2030

AGR 3030 Advanced Dairy Cattle Nutrition (3)

spring

Students in this course will analyze and develop rations for dairy cattle. Students will be able to troubleshoot existing rations and make recommendations for improvement of dairy rations. This course will be lab-intensive; 1 hour of lecture, 4 hours of laboratory per week. Prerequisite: AGR 2030

AGR 3040 Maple Production: Science & Practice (3)

spring

Current information relating to all aspects of maple production will be presented. Principles and practical application of sugarbush management, sap production, maple production facilities and equipment; maple syrup production; product packaging and marketing; and operator safety will be covered; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: BIO 1220; LAH 1050

AGR 3050 Advanced Nutrient Management (3)

spring

This course discusses the management of plant requirements for maximum production of plant crops. Special emphasis is placed on nutrient budgeting and use of manure-based fertilizers. Successful students will be able to interpret soil tests and make recommendations for soil amendments that benefit the farmer and the environment; 3 hours of lecture per week. Prerequisite: LAH 1050 or CET 2110

AGR 3110 Apples, Berries, & Bees (3)

fall

The production requirements of apples, common berries, and honey bees will be discussed in this course. Plant or species selection, growing requirements, disease prevention, and harvesting will be discussed for each. Successful students will feel confident managing production of each of these agricultural products; 3 hours of lecture per week. Prerequisite: AGR 3050; BIO 1220

AGR 3111 Vegetable & Fruit Production (3)

spring

This course deals with the principles, production, management, and handling of vegetable crops, in context of today's commercial production systems; 3 hours of lecture per week. Prerequisite: BIO 1220, instructor permission

AGR 4040 Agricultural Products (3)

fall

The course will explore the basic processing methods, laws pertaining to the sale of, and common marketing methods for the most common Vermont farm products including: milk, maple, vegetables, fruits, cheeses and meats; 3 hours of lecture per week.

AGR 4710 IAAFS Short Course Special Topic (0-2)

as required

These courses are for IAAFS offerings. Credits may vary. The special topics course requirements and evaluation criteria are developed by the instructor, subject to department approval. Details of specific course content are available from the Director of IAAFS.

AGR 4720 Diversified Agriculture Project (3)

spring

Students must work to develop a complete business plan outlining a diversified agriculture enterprise. Each project should contain a biological, financial and operational analysis of a single or multi product farm business; 1 hour of lecture per week. Prerequisite: AGR 3050, 3111, 4040; at least four AGR "enterprise" courses; BUS 2260

AGR 4801 AGR Senior Summer Internship (0)**summer**

Students spend a minimum of 45 hours in an agriculture setting. Student experiences should include grazing animals, farm machinery, plant and animal production; graded Pass/No Pass. Prerequisite: Department permission

AGR 4802 AGR Senior Summer Internship Review (1)**fall**

Students must document and communicate their summer internship experience with grazing, machinery, plants and animals; graded Pass/No Pass. Prerequisite: AGR 4801 [Course fee: \$250]

Allied Health Science (AHS)**AHS 2011 Emergency Medical Service (5)****fall**

This course follows the guidelines of the National Emergency Medical Service Blueprint for Education, with approval and oversight by the Vermont Department of Health. This course focuses on the assessment and management of medical emergencies and trauma in the prehospital environment. It provides a foundation of understanding anatomy, physiology, pathophysiology, and Emergency Medical Service operations through a series of lectures, small group activities, and skill labs. This course prepares students to test for licensure with the National Registry of Emergency Medical Technicians (NREMT) through the Vermont Department of Health. Successful completion of this course and licensure as an Emergency Medical Technician through the NREMT is required for graduate from the VTC Fire Science program. Those who are unable to attain National Registry certification with the AHS 2011/CED 0011 course guidelines and time frame will be given an incomplete grade and must attain the certification in the proscribed time period. If the student is still unable to attain the certification, a failing grade will be given for the course and the student will have to attain this certification outside of the VTC Fire Science program. The students will not be granted the AAS in Fire Science until NREMT certification is attained. The NREMT exam is computer-based. If the student is licensed under a Vermont EMS organization, the exam is \$70. Each subsequent exam is \$70; 4 hours of lecture, 4 hours of laboratory per week. [Course fee: \$200] *Non-credit version of AHS 2011 is CED 0011. Those registering as community members under CED 0011 are exempt from the graduation requirement.*

AHS 2035 First Aid & CPR (2)**spring**

This course is an introduction to first aid directed toward the basic principles of assessment and treatment of injury in the workplace. Scenarios and practice in outdoor and indoor workplace settings are included. Students will be able to provide first responder stabilization, treatment, and CPR; 4 hours of studio per week. [Course fee: \$75]

Architectural Engineering Technology (ARE)**ARE 1000 Freshmen Seminar (1)****fall**

This course provides a forum for first-year students to learn about the program and about the architectural and engineering professions and the building construction industry. Skills that will assist the student in having a successful experience at the college are also discussed; 1 hour of seminar per week.

ARE 1011 Introduction to Construction Drawing Practices (3)**fall**

This course covers basic instruction in architectural and engineering construction graphics utilizing hand drawing equipment and CAD software, as well as an introduction to the materials of residential construction. A set of drawings for a small residence is developed, in keeping with contemporary office practices; 6 hours of studio per week. [Course fee: \$50]

ARE 1210 Construction Materials & Methods (5)**spring**

This course is a comprehensive study of common construction materials and methods of fabrication and erection employed in building construction. Sources, methods of manufacture, and uses of materials are covered. There are two different studio sessions within this course: the materials laboratory sessions familiarize students with physical characteristics and uses of materials, performance of standard tests, and preparation of technical reports, while the design/drafting studio involves the detailing of construction assemblies. Accurate hand sketches and CAD are both used in the latter; 3 hours of lecture, 3 hours of materials testing laboratory, and 3 hours of detailing studio per week. Prerequisite: ARE 1011 [Course fee: \$30]

ARE 1220 Architectural History (3)**fall/spring**

Through photo slide lectures and seminars, the student is introduced to architectural design philosophies and construction systems that have developed over the ages. Influences such as social, political, religious, economic, and technological advances are traced from the first significant works of humans 5,000 years ago through the present day. A major concentration is western development since the 18th century, particularly in North America, and its significance to today's society is emphasized. Discussion seminars provide an opportunity for the student to join in follow-up discussions of lectures, with the objective of developing visual perception and knowledge of architectural styles and principles through the history of architecture; 3 hours of lecture per week.

ARE 2022 Architectural CAD II (3)

fall/spring

This course covers advanced instruction in computer-aided drafting and design for architecture and building engineering. There will be combined lecture and studio sessions in the use of "Building Information Modelling" in Revit Architecture to develop student skills in the industry standard for 3D design. Building design as well as presentation drawings and renderings will be explored; 6 hours of studio per week. Prerequisite: ARE 1011

ARE 2031 Environmental Systems I (3)

fall

This course covers the natural environmental influences upon building design and construction as well as the principal internal necessities for human habitation including sanitation, heating/ventilating, and mechanical requirements in small buildings. The studio session reinforces the lectures by teaching the student how to design plumbing and heating systems for a small residential scale building; 2 hours of lecture, 3 hours of studio per week. Corequisite: PHY 1043 [Course fee: \$10]

ARE 2032 Environmental Systems II (3)

spring

This is a continuation of Environmental Systems I. Broad-scale aspects of mechanical, electrical, and sanitary systems are investigated and studied as applied to larger buildings and groups of buildings. Other topics covered include electrical and lighting design; the impact that building codes and other regulations have on buildings; and current environmental topics affecting society today; 2 hours of lecture, 3 hours of studio per week. Corequisite: ARE 2031 or CPM 1010; MAT 1420 [Course fee \$10]

ARE 2040 Construction Practices (3)

fall

This course is a combination of several distinct areas in the building construction industry. One part of the course is comprised of an introduction to fundamental surveying principles and methods, including distance measurement, angular measurement, and elevation differences. Instrument practice and care for levels, electronic distance measurement instruments, and total station equipment are introduced. Other topics studied are: terminology, computations, developing site plans, and construction layout. Another part of the course covers topics in construction estimates and records including estimating, takeoffs, and pricing for both residential and commercial construction. A third part of the course covers construction management principles including scheduling practices, contracts, general conditions, and specifications; 2 hours of lecture, 3 hours of studio per week. Prerequisite: ARE 1210

ARE 2051 Architectural Design I (3)

fall

Individual design projects are developed by the student from conception to presentation under faculty supervision. Problem-solving and the process of design are taught and reinforced throughout the semester. Graphic techniques for design drawings are a major emphasis in this course. Building types covered range from small artifacts, through the house, to a small public building. Throughout the course, graphic and oral communication of goals, methods, and solutions are emphasized. Some projects are presented by the student before a jury of architecture faculty and practicing architects; 6 hours of studio per week. Prerequisite: ARE 1010, 1210, 1220, Corequisite: ARE 2031 [Course fee: \$20]

ARE 2052 Architectural Design II (3)

spring

This course is a continuation of Design I. The design projects and problem-solving involve more complex buildings than the previous course. The final project is a real-world building in Vermont. Students learn to work with zoning, building codes, and users of the building. Through the course, oral and graphic communication and presentation skill are developed as appropriate. Students work in teams on these projects to simulate real world working dynamics. The course terminates with the presentation of projects before a jury of architecture faculty and architectural practitioners; 6 hours of studio per week. Prerequisite: ARE 2051 [Course fee: \$20]

ARE 2720 Architectural & Building Engineering Seminar (1)

spring

This lecture/seminar course for sophomore students concentrates on developing knowledge and skills used in the workplace and throughout the student's life. Topics include job skills, continuing education, office practices, and soft skills; 1 hour of lecture per week. Prerequisite: Sophomore standing

ARE 3010 Design Systems Integration (3)

spring

The intent of this course is to concentrate the student's design thinking toward the areas used in architectural engineering, particularly in the integration of environmental and structural systems into the building design. The course complements the architectural engineering technology curriculum by introducing students to the design of sustainable low-energy systems in small buildings and by providing tools for analysis in the schematic phase; 6 hours of studio per week. Prerequisite: ARE 2032 (may be concurrent with permission), 2051; CET 2120 or CPM 2030 or by AE.CET to BS.AET transfer policy [Course fee: \$20]

ARE 3020 Structural Analysis (3)

fall

This course covers the analysis of statically determinate and indeterminate structures, building on the foundation that most students obtain in a course on statics. Topics include static determinacy and stability, re-

actions, and member forces and moments in beams, frames, and trusses through both determinate and indeterminate methods, as well as approximate methods. Deflection analysis is also covered. Computer applications for analysis are used. Topics such as matrix methods of analysis or dynamics/structural analysis may be introduced; 3 hours of lecture per week. Prerequisite: CET 2040; MAT 1520

ARE 3030 Steel Structures Design (3)**spring**

This course covers the design of steel structures, including typical structural elements such as tension members, beams, columns, base plates, connections, open web joists, and deck systems. Designs are based on the AISC Steel Construction Manual using the load and resistance factor design methodology. Issues such as economics of construction and sustainability are also addressed; 3 hours of lecture per week. Prerequisite: ARE 3020, 3111; CET 2120

ARE 3040 Electrical/Lighting Systems (3)**spring**

This course familiarizes students with the various electrical and lighting systems commonly found in modern buildings. Systems include lighting, power, communications, and emergency systems. The course emphasizes design practices, safety/Code issues, and coordination with other design professionals and building trades; 3 hours of lecture per week. Prerequisite: ARE 2032, 3112; ELT 3020 or SDT 4110

ARE 3050 Fundamentals of Fluids & Thermodynamics (4)**spring**

Students study the basic concepts and practical applications of fluid mechanics and thermodynamics. Topics include fluid properties and measurement; energy conservation; pipe and duct flow; pumps and fans; the first and second laws of thermodynamics; refrigeration; psychometrics; basic thermodynamic processes; and HVAC; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1520; PHY 1043

ARE 3111 Codes & Loads: Structural (1)**fall**

This course provides students with an understanding of which codes and specifications govern the determination of design structural loads for buildings and other structures. It introduces students to the determination of applicable code provisions, the application of those code provisions, and also to methods for calculating and estimating loads that are not specifically addressed (or are insufficiently addressed) in code books, manuals, and elsewhere (e.g. special studies, rules of thumb, past experience, expert elicitation). The course provides the basic knowledge and skills for the determination and use of such loads in courses such as steel structures design, concrete structures design, and senior project. Lectures introduce topics and methods of application; laboratories emphasize the application of codes and methods on varying structure types. This is a half-semester course usually conducted the first half of the semester; 1 hour of lecture, 3 hours of laboratory per week. Prerequisite: CET 2120

ARE 3112 Codes & Loads: Mechanical/Electrical (1)**fall**

This course provides students with an understanding of which codes and specifications govern the determination of design heating/cooling and lighting/electrical loads for buildings and other structures. It introduces students to the determination of applicable code provisions, the application of those code provisions, and also to methods for calculating and estimating loads that are not specifically addressed (or are insufficiently addressed) in code books, manuals, and elsewhere (e.g. special studies, rules of thumb, past experience, expert elicitation). The course provides the basic knowledge and skills for the determination and use of such loads in courses such as HVAC, plumbing, electrical/lighting, and senior project. Lectures introduce topics and methods of application; studios emphasize the application of codes and methods on varying structure types. This is a half-semester course usually conducted the first half of the semester; 1 hour of lecture, 3 hours of studio per week. Prerequisite: ARE 2032; MAT 1520; or instructor permission

ARE 4010 Concrete Structures Design (3)**fall**

This course covers the design of typical statically determinate and indeterminate concrete structures. The course makes extensive use of the American Concrete Institute building code requirements and considers concrete and steel material properties, design approximations, design of concrete linear members (beams and columns), slabs, foundations, and walls. Sustainable engineering concepts are addressed; 3 hours of lecture per week. Prerequisite: ARE 3020, 3111; CET 2120

ARE 4020 Architectural Engineering Management (3)**fall**

This course covers many of the business, management, professional, and ethical subjects that architectural and other engineers may face during their careers. These may include legal issues; business organizational frameworks; personnel and diversity issues; business planning and decision making; marketing; scheduling; professional ethics; project and design cost issues (including engineering economics); information management; technical presentation skills; and others. The course helps students develop communication skills and the ability to analyze and create management-related documents using various methods; 3 hours of lecture per week. Prerequisite: ARE 2040

ARE 4030 HVAC Systems (4)**fall**

This course addresses the engineering aspects of heating, ventilating, and air conditioning systems design.

Course Descriptions

There is a focus on mechanical systems for commercial buildings that includes psychometrics, basic HVAC calculations, design condition determination, load estimating, duct and pipe sizing, HVAC systems, and HVAC equipment selection. Students are required to perform system design on a commercial building in preparation for Senior Project. Introductions to energy conservation, comfort condition, indoor air quality, and mechanical codes are included. ASHRAE standards and international codes are used as a basis in these areas; 3 hours of lecture, 3 hours of studio per week. Prerequisite: ARE 2032, 3050, 3112 [Course fee: \$15]

ARE 4040 Plumbing Systems (3)

spring

Students in this course learn the basic practices and techniques for the design of plumbing systems in buildings. International Plumbing Code Commentary is the basis of course materials. Emphasis is placed on the design and calculations for sizing sanitary waste and vent systems; domestic hot and cold water systems; water heaters; storm drainage systems; and fire sprinkler systems, as well as fixture selection. Each topic includes discussions on materials and methods of construction and installation, code requirements, computer applications, specifications, and drafting symbols and standards; 2 hours of lecture, 3 hours of studio per week. Prerequisite: ARE 2032, 3050

ARE 4050 FE Exam Survey (1)

fall

This course provides students and practicing professionals with applications for, and review of, engineering, math, and science concepts to prepare for the Fundamentals of Engineering (FE) examination (primarily the "other disciplines" subject area) administered by most states as a first step toward professional licensure as a Professional Engineer. The course focuses on topics that students have been exposed to previously and on topics that are generally easier to understand and apply with limited explanation of background material. FE exam topics that are covered significantly in senior-level ARE courses (e.g., ethics and engineering economics) receive limited coverage. Strategies for studying for and taking the FE and similar examinations are covered, as is the application of engineering judgment in general; 3 hours of studio per week. Prerequisite: Senior standing in AET or an ABET-accredited program or instructor permission

ARE 4720 ARE Senior Project (4)

spring

This course is a capstone course that integrates knowledge and skills developed through other coursework and life experience. Students typically prepare drawings, design documentation, and presentations for a commercial project based on preliminary and incomplete architectural plans (the ASHRAE national student competition building is often used) or other information. Students work on electrical/lighting, mechanical, or structural systems. In most cases, a semester-long final design in one subject area is done; 2 hours of lecture, 6 hours of studio per week. Prerequisite: ARE 2022, 3030, 3040, 3111, 3112, 4010, 4020, 4030 [Course fee: \$10]

Automotive (ATT)

ATT 1010 Suspension & Steering (3)

fall

This course is designed to give the student a thorough understanding of the theory, construction, and design of vehicle steering and suspension systems. Emphasis is placed on the geometry of links and levers; vehicle suspension requirements; vehicle handling and dynamics; and the diagnosis of suspension problems; 2 hours of lecture, 3 hours of laboratory per week. [Course fee:\$55]

ATT 1050 Alignment & Brakes (4)

spring

This course is designed to give the student a thorough understanding of the theory, construction, and design of those mechanical devices utilized in tires, wheels and bearings, and hydraulic braking systems. Emphasis is placed on the geometry of links and levers; the physics of friction and hydraulics; vehicle braking requirements; vehicle handling and dynamics; wheel alignment procedures and equipment; and the diagnosis of brake problems. This course also includes curriculum necessary for successful completion of the Vermont state inspection certification test, administered by the DMV. Students who are already certified will receive credit for the inspection portion of the course; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ATT 1010 [Course fee:\$100]

ATT 1070 Automotive Engine Laboratory (1)

fall

This is the automotive section of the laboratory for GTS 1020; 3 hours of laboratory per week.

ATT 1090 Automotive Electronics Laboratory (1)

fall

This is the automotive section of the laboratory for GTS 1120; 3 hours of laboratory per week.

ATT 1110 Automotive Electrical Systems Laboratory (1)

spring

This is the automotive section of the laboratory for GTS 1040; 3 hours of laboratory per week.

ATT 2010 Engine Performance (4)

fall

This course gives the student an understanding of fuel delivery and other systems as they relate to the internal combustion engine. Topics include engine air/fuel requirements; gasoline fuel injection systems;

ignition systems; fuel and air delivery intake systems; exhaust systems; and sensors and diagnostics. The analysis of fuel-related problems, diagnosis of component failures, and verification of repairs are included; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: GTS 1040; ATT 1110; PHY 1030 [Course fee:\$125]

ATT 2020 Body Electronic Systems (4)

fall

This course is designed to give the student an understanding of commonly used chassis systems. Major topics studied include heating, ventilation, and air conditioning; instrument panels; air bags; and anti-lock brakes. The student is familiarized with system operation, diagnostic techniques, system failure analysis, and repair. The laboratory offers experience in diagnosis and repair of these systems as well as more practice in using electrical diagnostic techniques. This course includes the MACS A/C certification test; 3 hour of lecture, 3 hours of laboratory per week. Prerequisite: ATT 1010, 1110; GTS 1040 [Course fee: \$100]

ATT 2030 Advanced Engine Performance & Fuel (4)

spring

This course is intended to give the student a thorough understanding of the electronic controls and devices used on the modern automobile power train. Topics to be covered include the theory, design, operation, and application of various domestic and foreign electronic control systems. Analysis of system problems; diagnosis of system failures; component and system test procedures; sensors; emissions systems; advanced drivability diagnostics; exhaust gas analysis; and causes of premature component failure are studied in detail; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ATT 2010 [Course fee: \$75]

ATT 2040 Automotive Drive Trains (4)

spring

In this course, students learn the principles of construction, design, and operation of mechanical devices used in the modern automotive drive train. Specific topics to be addressed include helical and planetary gear drive systems; torque converters; hydraulic control systems; principles of electronically-controlled transmissions; clutches; manual transmissions and transaxles; drive shafts and axles; universal and CV joints; differentials; transfer cases; and problem diagnosis and component failure analysis; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ATT 1010, 1020, 1120 [Course fee:\$175]

ATT 2060 Advanced Technology Vehicle (4)

spring

This course will introduce students to the design, operation, and servicing of electric, hybrid, alternative fuel, and fuel cell vehicles. Topics will include basic physics and chemistry influencing design; motor and generator design and utilization; hybrid electric vehicle design variations; maintenance and service; light duty diesel; CNG vehicles; and a basic introduction to fuel cell vehicles; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ATT 1020 [Course fee:\$50]

ATT 2801/2802 ATT Summer Internship/ATT Summer Internship Review (0/1)

summer/fall

This course is a ten-week, 400-hour summer cooperative education experience followed by a one credit fall internship review; graded Pass/No Pass. Prerequisite: Department permission/ATT 2801 [Course fee: \$250]

Biological Sciences (BIO)

BIO 1020 Introduction to Environmental Biology (4)

fall

This course is intended to introduce students to the fundamentals of environmental biology. It is an introduction to the structure and biota of several aquatic and terrestrial ecosystems and students investigate why species occupy specific habitats. The course includes an introduction to Vermont's aquatic and terrestrial ecosystems; spatial and temporal changes in ecosystems and species; and critical observation and interpretation of landscapes. The course will stress communication skills, as well as critical thinking and teamwork; 3 hours of lecture, 2 hours of laboratory per week.

BIO 1030 Nutrition (3)

fall

The course focus is to provide sound, relevant background knowledge in the science of human nutrition and to translate the scientific principles of nutrition into applicable concepts of care. The course offers opportunities for the student to identify dietary modifications relating to the developmental stage of the patient. It implements the philosophy and objectives of the nursing and allied health programs by identifying the role of adequate nutrition in maintaining the health of the individual throughout the life-span; 3 hours of lecture per week.

BIO 1040 Principles in Biology (4)

fall

This course will provide a general knowledge of biology from the molecular level to whole systems. Topics will include cell chemistry, evolution, genetics, ecology, diversity, and population dynamics. When applicable, the class will focus on biological aspects of the state of Vermont; 3 hours of lecture, 3 hours of laboratory per week.

BIO 1220 Botany (3)

spring

This course provides students with an understanding of the fundamentals of plant growth and development. Higher plant structure, metabolism, growth regulators, and mineral nutrition are emphasized. Students also

become acquainted with the diversity of plants and plant-like organisms through study of bacteria, viruses, algae, fungi, mosses, and lower vascular plants; 3 hours of lecture, 3 hours of laboratory per week.

BIO 2011 Human Anatomy & Physiology I (4)

fall

This course is an introduction to the structure and function of the human body. It emphasizes the properties of cells, tissues, and organ systems and their relationships in health and disease. Topics include general body organization and function; cellular physiology and histology; and the anatomy and physiology of each organ system. Laboratory work parallels lecture topics and includes microscopy, study of human anatomical models, dissection of appropriate laboratory specimens, and physiologic experimentation; 3 hours of lecture, 3 hours of laboratory per week.

BIO 2012 Human Anatomy & Physiology II (4)

spring/winter

A continuation of BIO 2011, this portion of the course includes the study of the structure and function of the endocrine system, circulatory system, immune system, respiratory system, digestive system, excretory system, and reproductive system. Other topics covered include acid/base balance and electrolyte balance. Laboratory work parallels lecture topics and includes microscopy, dissection of appropriate laboratory specimens, and study of human anatomical models; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: BIO 2011

BIO 2030 Plant Pathology (3)

spring

Students explore the organisms and environmental factors that cause plant diseases. The biology of fungi, bacteria, and viruses, including their life histories, is studied extensively. A systematic approach to discovery and identification of plant disease is examined. Students learn to recognize disease symptoms. Methods of disease management are covered with emphasis placed on biorational techniques; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: BIO 2040 or instructor permission

BIO 2040 Entomology & Ecological Pest Management (3)

spring

Entomology examines the biology and management of insect and other related invertebrate pests that attack ornamental plants. Students study insect morphology, anatomy, life processes, and ecology. Special emphasis is placed on insect identification and life histories. Students explore management strategies as part of an integrated approach to pest management; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: Sophomore standing or instructor permission

BIO 2120 Elements of Microbiology (4)

fall/spring/summer

This course offers the student an opportunity to examine organisms that are too small to be seen with the naked eye. This is a comprehensive study of the basic principles of microbiology. A brief survey of the history of the science is given. Emphasis is placed on understanding the variety and differences of microbes and their relationship to humans. Virtual laboratory study and in-laboratory demonstrations complement the lecture. Successful completion of the laboratory exercises is a partial requirement for the course. Successful completion of BIO 2012 recommended; 3 hours of lecture, 3 hours of laboratory per week.

BIO 2320 Zoology (4)

fall

A laboratory course designed to acquaint the student with the fundamental concepts of animal biology, including molecular genetics and inheritance, evolution, and biological systems, with an emphasis on vertebrates. Previous successful completion of courses in biology and chemistry is highly desirable; 3 hours of lecture, 3 hours of laboratory per week.

Business (BUS)

BUS 1010 Introduction to Business (3)

fall

The focus of this course is to survey the interconnected disciplines of economics, management, marketing, finance, operations, and information technology. The course will also facilitate college success strategies such as note-taking, time management, test-taking, and study skills. Students will be introduced to assignments typical of higher level business courses with the goal to develop effective oral and written communication, critical thinking, problem solving, interpersonal skills, and personal and professional ethical behavior; 3 hours of lecture per week.

BUS 1051 Computer Applications for Business I (3)

fall

In this course, students will be introduced to information processing using the Windows operating system and common applications for business. File management, word processing, spreadsheets, database management, and presentation graphics will be covered; 1 hour of lecture, 4 hours of laboratory (hybrid format) per week.

BUS 1052 Computer Applications for Business II (3)

spring

In this course, students will learn advanced information processing skills using the Windows operating system and common applications for business. Applications will include word processing, spreadsheets, data-

base management, presentation graphics, publishing, and digital image manipulation; 1 hour of lecture, 4 hours of laboratory (hybrid format) per week.

BUS 2020 Principles of Management (3) fall

This course is an introduction to philosophy, principles, and techniques of management. Students will examine classical, modern, and emerging concepts as they relate to today's manager and the functional processes of planning, organizing, directing, and controlling resources. Learning experiences may include case studies, team experiences, and simulations; 3 hours of lecture per week.

BUS 2041 Entrepreneurship I (3) fall

This course is the first course in a two-course series on entrepreneurship and is a prerequisite for course two. Course one provides the knowledge and fundamental concepts of entrepreneurship; course two (BUS 3041) applies those concepts to cases and provides students hands-on experiences in entrepreneurial environments. This course provides the foundations for understanding the nature, challenges, and rewards of entrepreneurship. Entrepreneurship is approached as a special and unique way of thinking and behaving. Students will gain an understanding that entrepreneurship is a predictable and manageable process, applicable to profit, non-profit, and public organizations; 3 hours of lecture per week.

BUS 2131 Writing for Electronic & Social Media (3) fall/as required

This course will examine the history of electronic communication and social media and their roles in society and in business. The course will integrate components of communication, sociology, marketing, and analytics. Students will reflect on the impact of social media on individuals and on the consumer experience, and they will discuss the ethical, cultural, global, and professional effects of social media. This course will focus on how individuals and organizations can maximize the potential and minimize the drawbacks of electronic communication and social media. Students will write email messages, instant messages, text messages, and they will create blogs, microblogs, and social media postings. The course will prepare students to analyze the impact of electronic communication, to write typical business messages, to have a role in marketing, or to pursue an entrepreneurial venture. The class will review grammar guidelines and research techniques; 3 hours of lecture per week.

BUS 2132 Management Applications (3) spring

This course will focus on leadership theories and techniques applied with emphasis on the action skills that managers need for success. Course topics include leadership styles and strategies; meeting management; and parliamentary procedure. Students will describe the components of an effective business meeting and be able to conduct and participate in a meeting according to the Robert's Rules of Order; 2 hours of lecture, 2 hours of laboratory per week.

BUS 2140 Personal Finance (3) as required

This course is a study of the tools used in personal financial planning. The student is introduced to the process used by professional planners and shown how this can be helpful in planning their own financial futures; 3 hours of lecture per week. (General Education: SS)

BUS 2210 Small Business Management (3) fall/spring

This course explores the practical aspects of organizing and managing a small business. The goal of the course is to equip students with the knowledge necessary to make informed business decisions. Students will examine how to analyze a business and improve its management. The course covers the basic concepts of accounting, finance, cash management, business law, government regulations, taxes, and marketing; 3 hours of lecture per week.

BUS 2230 Principles of Marketing (3) spring

This course examines the role of marketing as it relates to manufacturing, wholesale, retail, and service businesses. Emphasis is placed on a study of the marketing mix of product, place, promotion, and price. Students will learn marketing strategies well-suited to small business; 3 hours of lecture per week.

BUS 2260 Principles of Financial Management (3) fall

This course is designed to build on the knowledge from basic accounting. Students apply tools learned in this course to develop a conceptual and analytical understanding of financial management. The emphasis is on learning decision-making techniques. 3 hours of lecture per week. Prerequisite: ACC 1020 or 2121

BUS 2270 Organizational Communications (3) fall/ as required

This class offers a hands-on approach to learning the role, the process, and the skills of interpersonal, group, and public communication in personal and professional settings. The distinctive feature and objective of the course is to understand the role of people in the communication process, both individually and in groups. Students will learn the psychology of face-to-face communication, the role of non-verbal communication, teamwork, effective listening, and professional behavior. Students will plan, prepare, and present team oral presentations; 4 hours of lecture per week. [Course fee: \$50]

BUS 2410 Human Resource Management (3)

spring

This course emphasizes selecting, training, and evaluating personnel; wages, benefits, and bargaining units; motivation, morale, and human relations; and personnel problems in the workplace; 3 hours of lecture per week.

BUS 2440 Introduction to Business Law (3)

fall/spring

This course is designed to familiarize students with the law as it relates to business. Following a review of the legal and constitutional environment of business, the course will focus on contract law; the Uniform Commercial Code; negotiable instruments; debtor and creditor rights; bankruptcy; and agency relationships; 3 hours of lecture per week. (General Education: SS)

BUS 2720 Business Seminar (3)

spring

This is a capstone course for associate degree students. It integrates skills and knowledge developed through previous coursework and research. Students will work in teams to select a topic for an oral presentation. The focus of the presentation will be a training session on an important business topic. Students will research the topic extensively and prepare several written assignments. A final team oral presentation will be judged by college faculty and staff members and business professionals; 3 hours of lecture per week. Prerequisite: Sophomore standing

BUS 2721 Business Planning Seminar (3)

spring

This course will teach students how to estimate the market potential for a business idea. The course will provide students with a realistic experience of the process of preparing a business plan that will attract lenders or investors. Students taking the class are presumed to already have a business idea or a technology to develop. The course will emphasize the importance of market research and the collection of information necessary to establish the viability and sustainability of the business idea. During the semester, students will be expected to repeatedly defend their ideas with their peers and invited guests. The development and presentation of a sound business plan is the final product; 3 hours of lecture per week. Prerequisite: ACC 1020 or 2121; BUS 2210, 2260

BUS 2820 Business Internship & Career Seminar (3)

as required

This course is designed to blend the reflective nature of classroom learning with the applied nature of the workplace. The course will focus on the role and importance of work in society and the impact of work and work-life balance on one's personal and professional life. Readings and online forum discussions will examine topics such as matching skills and interests to career paths; job search and interview techniques; physical, emotional, and financial well-being; work-life balance; dealing with difficult people; organizational politics; and ethical implications of decisions and actions. Students will create a resume, cover letter, and LinkedIn profile, and they will learn effective job search and interview techniques. This course consists of at least 75 hours of work and participation in the online class. The course will be valuable to students enrolled in any major; 3 hours of online lecture per week. Prerequisite: Sophomore standing

BUS 3041 Entrepreneurship II (3)

fall

This course is the second course in a two-course series on entrepreneurship. Course one provides the knowledge and fundamental concepts of entrepreneurship; course two applies those concepts to cases and provides students hands-on experiences in entrepreneurial environments. This course takes the fundamentals of entrepreneurship and applies them to business cases and fieldwork. The course is divided into two sections: (1) creating and pitching a new business concept and (2) evaluating an existing entrepreneurial venture through fieldwork. Students will work in teams to create, evaluate, and develop a concept for a new entrepreneurial venture for either a profit or non-profit mission. Students will also engage in field work with an existing organization engaged in entrepreneurial activities. Organizations may be identified by students or through client-based service providers (VT SBDC, VMEC, United Way, VBSR, etc.); 3 hours of lecture per week.

BUS 3080 Airline Operations & Management (3)

fall

Students obtain a broad perspective of airline operations and management. Topics include the role of air transportation in global economic development, alternative strategic approaches to route structure and product design, fleet selection, finance, and revenue management. Distribution systems including the role of travel agencies, freight forwarders, global distribution systems, and Internet portals are explored. The regulatory foundation of international aviation, the effects of liberalization and privatization, and emerging global alliances receive attention; 3 hours of lecture per week. Prerequisite: Junior or senior standing

BUS 3150 Production & Operations Management (3)

fall

This course provides students with overview of the concepts, methodologies, and applications of production and operations management as an evolving discipline, with roots in industrial engineering, behavioral theories of management, quantitative methods, and other functional areas of business; 3 hours of lecture per week. Prerequisite: MAT 2021; junior standing or instructor permission

BUS 3250 Organizational Behavior & Management (3) spring

This course provides an understanding of the structure and function of human behavior in organizations. The course explores the behavioral influences impacting productivity, organizational effectiveness, and efficiency. Behavior is examined at the individual, small group, and organizational levels. Topics include perception, motivation, negotiation, decision-making, communication, job design, power, politics, and organizational culture; 3 hours of lecture per week. Prerequisite: BUS 2020

BUS 3260 Investments & Portfolio Management (3) as required

This course examines investment in stocks, bonds, governments, warrants, options, and collectibles. Topics include investment setting; securities valuation and analysis; security markets and regulations; and portfolio constraints; 3 hours of lecture per week. (General Education: SS except for Business majors) Prerequisite: ACC 1020 or 2121; BUS 2260

BUS 3410 Business Ethics (3) fall

This course is designed to introduce students to the general field of ethics and to apply ethical thinking to the business environment. An overview of modern ethical thought is provided with specific cases and scenarios presented which students assess from legal, moral, and economic perspectives; 3 hours of lecture per week. (General Education: SS) Prerequisite: ENG 1061 or equivalent

BUS 4080 Business Policy & Strategy Development (3) as required

This capstone course focuses on both the analysis of an organization's internal and external environments and on the development of appropriate corporate, business, and function level strategies. The case study method is used extensively, with emphasis placed on policy formulation, strategic implementation, and control. Both for-profit and not-for-profit organizations are included; 3 hours of lecture per week. Prerequisite: Senior standing

BUS 4310 Business Information Architecture (3) fall/as required

Students will learn and apply theory, process, design, and development to create effective, user-centered written and electronic communications. The course will focus on the convergence of communication technology and tools and the impact on business applications such as letters, email messages, instant messages, podcasts, and a variety of social media. Students will design and create an on-line portfolio to showcase education, skills, abilities, and experience for a job search; 3 hours of lecture per week. Prerequisite: Senior standing

BUS 4510 Business Management Through IT (3) as required

Students examine the role of information technology in the conduct of business and the managerial uses of information at the operational, tactical, and strategic levels of decision-making. Topics focus on the use of IT to facilitate business change in policy and practice. The course includes discussion of the importance of communications to today's business organization and the role of the non-IT professional in systems development; 3 hours of lecture per week. Prerequisite: BUS 2020

BUS 4530 Technical Project Management (3) spring

This course is designed to introduce students to the field of project management. Because of the wide nature of the topic and the limited time of the course, coverage will be broad. This course emphasizes and follows the Project Management Institute (PMI) model of project management; 3 hours of lecture per week. Prerequisite: Junior standing or instructor permission

BUS 4730 Senior Project (3) spring

This is a capstone course for bachelor degree students. It is similar to the associate degree project, but requires advanced research and depth. It integrates skills and knowledge developed through previous coursework and research. Students work in teams to select a topic for oral presentation. The focus of the presentation will be to present a significant business problem, offer proof of the problem, recommend solutions, and give evidence that the solutions will help solve the problem. Students research the topic extensively and prepare several written assignments. A final team oral presentation is judged by college faculty and staff members and business professionals; 3 hours of lecture per week. Prerequisite: Senior standing

Continuing Education (CED)**CED 0011 Emergency Medical Services (0) fall**

This non-credit course combines classroom and hands-on instruction in all phases of pre-hospital emergency care. A minimum of six patient assessments through ride-along experience is required. This course prepares students to become EMT-B and CPR/AED Certified and to be eligible to take the NREMT EMT-B certifying exam. Graded Pass/No Pass. Prerequisite: FSC 1022 or CPR and AED certification [Course fee: \$450]

CED 0012 Firefighting Services I (0) fall

This noncredit course provides an overview of fire services; career opportunities in firefighting and related

fields; philosophy and history of fire protection/service; fire loss analysis; organization and function of public and private firefighting services; fire departments as part of a local government; laws and regulations affecting the fire service; introduction to fire protection systems; introduction to fire strategy and tactics. Students will learn basic fire suppression, rescue, and extrication skills. After training, students will participate in a live fire exercise at a Vermont Fire Academy site. This course prepares students to become NFPA FF I & II and to be eligible to take the NFPA FF I certifying exam; 3 hours of lecture per week.

CED 0013 Firefighting Services II (0)

spring

This is a continuation of CED 0012. After training, students will participate in a live fire exercise at the Vermont Fire Academy. This course prepares students to become NFPA FF I and to be eligible to take the NFPA FF I & II certifying exam; 3 hours of lecture per week. Prerequisite: CED 0012

Civil & Environmental Engineering Technology (CET)

CET 1000 Freshman Orientation (1)

fall

This course focuses on introducing the skills required by students for success in the Civil and Environmental Engineering Technology program. The course may have guest speakers and field trips to construction projects and public facilities that will give the students a picture of the variety of work done by civil engineers and the job opportunities in the field; 1 hour of seminar per week.

CET 1011 Surveying I (3)

fall

The course introduces fundamental surveying principles and methods, including benchmark leveling; the measuring of distances and angles; and instruction and practice in the care and use of equipment. Areas covered are azimuths and bearings; coordinate geometry; cross sections and profiles; note-keeping; computations and field practice relating to traverses; introduction to total stations and point files; and the adjustment of surveying instruments. The basics of construction surveying are discussed; 2 hours of lecture, 3 hours of laboratory per week. Corequisite: MAT 1420

CET 1020 Engineering Materials (3)

spring

This course studies the materials used in construction, including aggregates, cements, Portland cement concrete, timber, asphalts, bituminous concrete mixes, steel, and masonry. Sources, standard tests, and methods of manufacture and handling are covered. Portland cement concrete and bituminous concrete mixes are designed and tested. Laboratory work includes performance of standard tests and the preparation of technical reports of the tests; 3 hours of lecture, 3 hours of laboratory per week. [Course fee: \$30]

CET 1030 CAD for Civil Engineering (3)

spring

This course provides a solid foundation in CAD for the civil and environmental engineer. Course covers topics in AutoCAD and Surveying & Civil and requires access to AutoCAD and Carlson Surveying & Civil and Environmental outside of regular class hours. Students should have the ability to move files using Windows Explorer and be familiar with MS Word; 6 hours of laboratory per week. Prerequisite: Basic computer skills

CET 1031 Engineering & Surveying Computer Applications I (2)

fall

This course provides the student with a working knowledge of the use of computers for Civil and Environmental Engineering Technology. No prior computer training is required. The course is designed to introduce the computer and its operating system in conjunction with laboratory assignments in the use of CAD. The fundamentals of CAD operation and application are presented through the use of civil and environmental engineering topics including site, structural, and environmental drawings. Major graphic subjects include creating and editing CAD primitive and complex entities, dimensioning, drawing construction, layout, and output. Spreadsheets are also introduced with applications appropriate to civil and environmental engineering including calculations, quantities, estimates, and graphs; 6 hours of laboratory per week. [Course fee: \$35]

CET 1032 Engineering & Surveying Computer Applications II (2)

spring

This course is a continuation of CET 1031 intended to provide proficiency in the creation and understanding of working drawings related to civil engineering. Covered AutoCAD topics include advanced AutoCAD entity manipulation, customization, and programming. The student is introduced to a civil survey software package used for site mapping, terrain modeling, and road and utility design. In addition, related technologies such as Geographic Information Systems (GIS), their application, and data sources are discussed; 6 hours of laboratory per week. Prerequisite: CET 1031

CET 2012 Surveying II (4)

fall

A continuation of Surveying I, this course gives additional and more detailed information in route location and design, construction surveying, and advanced surveying topics. Specialized equipment such as electronic distance measuring instruments and state-of-the-art total stations and data collectors are used in the field labs. Least squares adjustments are introduced. Cogo surveying software is an integral portion of the course; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: CET 1011, 1032; MAT 1420 [Course fee: \$40]

CET 2020 Hydraulics & Drainage (3)**fall**

The course includes an introduction to the fundamental concepts of fluids and to the applications of flow mechanics in civil and environmental engineering projects. Topics include closed and open channel flow, precipitation, stormwater run-off, infiltration, ground water, watershed drainage systems, measuring devices, buoyancy, and steady flow. Calculations and laboratory work involve the use of precipitation and run-off data; culvert and stormwater system design; flume and hydraulic bench experiments; and the use of current industry standard computer programs; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1520; PHY 1042

CET 2030 Environmental Engineering & Science (3)**spring**

This course emphasizes quantitative analysis of environmental problems and introduces the student to engineering methods for treatment and prevention of water, soil, and air pollution. Fundamental concepts of chemistry, microbiology, ecology, and statistics which are critical to environmental analysis and engineering design are covered. The laboratory includes both field and indoor testing of water quality as well as field trips to environmental facilities; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: CHE 1031; MAT 1420; PHY 1042

CET 2040 Statics & Strength of Materials (4)**fall**

Statics involves the study of vector forces, resultants, and moments and their effect on beams, columns, frames, and trusses. Strength of materials includes the study of material properties; tension, compression, shear, and bending stresses; and the methods of determining centroids and moment of inertia. Laboratory work includes calculation of force and stress analysis, in addition to material testing; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1520; PHY 1042

CET 2050 Civil & Environmental Design (4)**spring**

This course is designed to give the student experience with realistic civil and environmental engineering technology problems that require the use of knowledge and skills obtained in previous courses taken at Vermont Tech. Under faculty supervision, students are assigned design projects that could include site development plans; buildings and parking structures; bridges; water supply and treatment facilities; and roads and highways. The students develop graphic presentations, preliminary designs, calculations, and working drawings. The final phase of some projects may include estimating and construction scheduling; 2 hours of lecture, 6 hours of laboratory per week. Prerequisite: CET 2012, 2020, 2030, 2040, Corequisite: CET 2060, 2110, 2120 [Course fee: \$35]

CET 2110 Mechanics of Soils (3)**spring**

A study of the basic principles and applications of soil mechanics as used in design and construction is covered. This course introduces knowledge of soil: its formation, actions, and uses. Included are studies of index properties; soil classification; exploration and sampling; compaction; soil strength; erosion control; foundations; and retaining walls. Problems relating to these items are presented and solved. Laboratory testing is done in conjunction with classroom studies to give a more complete understanding of the material. Each student is required to prepare an individual technical report of each test performed; 2 hours of lecture, 3 hours laboratory per week. Prerequisite: CET 2040

CET 2120 Structural Design (3)**spring**

This course studies the design of structural systems, focusing on solid sawn wood and engineered wood products. Structural loads, general framing concepts, structural drawings, and structural systems of wood, reinforced concrete, and steel are presented. The design of various wood structural members and systems, such as tension members, beams, columns, and connections is covered in accordance with relevant design codes. Structural foundations are introduced. Laboratory work consists primarily of the application of building and design codes to the design and analysis of structural systems; 3 hours of lecture, 3 hours laboratory per week. Prerequisite: CET 2040 [Course fee: \$10]

CET 3010 Evidence & Procedures for Boundary Line Location (3)**spring**

The purpose of this course is to familiarize land surveying students with the importance of locating the original boundary line between two or more tracts of land, the evidence that needs to be collected, and the procedures for this collection. This course is intended for students who wish to pursue a career in the field of land surveying. The course is also intended for people working in the field of land surveying who wish to obtain a license as a Professional Land Surveyor in the state of Vermont. 3 hours of lecture.

Chemistry (CHE)**CHE 1020 Introduction to Chemistry (4)****fall/spring**

Descriptive chemistry; atomic and molecular structure; chemical reactions; and the fundamentals of chemistry are studied. Laboratory work complements lectures and develops basic laboratory techniques. Previous successful completion of a course in chemistry is highly desirable; 3 hours of lecture, 2 hours of laboratory per week.

CHE 1031 General Chemistry I (4)

as required

This course is intended for engineering students and consists of the fundamentals of general and physical chemistry. Laboratory work is designed to give students hands-on experience with principles discussed in the lectures, provide an introduction to laboratory techniques, and introduce some methods of analysis currently used in the industry. Laboratory experiments will reinforce concepts introduced in lectures and will teach basic laboratory skills and techniques. Fundamental quantitation and analytical techniques are emphasized; 3 hours of lecture, 3 hours of laboratory per week.

CHE 2060 Principles of Organic Chemistry (4)

spring

This course is designed to enhance knowledge and skills in organic chemistry. It includes a general overview of the following organic compounds: aliphatic compounds (hydrocarbons, alcohols, ethers, aldehydes, ketones, carboxylic acids, and carbohydrates); cyclic compounds; and combinations of aliphatic and cyclic structures (including amino and nucleic acids). Important areas of organic chemistry are covered, including polymerization, hydrogenation, isomerization, photochemistry, and stereochemistry; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: CHE 1031

Computer (CIS)

CIS 1030 Introduction to Computers (3)

as required

Students will become familiar with the Windows operating system, the applications that comprise the Microsoft Office software suite (word processing, spreadsheet, database, and presentation graphics), and communication software; 3 hours of lecture and laboratory per week.

CIS 1050 Introduction to Spreadsheets (1)

fall/spring

This course introduces the student to the Microsoft operating system, e-mail, Internet, and the use of spreadsheets. Topics include the commands necessary to build a spreadsheet and make graphs; 1 hour of laboratory per week.

CIS 1080 Introduction to Spreadsheets & Database Management (2)

fall/spring

This course introduces students to the use of e-mail, Web Services database functions, and the Internet, as well as to the use of spreadsheets and databases. Spreadsheet topics include all functions necessary to build a spreadsheet and create graphs. Database topics include the fundamentals of computer database design and management; 2 hours of laboratory per week.

CIS 1120 Introduction to Information Technology (3)

fall

This course introduces students to the world of IST across a broad range of topics. Topics include history of computing in society, career paths in computing, and the use of computers in the workplace; 3 hours of lecture per week.

CIS 1151 Website Development (3)

fall/spring

This course includes the introduction of web pages for commercial websites including use of and design with hypertext markup language (HTML), text, and graphics; applying appropriate design, color, and art; size and placement of graphics, including image maps, in a web page; creation of advanced tables, including nested tables; creation of forms that contain advanced input types and attributes, text areas, and advanced lists; and use of a validation tool to debug an HTML document; 2 hours of lecture, 2 hours of laboratory per week. The online section has 3 hours of online lecture per week only without a lab.

CIS 1152 Advanced Website Development (3)

spring

Students learn intermediate skills and techniques used in webpage development. Topics include applying sophisticated formatting to text; creating documents that automatically display another page and that contain interactive JavaScripts; creation of and work with frames documents; examination of document styles and recommendations on improvements; HTML document creation/conversion tools; using XML to manage content; an introduction to database theory; and use of basic SQL programming; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 1151

CIS 2010 Computer Organization (4)

spring

In this course, students gain a basic understanding of computer hardware. The students are introduced to binary data representation, pointers, and memory through the C language. This understanding expands to include the functioning of the CPU (including registers, ALU, and simple I/O) culminating in an introduction to assembly language; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: C- or better in CIS 2025 or 2262 or 2271

CIS 2025 C Programming (3)

fall/spring

This course teaches students to write programs using the C language. All fundamental features of C are covered, including arrays, functions, pointers, file I/O, string manipulation, and preprocessor directives. In

addition, this course will emphasize good software design techniques, programming style, and documentation. No prior programming experience is required. This course is offered in both classroom and online versions. Sufficient internet skills are required to take the course online; 2 hours of lecture, 2 hours of laboratory per week.

CIS 2151 Networks I (3)**spring**

This course introduces the student to network protocols. The course covers physical, data link, network, transport, and application layer protocols. The TCP/IP protocol suite is discussed in detail. Topics include Ethernet, connectionless protocols, connection-oriented protocols, and application protocols such as DNS, DHCP, and HTTP. Students learn about both hardware and software troubleshooting tools, security issues, and current topics such as IPv6. Hands-on experience working with networking equipment and use of network simulation tools is used throughout the course; 3 hours of lecture per week. Prerequisite: CIS 2025 or 2262 or 2271

CIS 2230 System Administration (4)**fall**

This course explores the basics of computer system administration with a focus on the servers used in large and small businesses and the cloud. The course provides the student with enough theory to understand how operating systems work and to interpret the output of various management tools. It also covers practical issues in system administration including process, memory, and file system monitoring and performance tuning. Topics include: scripting; file commands; text commands; piping and filtering; file permissions; security; remove access protocols; and resource monitoring; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 2025 or 2262 or 2271

CIS 2235 Advanced System Administration (4)**spring**

This course develops the skills for setting up UNIX servers for commercial deployment. The first half of the course covers the advanced skills required for creating and maintaining a robust UNIX server. Topics include scripting, code control, partitioning, hardening, backup strategies, file systems, file sharing protocols, job scheduling, encryption, and virtualization. The second half covers installation and configuration of typical services including file, web, mail, and print; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 2230

CIS 2260 Object-Oriented Programming (3)**fall**

This course introduces students to the concepts of programming with abstract data types and object-oriented programming. It uses Java to cover classes, inheritance, and polymorphism. The course also builds on the prerequisites to provide students with more advanced exposure to software design, implementation, debugging, and documentation; 3 hours of lecture per week. Prerequisite: C- or better in CIS 2262 or 2271

CIS 2261 Introduction to Java Programming I (4)**fall**

This course is the first of a two-semester series. It introduces the basic concepts and techniques of Java, including object-oriented programming (OOP). Essential topics include program structure; primitive and String data types; operators; expressions; control structures; static methods (including an introduction to recursion); exception handling; use of library packages; and top-down design. OOP concepts include classes and objects; instance methods and constructors; inheritance; polymorphism; and an introduction to object-oriented design. Time permitting, the course may cover the basics of graphical user interface (GUI) construction; 3 hours of lecture per week.

CIS 2262 Introduction to Java Programming II (3)**spring**

A continuation of CIS 2261, this course develops a more solid foundation for future programming; 3 hours of lecture per week. Prerequisite: CIS 2261

CIS 2271 Java Programming (4)**fall**

This course introduces the basic concepts and techniques of Java, including object-oriented programming (OOP). Essential topics include program structure; primitive and String data types; operators; expressions; control structures; static methods (including an introduction to recursion); exception handling; use of library packages; and top-down design. OOP concepts include classes and objects; instance methods and constructors; inheritance; polymorphism; and an introduction to object-oriented design. Time permitting, the course may cover the basics of graphical user interface (GUI) construction; 3 hours of lecture, 2 hours of laboratory per week.

CIS 2280 Perl Programming (2)**as required**

This course continues the student's training in programming by introducing the use of the scripting language, Perl. Students are introduced to the Linux operating system. The basic concepts of programming are reviewed using Perl to demonstrate those concepts. Concepts unique to Perl, such as regular expression handling and hashes, are introduced. The emphasis in the course is on using Perl as a tool to get things done rather than only as a vehicle to explain how to program. Examples and assignments are drawn from topics related to system administration, web programming, and application programming; 2 hours of lecture

per week. Prerequisite: CIS 2025 or 2262 or 2271

CIS 2320 Software Quality Assurance & Testing (3)

fall

Students are introduced to the concepts, techniques, and tools used for evaluating and ensuring the quality of computer software. Topics include dimensions and implications of quality, code reviews, test construction, test coverage metrics, partition testing, user interface testing, and current test support tools; 3 hours of lecture per week. Prerequisite: CIS 2025 or 2262 or 2271

CIS 2411 Introduction to E-commerce (3)

spring

In this course, students will examine critical information technologies that provide the basis for electronic commerce and its application in a variety of sectors and industries. It will begin with coverage of the tools, skills, and business concepts that surround the emergence of electronic commerce and the consequences of applying these information and technologies to different commercial processes from both an operational and strategic perspective. The course then explores several of the problems surrounding electronic commerce such as security, privacy, content selection, and rating, as well as intellectual property rights, authentication, encryption, acceptable use policies, and legal liabilities; 3 hours of lecture per week.

CIS 2450 Advanced Web Technologies (3)

spring

This course introduces the student to advanced use of web technologies methods and practices. The use of technologies such as PHP, XML, JSON, AJAX, jQuery, and web APIs such as Google, Flickr, YouTube, and Twitter is discussed and implemented in a lab environment. Comprehensive labs emphasize hands-on learning and practice to reinforce the skills learned in class; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 1151

CIS 2610 Topics in Information Technology (3)

as required

This course is an in-depth investigation of a topic or technology of current interest to the information technology infrastructure community; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 2151, 2230

CIS 2620 Topics in Software Engineering (3)

as required

This course provides students with the opportunity to integrate the topics presented throughout the curriculum, as well as to explore additional specific topics that are relevant to the current state of the software engineering field. At the discretion of the instructor, students may work on a semester-long project, do library research, or develop a significant program or system. The precise content and nature of this course varies from year to year, depending on current industry needs; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 2025 or 2262 or 2271

CIS 2720 Current Topics in Computer Engineering (3)

spring

This course provides students the opportunity to integrate the topics presented throughout the curriculum as well as to explore additional specific topics that are relevant to the current state of the field. Recent topics have included HTML authoring, Java, CGI scripting, Windows programming, X11/Qt programming, and databases. At the discretion of the instructor, students may work on a semester-long project, do library research, give an oral presentation, write a significant program, or build significant electrical hardware. The precise content and nature of this course varies from year to year, depending on current industry needs; 2 hours of lecture, 2 hours laboratory per week. Prerequisite: CIS 2151; ELT 1080, 2050, Corequisite: CIS 2230

CIS 2730 Software Engineering Projects (3)

spring

This capstone course involves the development of a group project. The development effort will be combined with an introduction to systems development and life cycle. Students will also receive an introduction to orally presenting technical information to a technical audience. Each group will present their project design and the final project; 2 hours of lecture and 2 hours of laboratory per week. Prerequisite: CIS 2025 or 2262 or 2271

CIS 3010 Database Systems (4)

spring

This course covers methods for designing relational databases, the use of SQL to define and access a database, and the use of production-level database management systems to implement a relational database system. Students are required to complete a project in which they either implement a real-world example relational database or, at the instructor's discretion and approval, research a specific database topic not covered during class. Additional topics that may be discussed as time and class interest permit include: integrating databases into applications or websites; alternative database paradigms; database design/engineering tools; and underlying implementation of databases; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 2230

CIS 3012 C++ Programming (3)

spring

The course covers the syntax and semantics of the major C++ features. Topics include a review of C-like constructs from a C++ point of view, data abstraction and object oriented programming in C++, and generic programming in C++ including the use of the standard template library. Discussion of C++ best practices and design techniques is done throughout; 3 hours of lecture per week. Prerequisite: CIS 2260; CIS 2010 or 2025

CIS 3030 Programming Languages (3)**fall**

This course covers fundamental concepts in programming language design from the perspective of the practical programmer. Topics include the syntactic representation of programs, functional programming, static vs. dynamic programming languages, selected advanced object-oriented topics, and an introduction to the theory of computation as it applies to programming languages. Students will gain useful experience with at least two new languages (one the focus of the instructor and one chosen by the student for a project); 3 hours of lecture per week. Prerequisite: CIS 2260, Corequisite: CIS 3050

CIS 3050 Algorithms & Data Structures (3)**fall**

This course focuses primarily on the implementation of various important algorithms and data structures. It contains some theory, but the theory content is minimized in favor of a more rigorous treatment of implementation techniques. The course covers classic topics such as lists, trees, hash tables, sorting, and string matching. It also covers selected other topics such as encryption, data compression, and image processing; 3 hours of lecture per week. Prerequisite: CIS 2260 or instructor permission

CIS 3080 Issues in Information Technology (3)**as required**

This course is an in-depth study of the uses of and issues related to computers and information systems in society. Topics explore the benefits and professional impact of continuing career preparation, career progression, and outreach to the community, ethical development, and ethical behavior. Controversies and alternative points of view are evaluated on issues such as professional ethics and professional responsibility. Students research and write extensively on course topics; 3 hours of lecture per week. Prerequisite: Junior standing

CIS 3152 Network Programming (3)**spring**

This is a course in network programming. Topics include client/server programming with sockets for TCP and UDP, programming at least one application level protocol such as HTTP or SMTP/MIME, and introduction to character sets and at least one remote procedure call system (ONC RPC, Ice, etc.) In addition, an introduction to XML and the use of XML libraries is also presented. Proper error handling techniques are discussed throughout; 3 hours of lecture per week. Prerequisite: CIS 2151; CIS 2010 or 2025; CIS 2262 or 2271

CIS 3170 History of the Theory of Computation (3)**fall**

In this course, the history of computers and early calculators will be examined. Students will learn the principles of early computational devices and investigate how the concepts utilized in these devices are implemented in modern computers. Particular attention is focused on Boolean logic, Frege formula language, flow charts, state machines, and Turing machines. Implications of Shannon's Law and Moore's Law will also be studied. This course is offered online; 3 hours of lecture per week. (General Education: SS)

CIS 3210 Routing Concepts & Wide Area Networks (3)**fall**

This class is an introduction to wide area and local area routing concepts, methods, fundamentals of routing protocols, and packet forwarding. Routing protocols such as RIPv1, RIPv2, EIGRP, and OSPF are analyzed. Also discussed are distance vector and link state routing protocols and their implementation factors in an enterprise network environment. This course utilizes Cisco networking equipment and simulation tools for laboratory work and assignments; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 2151, 2230

CIS 3250 Advanced Network Architectures (3)**spring**

This course teaches students how to implement, monitor, deploy, and maintain a network in a converged enterprise environment. Students will learn how to plan, configure, and verify the implementation of complex enterprise switching solutions. The course also covers the secure integration of VLANs, WLANs, voice, and video into networks. Comprehensive labs emphasize hands-on learning and practice to reinforce the skills learned in class; 3 hours of lecture per week. Prerequisite: CIS 2151

CIS 3310 Artificial Intelligence (3)**as required**

Students learn the algorithms and data structures used in artificial intelligence and to program a range of approaches that computers use to emulate intelligence, such as planning, knowledge representation, learning, decision-making, and game-playing; 3 hours of lecture per week. Prerequisite: C- or better in CIS 2025 or 2260 or 2262 or 2271

CIS 3710 Topics in Information Technology (3)**fall**

This course provides students with the opportunity to integrate the topics presented throughout the curriculum as well as to explore additional specific topics that are relevant to the current state of the information technology field. At the discretion of the instructor, students may work on a semester-long project, do library research, or develop a significant program or system. The precise content and nature of this course varies from year to year, depending on current industry needs; 3 hours of lecture per week. Prerequisite: Per course offering

CIS 3720 Topics in Software Engineering (3)**fall**

This course provides students with the opportunity to integrate the topics presented throughout the cur-

riculum as well as to explore additional specific topics that are relevant to the current state of the software engineering field. At the discretion of the instructor, students may work on a semester-long project, do library research, or develop a significant program or system. The precise content and nature of this course varies from year to year, depending on current industry needs; 3 hours of lecture per week. Prerequisite: Per course offering

CIS 4011 Information Warfare (3)

fall

This course is a strategic level examination of the use of the information instrument of national power. Topics covered include: cyberspace operations, computer network operations, information operation, military strategy, and civil military relations; 3 hours of lecture per week. Prerequisite: CIS 2151, 2230

CIS 4020 Operating Systems (4)

fall

In this course, students study the internal workings of modern operating systems. Topics include multiprocessing, memory management, file systems, and device drivers. Distributed operating systems and real time operating systems are also discussed. As part of this course, students write a kernel module and/or device driver for an operating system chosen by the instructor; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 3050

CIS 4040 Computer Security (3)

spring

This course focuses on security issues associated with computers and computer networks. The course starts by covering cryptographic topics such as symmetric and public key cryptography, digital signatures, secure hashes, random number generation, and message authentication codes. Network security topics are also covered including secure protocols (SSL/TLS, IPsec), network attack methods, network authentication protocols (Kerberos), and firewalls. Finally, the course covers host security matters such as building secure software, auditing, and intrusion detection; 3 hours of lecture per week. Prerequisite: CIS 2151, 2230; CIS 2025 or 2262 or 2271

CIS 4050 Compiler Design (3)

spring

This course familiarizes the student with how computer languages are implemented. During the course, students will write a small compiler for a simplified programming language specified by the instructor. Students will use compiler construction tools such as lexical analyzer generators and parser generators as well as create some hand-built components. Although some theory is presented, the emphasis is on implementation. The programming is done in C, C++, or Java at the instructor's discretion; 3 hours of lecture per week. Prerequisite: CIS 3030, 3050

CIS 4120 Systems Analysis & Design (3)

spring

This course addresses the methodology used in gathering data, analyzing data, and determining user requirements for information processing using advanced systems analysis techniques and the associated techniques used in designing solutions that can then be programmed as application software for use on computer-based systems; 3 hours of lecture. Prerequisite: Junior standing in computer major or instruction permission

CIS 4140 Human Computer Interaction (3)

as required

This course covers the design, implementation, and evaluation of user interfaces for computers and other modern, complex electronic equipment; 3 hours of lecture per week. Prerequisite: C- or better in CIS 2262 or 2271

CIS 4150 Software Engineering (3)

fall

This course is chiefly concerned with the application of engineering principles to the all-too-chaotic process of software development. The student will learn how the concepts of repeatability, modularity, traceability, maintainability, and reusability affect the architecture and design of software systems. The software life cycle and how it is supported by various methodologies will be explored, as well as the ramifications of differing team sizes to the selection of traditional versus agile methods. The student will be shown how documentation techniques, modeling languages, and CASE tools can be used to minimize miscommunications and ensure that the system desired is the system that is eventually built; 3 hours of lecture per week. Prerequisite: CIS 2025 or 2262 or 2271; junior standing

CIS 4210 Computer Graphics (3)

as required

This course deals with computer generation of realistic images of 2- and 3- dimensional scenes. This course involves substantial computer programming; 3 hours of lecture per week. Prerequisite: CIS 3050; MAT 1520

CIS 4220 Physical Simulations (3)

as required

This course combines numerical programming techniques with Newtonian physics and calculus to give the student an understanding of how physical systems can be simulated on a computer. Topics include the simulation of rigid bodies, soft bodies, fluids, and collision detection. This course emphasizes applications rather than mathematical theory and entails a significant amount of programming; 3 hours of lecture per

week. Prerequisite: C- or better in CIS 2025 or 2262 or 2271; MAT 1520; PHY 1041

CIS 4230 Parallel Programming (3) as required

This course examines the applications, algorithms, construction, configuration, and performance of parallel programs. Topics include shared memory parallelism using POSIX threads and OpenMP and multi-machine parallelism using MPI. Parallel programming on modern GPU devices is also introduced; 3 hours of lecture per week. Prerequisite: CIS 2230, 3050

CIS 4310 Computer Forensics (3) fall

This class is an introduction to digital forensic methods, practices, technology, and legal concerns. Students will consider issues of incident response and handling, data collection, chain of evidence, data analysis, cryptanalysis, steganography, and report writing; 3 hours of lecture per week. Prerequisite: CIS 2151, 2235

CIS 4711 Project I (2) fall

This course is a largely self-directed senior project in which students demonstrate their mastery of the subjects covered in their program; 1 hour of lecture, 3 hours of laboratory per week. Prerequisite: Senior standing [Course fee: \$50]

CIS 4712 Project II (3) spring

Completion and final presentation of the senior project begun in the fall. Regular progress reports and a formal presentation at term's end are required. This presentation occurs in front of students, department faculty, and invited guests (including potential employers); 1 hour of lecture, 6 hours of laboratory per week. Prerequisite: CIS 4711 or 4721

CIS 4721 CIS Project I (2) fall

This course is a largely self-directed senior project in which students demonstrate their mastery of the subjects covered in the BS.CSE or BS.CIT programs; 1 hours of lecture, 2 hours of laboratory per week. Prerequisite: Senior standing in the CSE or CIT programs or senior standing in the CPE program with instructor permission

CIS 4722 CIS Project II (3) spring

This course is the completion and final presentation of the senior project begun in the fall. Regular progress reports are required and a formal presentation is required at the end of the academic year. This presentation occurs in front of students, department faculty, and invited guests (including potential employers); 1 hour of lecture, 4 hours of laboratory per week. Prerequisite: CIS 4721

CIS 4730 Information Systems Technology Project (3) as required

This capstone course combines a major project with a review of systems development and life cycle including select human and organization behavior issues; a survey of information technology-associated literature focusing on the role of information sciences in society; the psychological underpinnings of design; experimental technologies; and future-looking science fiction. In addition to the significant project spanning at least the three stages of the life cycle, reflective activities include development barriers, use interaction, analyzing project performance, and planning for future issues; 1 hour of lecture, 3 hours of laboratory per week. Prerequisite: Senior standing in the CSE or CIS programs

Construction (CPM)

CPM 1000 CPM Freshman Seminar (1) fall

This course is designed to facilitate a successful transition to college and focuses on orientation to college and academic success strategies. Topics include student rights and responsibilities; student grading and graduation requirements; student information technologies and database orientation; campus/site resources; time management; note taking; introduction to career opportunities; and program-specific topics including construction program issues, the building construction industry, and professional development; 1 hour of seminar per week; graded Pass/No Pass.

CPM 1010 Electrical/Mechanical Systems (3) spring

The student is introduced to the major environmental systems in a building: plumbing; heating, cooling, and ventilation; and electrical and illumination. Also included is an introduction to the influences of the natural environment on the built environment and a consideration for how these effect energy use and conservation. The building codes that govern the design of the various environmental systems are studied; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: CPM 1021, 1031 or instructor permission

CPM 1021 Construction Graphics I (2) fall

This course prepares students to interpret construction drawings by teaching them to make their own basic architectural drawings by hand. Students learn to draw plans, elevations, sections, and details and to understand how they relate to each other. Informal sketching techniques are practiced and used throughout this

course. This course provides the student with a basic knowledge of the use of spreadsheets in construction. Spreadsheets are introduced with applications appropriate to construction including calculations, quantities, and estimates. No prior computer training is required; 1 hour of lecture, 2 hours of laboratory per week.

CPM 1022 Construction Graphics II (2)

spring

This course is a continuation of CPM 1021. Students experience blueprint reading of residential and commercial construction plans using classroom instruction, drawing of print details, and plan-reading exercises. Students perform basic material takeoff techniques used in estimating and apply AutoCAD basic 2D mechanical drafting techniques to drawing plans and design details; 1 hour of lecture, 2 hours of laboratory per week. Prerequisite: CPM 1021

CPM 1031 Residential Construction Systems (3)

fall

Students study residential construction methods and materials for the following systems: foundations; framing; insulating; interior and exterior finish; and roofing. They learn about the CABO building code, new products, and estimating material quantities; 3 hours of lecture per week. Corequisite: CPM 1032

CPM 1032 Construction Lab (2)

fall

Students are introduced to the basic materials and methods of commercial construction; 6 hours of laboratory per week. Corequisite: CPM 1031

CPM 1111 Commercial Construction Systems (4)

spring

This course introduces students to the construction materials and installation methods used in commercial projects. Students study soils and foundation types; heavy timber frame construction; masonry, concrete and steel construction systems; and commercial roofing, insulation, and cladding systems. They also learn about the IBC building code. CPM 1111 is the same as ARE 1210 for the lecture portion; 4 hours of lecture per week. Prerequisite: CPM 1031

CPM 2010 Construction Estimates I (3)

fall

This course introduces the estimating principles and procedures used to determine detailed cost estimates for construction bidding purposes. Both residential and light commercial applications are addressed. Included are: organizing the estimate; methods of pricing labor, materials and equipment; direct and indirect overhead costs; units of measure; computer spreadsheets; and profit. An introduction to contracts and types of bids is provided. Familiarization with computer estimating software applications is included; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: CPM 1022, 1031, 1111; MAT 1100 or 1420

CPM 2020 Construction Project Management (3)

fall

This course introduces students to the principles of construction project management. Included are the design/construction process, contract documents, organization of the construction firm, subcontractor relationships, records and reports, cost control methods and procedures, schedule control, construction safety, and quality control. Bar chart and critical path method scheduling are covered. An introduction to design-build and construction manager contracting is included; 3 hours of lecture per week.

CPM 2030 Elementary Theory of Structures (4)

spring

This course introduces the student to the methods used in the preliminary analysis and design of building framing systems and why certain materials and member sizes are used. An introduction to statics and strength of materials includes basic analysis of framing systems and properties of materials used in residential and commercial construction. The student is introduced to building and design codes and the study of building loads and how the building reacts to the loads. General structural system using wood, steel, concrete, and masonry elements including pre-engineered products are studied; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: CPM 1031, 1111; MAT 1100 or 1420; PHY 1030

CPM 2050 Construction Management Software (1)

fall

This course exposes student to software used in construction management, particularly spreadsheets and scheduling. Students will learn the software by direct instruction, by working through tutorial exercises, and by creating functional spreadsheets and project schedules; 3 hours of laboratory per week. Prerequisite: CPM 1022

CPM 2060 Field Engineering (3)

fall

This course introduces students to the fundamentals of construction field engineering, survey, and building layout. Students will learn the use and care of survey equipment while performing field practices such as distance measuring; building layout; profile and cross-sectional leveling; and traversing. Trigonometry and geometry will be used to balance angles, make distance corrections, and compute areas and volumes; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1100 or equivalent [Course fee: \$25]

CPM 2720 Construction Supervision (1)

fall

This is an elective course for Construction Management seniors. The intent is to give these students practice

supervising first-year students during their Construction Lab and managing the CPM job site. This course is repeatable for additional credit; 3 hours of laboratory per week. Prerequisite: Instructor permission

CPM 2730 Construction Seminar & Project (3) spring

This seminar weaves prior coursework into workplace-ready applications. In the lab, students read and interpret the contract and specifications for commercial projects of significant scope. Through individual and group work on this project, they develop an estimate of construction time, a project schedule, a schedule of values, and a safety plan; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: Sophomore standing

CPM 2801/2802 Construction Internship/Construction Internship Review (0/1) summer/fall

This is a required part of the CPM curriculum and involves a ten-week summer cooperative education experience that will broaden student understanding of real world construction and management and an internship review seminar in the subsequent fall term; graded Pass/No Pass. Prerequisite: Department permission/CPM 2801 [Course fee: \$250]

CPM 3010 Construction Estimates II (3) spring

This course covers detailed estimations of residential, commercial, and civil construction projects. Value engineering; pre-construction services; preliminary budgets; materials; labor and overhead costs; worker productivity, constructability reviews; proposals; and bids are covered. Includes introduction to Building Information Modeling (BIM) and On-screen Take-off (OTF); 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: CPM 2010

CPM 3020 Construction Documents (3) spring

This course covers analysis, creation, and organization of construction documents. Students will conduct takeoffs and divisional cost controls; create and track submittals, shop drawings, requests for information, and proposals; Interpret specifications, contracts and architectural, civil, and structural drawings; and interpret LEED, International Building Code, and local zoning and life safety requirements; 3 hours of lecture per week. Prerequisite: CPM 2020 or instructor permission

CPM 3030 Concrete & Steel Lab (2) spring

This course prepares students for the American Concrete Institute's Field 1 Concrete testing certificate test. Testing is conducted by an outside authority. Students will interoperate soil sieve analysis relative to concrete characteristics. Concrete batch and strength will be examined. Methods of testing will be taught and practiced through laboratory experience and analytical reporting. Structural and thin-walled steel will be presented and students will work with these products in a laboratory setting. A visit to a batch plant or bridge reconstruction usually concludes the lab; 1 hour of lecture, 2 hours of laboratory per week. Prerequisite: CPM 1111 or instructor permission [Course fee: \$150]

CPM 3130 Construction Soils (3) fall

The student will develop a basic understanding of soils in construction and engineering industries. The course will stress the applied aspects of soil as a building material and as a medium in other industries such as wastewater design, wetlands, and hazardous waste spills. Topics include excavation; grading; soil investigation techniques; erosion prevention and control; compaction; and foundations in addition to soil basics of texture, structure, soil formation, soil water movement, and soil classification. This course focuses on hands-on familiarity with soils, soils characteristics, maps, tools, and resources with some technical writing; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: Placement level 2 or MAT 1210

CPM 4010 Contract Negotiations (3) fall

This course is designed to improve students' skills in all phases of negotiation: understanding negotiation theory as it applies to single and multiparty negotiations; to buyer-seller transactions and the resolution of disputes; to the development of negotiation strategy and the management of integrative and distributive aspects of the negotiation process. The course is based on a series of simulated negotiations in a variety of contexts including one-on-one, multiparty, third party, and team negotiations; 3 hours of lecture per week. Prerequisite: CPM 2020 [Course fee: \$60]

CPM 4030 Construction Safety & Risk Management (3) fall

This course is a study of safety problems in the construction and manufacturing environment with emphasis on the day-to-day activities of the construction safety coordinator. Ethical, moral, productivity, and monetary implications of the practices of safety are considered. The course culminates in the creation of a workplace safety plan; 3 hours of lecture per week.

CPM 4040 Construction Scheduling (3) fall

This course addresses the time management of construction projects. Topics include project scheduling, durations and dependencies; efficiency calculations, critical path method; and cost control models. Industry examples and case studies will be used to demonstrate resource allocation, dispute resolution, and pro-

ductivity. Computer applications for construction scheduling will be used to create Gantt charts, network diagrams, and progress reports; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: CPM 2802 or 4802; CPM 3010 or instructor permission

CPM 4120 Project Planning & Finance (3)

spring

This course is an investigation of project planning and scheduling and the relationship to construction financing during all phases of project development. Topic items include control theory, productivity calculations, progress payments, permanent loans, construction loans, sources of mortgage funds, and venture capital; 3 hours of lecture per week. Prerequisite: ACC 1020 or equivalent

CPM 4130 Construction Superintendency (3)

spring

This course covers the duties and responsibilities of on-site construction leaders. Emphasis will be on the procedures, methods, and administration documentation system used by the construction contractor during construction and post-construction phases of a project. Quality control and reporting are discussed, as are motivational and leadership concepts as they apply to construction; 3 hours of lecture per week. Prerequisite: Junior standing

CPM 4140 Construction Contracts (3)

spring

This is an in-depth study of the role of contracts in the construction industry. The course will focus on the different contractual terms and how those terms control risk allocation and the relationships between parties. Students will examine the legal considerations of standardized construction contracts and develop skills in analyzing contracts with an emphasis on dispute prevention; 3 hours of lecture per week. Prerequisite: CPM 2020 or instructor permission

CPM 4730 Preconstruction Services (3)

fall

This course covers development of comprehensive preconstruction proposals for horizontal and vertical construction. Students will use presentation skills and practice to tailor detailed cost analysis, schedules, labor requirements, and methods of construction for multiple construction projects; 3 hours of lecture per week. Prerequisite: Senior standing [Course fee: \$200]

CPM 4801 CPM Senior Summer Internship (0)

summer

This internship is an optional introduction to commercial construction workplaces. Emphasis is on field operations and management applications as they apply to commercial, retail, healthcare, industrial, or heavy/highway construction projects; graded Pass/No Pass. Prerequisite: CPM major in good academic standing

CPM 4802 CPM Senior Summer Internship Review (1)

fall

This course is used to review and evaluate the effectiveness of the internship experience and quantify the learning outcomes as they pertain to the major and the construction practices career field; graded Pass/No Pass. Prerequisite: CPM 4801 [Course fee: \$250]

Dental Hygiene (DHY)

DHY 1011 Pre-clinical Dental Hygiene (5)

fall

This course is designed to begin to provide the didactic and clinical framework necessary to the practice of dental hygiene. The didactic component consists of learning units covering preventive dental hygiene theory. The primary emphasis of the clinical component is placed on learning the techniques of basic dental hygiene instrumentation. Students will begin to integrate their knowledge of theory and practice through simulated patient experiences on manikins and student partners; 3 hours of lecture, 6 hours of laboratory per week. [Course fee: \$150]

DHY 1012 Clinical Dental Hygiene I (4)

spring

This course is a continuation of DHY 1011 and provides the clinical and didactic framework necessary to the practice of dental hygiene. The emphasis is placed on the clinical component of dental hygiene practice. Students will integrate their knowledge of dental hygiene theory and practice by providing dental hygiene care to consumer patients during the second half of the semester. The didactic and clinical components of this course will challenge students to develop problem-solving and critical thinking skills; 1.5 hours of lecture, 8 hours of clinic per week. Prerequisite: DHY 1011, 1021

DHY 1021 Oral Tissues I (3)

fall

Oral Tissues I will encompass an in-depth study of the areas of dental terminology, tooth morphology, and tooth tissues. The course includes both didactic and activity sessions to facilitate learning and retention of the concepts; 2 hours of lecture, 2.5 hours laboratory per week. Corequisite: DHY 1011

DHY 1022 Oral Tissues II & Medical Emergencies (3)

spring

This is a continuation of DHY 1021 emphasizing head and neck anatomy, oral embryology, odontogenesis, and medical emergencies; 2 hours of lecture per week, 2 hours of laboratory per week. Prerequisite: DHY

1011, 1021, Corequisite: DHY 1012

DHY 1030 Dental Radiology (3)**fall**

Dental Radiology is the study, demonstration, and practice of the fundamentals of dental x-ray production and intraoral and extraoral radiographic techniques utilizing digital imaging. The student will learn to recognize the radiographic appearance of normal anatomical structures and common oral disorders; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: BIO 2012; DHY 1012, 1022 [Course fee: \$75]

DHY 2010 Dental Materials (3)**spring**

This course is designed to emphasize the clinical and theoretical concepts of dental materials and their clinical application. There is a blend of lecture with laboratory time to provide the students with adequate opportunity to manipulate materials introduced during the didactic portion of the course. Knowledge in the use of dental materials will allow the dental hygienist to better promote and explain the necessary preventative and restorative needs of the patient; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: DHY 1030, 2030, Corequisite: DHY 2020, 2721, 2722 [Course fee: \$75]

DHY 2020 General Pathology & Clinical Dental Pharmacology (3)**spring**

Pathology and Pharmacology is an introduction to clinical pathology and the pharmacological management of the treatment of dental patients. The student will learn to integrate medical diseases commonly found in dental hygiene practice with the pharmacological agents used in management of those diseases; 3 hours of lecture per week. Prerequisite: BIO 2012, 2120; DHY 1030, 2721

DHY 2030 Periodontics (3)**fall**

This course is specifically designed to guide dental hygiene students toward an in-depth understanding of the recognition, progression, and treatment of periodontal diseases. Inasmuch as it is the dental hygienist who is, and who will continue to be, called upon to provide the direct communication to patients in regard to education, prevention and control of both periodontal diseases and dental caries, he or she must possess sufficiently detailed knowledge to assist any single patient to better understand his or her specific dental condition. Insufficient, inadequate, or faulty understanding on the part of the hygienist will regularly show itself in varying degrees of unsuccessful prevention and incomplete care for patients; 3 hours of lecture per week. Prerequisite: BIO 2012; DHY 1012, 1022

DHY 2210 Community Oral Health I (2)**fall**

This course is an introduction to the concepts of community oral health with emphasis on advanced research designs, community health issues, and the function of public health programs. Included is an introduction to sociological study with an emphasis on core models and concepts associated with dominant sociological perspectives; 2 hours of lecture per week. Prerequisite: DHY 2020, 2722

DHY 2211 Community Oral Health II (1)**spring**

This course is a continuation of DHY 2210. Students will use knowledge gained in Community Oral Health I to plan, implement, and evaluate a semester-long community outreach project; 1 hour of lecture per week. Prerequisite: DHY 2210, 3821

DHY 2220 Oral Pathology (2)**spring**

Oral Pathology is designed to assist the second-year dental hygiene student to integrate the knowledge gained from general pathology and basic anatomical, physiological, and dental sciences with the concepts of diseases. Emphasis will be placed on helping students understand the etiology and histopathology and treatment of specific oral diseases. The course intends to support the importance of a comprehensive medical and dental history, as well as the recognition of clinical signs and symptoms of oral pathology. The process of formulating a differential diagnosis of oral lesions based on this information will also be emphasized. Oral neoplasia, pulpal pathology, temporomandibular joint disorder, microbial diseases, and selected systemic diseases will be highlighted; 2 hours of lecture per week. Prerequisite: DHY 2020, 2030, 2721, Corequisite: DHY 2722

DHY 2721 Clinical Dental Hygiene II (5)**fall**

This course is a continuation of DHY 1012 and involves clinical practice with patients from Class 0 to Class V periodontal conditions. Topics related to patient care are discussed in the classroom setting and dental hygiene care is provided for children, adults, and special-needs populations in the clinical setting; 1.5 hours of lecture, 8 hours of clinic per week. Prerequisite: BIO 2012; DHY 1012, 1022 [Course fee: \$150]

DHY 2722 Clinical Dental Hygiene III (5)**spring**

This course is the continuation of DHY 2721 and involves clinical practice with patients from Class 0 to Class V periodontal conditions. Topics related to patient care are discussed in the classroom setting and dental hygiene care is provided for children, adults, and special-needs populations in the clinical setting. The administration of local anesthetics will be incorporated; 1.5 hours of lecture, 8 hours of clinic per week. Prerequisite: DHY 1030, 2030, 2721

DHY 3010 Evidence-Based Decision-Making in Dental Hygiene (3) fall

This course will provide fundamental knowledge about evidence-based decision-making. It will provide tools and skills needed to locate and review research articles and abstracts quickly and easily so that the student can interpret the literature to provide the best possible care and achieve optimum outcomes for patients; 3 hours of lecture per week. Prerequisite: AS in DHY

DHY 3015 Contemporary Issues in Dental Hygiene (3) fall

This course examines current societal and professional issues and their impact on dental hygiene practice. Students will examine the roles of the dental hygienist and discuss the dental hygienists' role in increasing access to dental care. Students will research and compare traditional and alternative practice models and propose changes to the health care system to improve dental care delivery. Changing technology in dentistry and dental hygiene; political advocacy; demographic shifts; ethics and professionalism; and the aging of America and its impact on the delivery of dental care will also be discussed. Prerequisite: AS in DHY

DHY 3020 Advanced Periodontics (3) spring

This course will expand on the student's existing knowledge of current concepts in etiology; risk factors; assessment; treatment planning; implementation and evaluation of contemporary treatment modalities; and maintenance therapy. The interrelationship of periodontal treatment with other dental specialties will be discussed along with an investigation of the periodontal literature. Emphasis will be placed on the dental hygienist's role in periodontal therapy. Prerequisite: DHY 3010

DHY 3030 Dental Hygiene Methodology & Leadership (3) spring

This course is designed to provide the student with an introduction to educational concepts and theory relative to dental hygiene education, as well as theories, concepts, and principles of leadership in the dental hygiene educational setting. Topics included are course development and design; goals and objectives; principles of learning; learning styles and motivation; classroom instruction using educational media and software; and leadership skills. Prerequisite: DHY 3822 or equivalent and instructor permission

DHY 3821 Clinical Dental Hygiene IV (6) fall

This course is a continuation of DHY 2722 involving clinical practice with patients from Class 0 to Class V periodontal conditions. Children, adults, and special populations are treated; 1.5 hours of lecture, 12 hours of clinic per week. Prerequisite: DHY 2020, 2722

DHY 3822 Clinical Dental Hygiene V (6) spring

This course is a continuation of DHY 3821 involving clinical practice with patients from Class 0 to Class V periodontal conditions. Children, adults, and special populations are treated; 1.5 hours of lecture, 12 hours of clinic per week. Prerequisite: DHY 3821

DHY 4010 Advanced Community Oral Health (3) fall

This course provides a comprehensive introduction to evidence-based public health practices through the study and evaluation of existing public health programs. Emphasis will be placed on the role of evidence-based research as the key to startup and maintenance of successful dental public health programs. The various components of this course aim to stimulate interaction among learners around important problems and issues facing public health today, with an emphasis on community oral health practices. Prerequisite: DHY 3015

DHY 4213 Practice Management (3) spring

This course is designed to enhance the ability of the student to provide optimum patient care while functioning within an interdisciplinary dental team or alternative practice setting. Learning skills including communication, teamwork, business and management practices, and patient management will be emphasized. We will focus on the skills and knowledge necessary for managing a dental practice or an alternative practice setting in order to understand those functions necessary to improve the delivery of services patients. Students will research traditional and alternative practice settings and develop and present their own ideal Practice Plan. Prerequisite: DHY 3010

DHY 4237 Introduction to Dental Hygiene Research Methods (3) spring

This course provides the student knowledge on the methodology of research. The course includes strengths and limitations of quantitative and qualitative research methods while developing methodological skills and proficiencies related to research including the development of a review of the literature and research proposal. Prerequisite: DHY 3010

Diesel (DSL)

DSL 1001 Commercial Driver's License Training (3) fall

In this course, students will receive the training and seat time necessary to take and pass Vermont's Com-

mercial Driver's License-B examination; 3.5 hours of lecture, 1.8 hours of laboratory per week. Prerequisite: Current driver's license [Course fee: \$1000-5000]

DSL 1010 Steering, Suspension Systems, & Alignment (3) fall

This course provides a comprehensive study of the theory, design, construction, and repair of suspension, steering, and braking systems in diesel-powered equipment and trucks. Topics include steering systems; conventional suspension systems; air suspension systems; wheels and tires; and alignment; 2 hours of lecture, 3 hours of laboratory per week.

DSL 1030 Diesel Electronics Laboratory (1) fall

This course will include the practical application of Ohm's law; Kirchhoff's law; analysis, diagnosis, and repair of faulty electrical circuits; and the diagnosis, replacement, and repair of electrical and electronic components; 3 hours of laboratory per week. Corequisite: GTS 1120

DSL 1050 Preventive Maintenance (3) fall

This course provides students with an understanding of the development and administration of preventive maintenance programs. Topics include PM schedules; types of service; record keeping; out-of-service vehicles; winterizing; coolants and additives; oil and lubricants; analysis and additives; contamination control; and track maintenance; 2 hours of lecture, 3 hours of laboratory per week.

DSL 1060 Diesel Engine Laboratory (1) fall

This course will include all aspects of diesel engine repair including diagnosis of complaints; disassembly and reassembly of mechanical components; failure analysis; running in; and performance testing; 3 hours of laboratory per week. Corequisite: GTS 1020

DSL 1070 Diesel Electrical Systems Laboratory (1) spring

Students will proceed through various laboratory exercises designed to familiarize the student with some specific area. Topics include the operation and testing of storage batteries, starting systems, charging systems, and basic accessory systems. The student will become familiar with various types of test equipment, diagnostic charts, and vehicle wiring schematics; 3 hours of laboratory per week. Corequisite: GTS 1040

DSL 1110 Heavy Duty Braking Systems (3) spring

This course provides a comprehensive study of the theory, design, construction, and repair of braking systems in diesel-powered equipment and the performance of wheel alignments on trucks. Topics include alignment; air braking systems; hydraulic and air over hydraulic braking systems; ABS and electronic brakes; and noise, vibration, and harshness; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: DSL 1010

DSL 2010 Fuel Systems (4) fall

This course provides a comprehensive study of the theory, design, construction, and repair of diesel fuel system. Topics include an overview of diesel fuel injection systems; the chemistry of combustion; diesel fuel and alternatives; fuel transfer systems; mechanical injector nozzles; and Unit Electrical Injector's (UEI); Bosch, Detroit Diesel, Caterpillar, Cummins DFI systems; governors; system diagnosis and service; and computerized fuel control systems; 3 hours of lecture, 3 hours of laboratory per week.

DSL 2020 Chassis Electrical & Electronic Systems (4) spring

This course is intended to give students a thorough understanding of advanced diesel chassis electrical and electronic systems and to teach diagnostic and troubleshooting skills. Topics include advanced networks and multiplexing; A/C systems; lighting systems; instrument panels; wiper and washer systems; alarm systems; collision avoidance systems; supplemental restraint systems; ground based communication systems; satellite based communication systems; and accessory systems; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: DSL 1060 [Course fee: \$15]

DSL 2030 Hydraulics (3) fall

This course provides a comprehensive study of the theory, design, construction, and repair of mobile hydraulic systems. Topics include hydraulic systems; components; hydraulic symbols and engineering drawings; pilot systems; and electronic control systems; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: DSL 1060

DSL 2040 Power Transmission (3) spring

This course is intended to give students a thorough understanding of power transmission systems and to teach diagnostic and troubleshooting skills. Topics include an introduction to power transmissions; clutches and torque converters; manual transmissions; gear theory; planetary gear theory; hydraulic planetary controls and support systems; power-train management and electronically controlled transmissions; Allison Commercial Electronic Control (CEC) system; Eaton Auto-shift transmission; drive shafts; final drives; and tracks; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: DSL 1030, Corequisite: DSL 2020

DSL 2060 Fabrication (3)

spring

This course provides a comprehensive study of manufacturing processes and fabrication. Topics include manufacturing processes; use of fabrication tools; job planning; basic gas and MIG welding; advanced welding; rodding and tubing of hydraulic cylinders; and drive-shaft repair; 2 hours of lecture, 3 hours of laboratory per week.

DSL 2801/2802 DPT Summer Internship/DPT Summer Internship Review (0/1)

summer/fall

A 400-hour internship at a diesel repair facility or OEM dealership is required. The Internship Review provides for a critique of the internship; graded Pass/No Pass. Prerequisite: Department permission/DSL 2801 [Course fee: \$250]

Economics (ECO)

ECO 2020 Macroeconomics (3)

fall

The course consists of an introduction to basic principles of macroeconomic analysis and a survey of the economic government, household, and business sectors. The student is introduced to the analysis of the level and variations of the national income; government fiscal and monetary policies; money; the banking system; and the problems of inflation and unemployment; 3 hours of lecture per week. (General Education: SS) Prerequisite: Math placement level 2 or instructor permission

ECO 2030 Microeconomics (3)

spring

This course covers the theory and analysis of market structures, prices, profits, wages, interest, and international trade. Developments in such areas as agriculture and the balance of international payments are examined by means of reading and class discussion about current economic events; 3 hours of lecture per week. (General Education: SS). Prerequisite: Math placement level 2 or instructor permission

Education (EDU)

EDU 2051 Teaching Methods I (3)

fall

This course is designed to provide in-depth coverage of technical center operations and procedures for teachers who are new to the field of Trade and Industry teacher licensure. The yearlong course includes a classroom component and a field practicum. The classroom component provides specific information on standards based education; program competencies; competency and employability skill lists; and federal and state rules and regulations. The unique mandates of technical education are reviewed and implemented by course participants who must be teaching at least one half day each week in a technical center under supervision of a peer coach. The practicum component of the course requires formal lesson plans, classroom/laboratory observations, and evaluation conferences with the course teacher and a field supervisor. Observations are conducted three times each semester; graded Pass/No Pass. Prerequisite: Instructor permission

EDU 2052 Teaching Methods I (continued) (3)

spring

This class continues curriculum from EDU 2051. Prerequisite: EDU 2051

EDU 2061 Teaching Methods II (3)

fall

This course is designed to provide in-depth coverage of technical center operations and procedures for teachers who are new to the field of Trade and Industry teacher licensure. The yearlong course includes a classroom component and a field practicum. The classroom component provides specific information on standards based education; program competencies; competency and employability skill lists; and federal and state rules and regulations. The unique mandates of technical education are reviewed and implemented by course participants who must be teaching at least one half day each week in a technical center under supervision of a peer coach. The practicum component of the course requires formal lesson plans, classroom/laboratory observations, and evaluation conferences with the course teacher and a field supervisor. Observations are conducted three times each semester; graded Pass/No Pass. Prerequisite: Instructor permission

EDU 2062 Teaching Methods II (continued) (2)

spring

This class continues curriculum from EDU 2061. Prerequisite: EDU 2061

EDU 2115 Issues & Trends in Technical Education (3)

summer

This course is designed to provide in-depth coverage of current issues in technical education with a historical perspective on the development of programs in Vermont; 3 hours of lecture per week.

EDU 2135 Instruction for Students with Special Needs (3)

summer

This three credit course is designed to inform technical educators about students who are members of special populations, including methods of identification, assessment, modifications, and accommodations provided to these individuals and the role of the technical educator in these processes; 3 hours of lecture per week.

EDU 2802 Educational Externship (1)**fall**

This is an education externship for continuing technical education students, taken in conjunction with EDU 2061; graded Pass/No Pass. Corequisite: EDU 2061

Electromechanical Engineering Technology (ELM)**ELM 3015 Sensors & Instrumentation (3)****spring**

This course is an introduction to the type of sensors used in research and industry to measure physical and mechanical parameters and the standard methods of interfacing these devices. Discussion includes investigation of the underlying physical phenomenon which each transducer exploits and various signal conditioning and interfacing strategies. Typical devices covered include strain gages, LVDTs, load cells, pressure transducers, tachometers, accelerometers, temperature sensors, level sensors, and optical sensors; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1110 or 2072; MAT 1520; PHY 1042, Corequisite: CIS 2025; ELT 1032 or equivalent; MAT 2532 [Course fee: \$250]

ELM 4015 Electromechanical Power Systems (3)**fall**

This course provides a detailed analysis of the components in high-power hydraulic, pneumatic, and electrical systems. Topics include pumps, pneumatic circuits, safety valves, actuators, electric motors, generators, transformers, relays, solenoids, and high-power semiconductors. Emphasis is placed on specifications (power ratings), typical uses, and energy conversion issues. Programmable controllers are introduced to demonstrate control and sequencing in these systems; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELM 3015; MAT 3170

ELM 4231 Control Systems I (3)**fall**

Students are introduced to analytical system modeling and the design of controllers for closed-loop electrical and mechanical systems. Topics include finite state machine design and implementation; the development of dynamic systems models using Laplace techniques; block diagram system representation; time-domain and frequency-domain system analysis; the determination of system stability; system error computation; an introduction to controller design; and an introduction to the design of discrete-time controllers using z-transform methods; 3 hours of lecture per week. Prerequisite: ELT 2061; MAT 3170; or permission of the Academic Dean

ELM 4232 Control Systems II (3)**spring**

This course is a continuation of Control Systems I. Students are introduced to advanced system design methodology for complex second-order and higher-order systems. Topics include system modeling methods, performance parameter design trade-offs, the design of multiple feedback loop controllers, z-transforms, and State-Space design; 3 hours of lecture per week. Prerequisite: ELM 4231

ELM 4241 Senior Laboratory I (1)**fall**

Laboratory projects performed in this course are designed to accompany the classroom learning in ELM 4231 and ELM 4015; 3 hours of laboratory per week. Corequisite: ELM 4015, 4231; or department permission [Course fee: \$310]

ELM 4242 Senior Laboratory II (1)**spring**

Laboratory projects performed in this course are designed to accompany the classroom learning in ELM 4231 and ELM 4015; 3 hours of laboratory per week. Corequisite: ELM 3040, 4232; or department permission [Course fee: \$310]

ELM 4701 Electromechanical Project I (2)**fall**

This course emphasizes project design, planning, and manufacturing issues. Topics include planning and budgeting; safety in the design; design for manufacturability; fabrication techniques; testing for safety and reliability; and quality control. Students are given a small electrical/electromechanical design on which to apply the lecture material. Students also select and begin planning a major, team-oriented project that is completed in Projects II. The project must have major software, electrical, and mechanical (for ELM students) components; 1 hour of lecture, 3 hours of laboratory per week. Prerequisite: Senior standing, Corequisite: ELM 4015, 4231 [Course fee: \$200]

ELM 4702 Electromechanical Project II (3)**spring**

This course is a continuation of ELM Project I and deals primarily with issues of large-scale projects. Coordination between the members of the design teams is stressed with frequent seminars and mini-presentations to communicate the design and the team progress. A major presentation of the team project is required at the end of the semester; 1 hour of lecture, 6 hours of laboratory per week. Prerequisite: Senior standing, Corequisite: ELM 4232; ELT 3040 [Course fee: \$200]

Electrical Engineering Technology (ELT)

ELT 1015 Introduction to Engineering (1)

fall

This course is designed to facilitate a successful transition to college and engineering tools and strategies needed as freshmen in Electrical, Electromechanical, and Computer Engineering Technology programs. The course focuses on orientation to college, academic success strategies, professional development, and an introduction to a degree program. Topics include student rights and responsibilities; student grading and graduation requirements; campus/site resources; time management; note taking; introduction to career opportunities, and program-specific topics. This course provides hands-on experience using technical software and creating technical documentation using many different software programs including MS Word, Excel, LabVIEW, and MultiSim. Topics include terminology, layout, chart creation, effective chart usage, and integrating text and graphics; 3 hours of laboratory per week. Corequisite: ELT 1031; MAT 1311 [Course fee: \$150]

ELT 1031 Electrical Circuits I (4)

fall

This course is an introductory study of DC and AC electrical circuits. Course content includes the basic ideas of electrical charge, current, voltage, resistance, energy, and power. Capacitance, inductance, and the transient behavior of RC and RL circuits are also studied. For AC, the concepts of frequency, period, phase, and magnitude of sine waves are developed. The electrical circuit parameters are studied as phasors and complex numbers and expressed in polar and rectangular form. Major AC topics studied include reactance, impedance, power, and resonance. Electric circuit theory includes Ohm's law; Kirchhoff's laws; series and parallel circuits; and electrical sources. Also introduced are voltage and current dividers and Thevenin's Theorem. Laboratory exercises develop the use of basic measurement equipment, such as the ammeter, voltmeter, and oscilloscope, while verifying the concepts studied in lectures; 3 hours of lecture, 3 hours of laboratory per week. Corequisite: ELT 1015; MAT 1311 [Course fee: \$300]

ELT 1032 Electrical Circuits II (4)

spring

This course is a continuation of ELT 1031. Circuit analysis using advanced network theorems and techniques is introduced. Topics such as superposition; Mesh and Nodal analysis; Thevenin's theorem; and controlled sources are investigated. Other topics include bridges, power factor correction, transformers, polyphase circuits, filters, parallel resonance, frequency response, and response to non-sinusoidal signals. Laboratory exercises provide experience in using oscilloscopes, function generators, and frequency counters on circuits demonstrating the concepts developed in lectures; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1031; MAT 1312 [Course fee: \$105]

ELT 1110 Introduction to Digital Circuits (3)

spring

This first course in digital electronics introduces basic logic principles, logic circuit definition, and binary number theory. The concepts of combinational logic circuits are developed along with logic circuit generation, minimization, and construction. The course later deals with memory and sequential logic circuits including counters, shift registers, and random access memories. State machines are then discussed and illustrated through more complex systems. A strong working knowledge of modern CAD tools and technologies, including VHDL and circuit simulators, as well as the function and application of programmable logic devices (PLDs) is developed in the laboratory; 2 hours of lecture, 3 hours of laboratory per week. [Course fee: \$115]

ELT 2015 Introduction to Projects (1)

fall

This course introduces the student to electrical product development and fabrication. Topics include introduction to schematic and circuit layout software and conventions; printed circuit board assembly; enclosures; connector and cabling options; and scheduling, budgeting, and documenting the project. Each student will work on a common product of reasonable complexity; develop and assemble a printed circuit board; and document and present the finished product. The course is intended to develop practical skills in circuit board layout and fabrication, time management, and technical presentation; 3 hours of laboratory per week. Prerequisite: ELT 1015, 1110, 2041 or equivalent [Course fee: \$85]

ELT 2041 Electronic Circuits I (4)

spring

This is an introductory course in electronic circuits. It extends DC-AC circuits into active devices and their associated circuitry. Diodes, bipolar junction and field-effect transistors, and 4-layer devices are studied. Topics also include studying the transistor as a small signal amplifier and as a switching element; op-amp circuits; and interfacing circuits common to computer applications. Laboratory exercises serve to reinforce concepts studied in lectures; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1015, 1031, or equivalent, Corequisite: MAT 1312 [Course fee: \$260]

ELT 2042 Electronic Circuits II (4)

spring

This course is a continuation of Electronic Circuits I. It addresses electronics from a system and applications view rather than a device view. System issues such as two-port networks, cascaded amplifiers, frequency response, Bode plots, and related topics are explored. Differential amplifiers; operational amplifiers; active filters; linear and switching power supplies; oscillators; and modulation are also covered. Laboratory exercises serve to reinforce concepts studied in lectures; 3 hours of lecture, 3 hours of laboratory per week.

Prerequisite: ELT 2041; MAT 1520 [Course fee: \$10]

ELT 2050 Microcomputer Techniques (4)**fall/spring**

This course introduces students to the fundamentals of computers with an emphasis on applications using microcontrollers. Topics include assembly language programming; computer architecture (CPU, memory, input/output devices, and busses); counters; timers; parallel ports; A/D and D/A converters; and interfacing to switches, keypads, display devices, simple sensors, and DC motors; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: CIS 2025 or 2262 or 2271; ELT 1110, 2041 or 2072 [Course fee: \$200]

ELT 2051 Electronics I (4)**fall**

This is an introductory course in electronics. It extends DC-AC circuits into active devices and their associated circuitry. Stress is placed on solid-state theory. Diodes, bipolar transistors, and several types of field-effect transistors are studied. Small signal equivalent circuits and large signal graphical analysis are developed. Included in the applications studied are Class A and Class B amplifiers. Practical approximation methods are developed throughout the course; 3 hours of lecture, 3 hours laboratory per week. Prerequisite: ELT 1032; MAT 1520 [Course fee: \$50]

ELT 2052 Electronics II (4)**spring**

This course addresses electronics from a system and applications view rather than a device view as in ELT 2051. System issues such as two-port networks, frequency response, dB, bode plots, and related topics are explored. Active filters, linear supplies, switching supplies, oscillators, and modulation are also covered. Several additional topics that tie electronics and applications together are also introduced; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 2051, 2060; MAT 1520 [Course fee: \$50]

ELT 2060 Electronic Applications (4)**fall**

The purpose of this course is to integrate material from several courses in order to achieve small working systems. In the process of achieving this integration, topics in the theory and application of operational amplifiers, the theory and applications of A/D and D/A systems, and the integration of instrumentation will be explored. Analysis in both time and frequency will be used. Additional topics will be added as appropriate. Analysis will often use MultiSim to assist with concepts; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1032, Corequisite: ELT 2050, 2051 [Course fee: \$50]

ELT 2061 Electromechanical Systems I (4)**spring**

The course starts with an overview of control systems using block diagrams for description and analysis. Electronic operational amplifier circuits are introduced at an early stage due to their prevalence in conditioning transducer signals and as analog controller elements. Laplace Transform techniques are used to predict both first and second order system responses for the typical input functions. Steady state error and stability are examined. Algebraic prediction of closed loop responses is made. Bode Plot analysis in the frequency domain is used as an alternative method to the time domain response. PID Controller functions are covered. The programming is done using Matlab or Vissim depending upon the location of the course offering (Matlab at Williston, Vissim at Randolph Center); 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1031, 2071, or equivalent; MAT 1520; PHY 1042 [Course fee: \$50]

ELT 2071 Basic Electricity (3)**fall**

The course introduces the physical concepts of electricity and electrical devices for mechanical engineering technology students. Fundamentals of power, resistance, inductance, capacitance, motors, and generators from the standpoint of their relationship to mechanical applications are covered; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1312 [Course fee: \$50]

ELT 2072 Electronics (4)**spring**

Discrete semiconductors, linear, and digital electronics are studied from the standpoint of the electrical-mechanical interface. Concepts of sensors and transducers; amplifiers; DACs and ADCs; semiconductor control devices; and integrated logic circuits account for approximately 80% of the course. The remainder is spent on learning the application of Programmable Logic Controllers (PLCs) using ladder logic; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 2071; CIS 1050 or MEC 1050 or equivalent [Course fee: \$50]

ELT 2073 LabVIEW (3)**spring**

This course introduces the basics of the program and system design platform LabVIEW (Laboratory Virtual Instrumentation Engineering Workbench). Students will develop and use a series of virtual instruments (VIs), test, and control systems within the LabVIEW environment. Advanced data analysis using the built-in program libraries will be explored with results displayed on user-defined graphical readouts. Related laboratory exercises reinforce the class material; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1031 or 2071 or instructor permission [Course fee: \$255]

ELT 2075 Programmable Logic Controllers (3)**spring**

Programmable Logic Controller (PLC) design methodology, programming procedures, and practical system

implementation topics are presented in an interactive lecture setting. The design principles discussed during the lecture are reinforced with demonstrations and participative exercises; 3 hours of lecture per week. Prerequisite: ELT 1031; MAT 1312

ELT 2130 Industrial Electronics (4) spring

This is a multi-purpose course designed to acquaint the student with the electronic devices, circuits, and computer techniques used to control industrial operations. Specifically included in the course are sensors and related instrumentation; power switching devices; DC and AC motors; stepping and brushless motors; and Programmable Logic Controllers. Applications and control issues involved with these devices are investigated as well. If time permits, additional topics of student interest will be investigated; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1032, 2051; MAT 1520 [Course fee: \$50]

ELT 2210 Introduction to Solid State Lighting (3) fall

This course introduces the fundamentals of solid state lighting systems. The student will gain experience using various LEDs, optics, and heat sinks to create a total lighting solution. Various applications for using LEDs for lighting will be studied; 2 hours of lecture, 2 hours of laboratory per week. Pre-requisites: MAT 1420; PHY 1041 or 2041 [Course fee: \$150]

ELT 2720 Electrical Project (2) spring

This course introduces the student to electrical product development and fabrication. Topics include schematic and circuit layout conventions; printed circuit board assembly; enclosures; connector and cabling options; and scheduling, budgeting, and documenting the project. Each student will work on a product of reasonable complexity; develop and assemble a printed circuit board; and document and present the finished product. The laboratory portion is intended to develop practical skills in circuit board layout and fabrication; 1 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1110, 2050, 2052, Corequisite: ELT 2130 [Course fee: \$200]

ELT 3010 Digital Circuits II (3) fall

This course is designed to extend the student's skill with digital hardware. It covers more advanced topics than can be covered in a first digital course, including advanced digital design techniques. Various design methodologies are studied, such as state machine design and the use of hardware description languages. Applications focus on the design of computer hardware subsystems. The laboratory experiences illustrate the various methods for design entry such as schematic entry and VHDL. Additionally, simulation and testing is a major focus in the laboratory. Designs are implemented using commercial Programmable Logic Devices (PLDs); 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: ELT 1110, 2050 [Course fee: \$50]

ELT 3040 Electronic & Data Communications (4) spring

This course introduces students to the concepts necessary to understand data communications in today's networked world. Both analog communications and digital communications are studied. Topics include media characteristics, Fourier series analysis, frequency division multiplexing, noise, and modulation techniques. Additional topics include network protocols; data encoding techniques; error detection and correction; encryption; and data compression; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: CIS 2025; ELT 2050; MAT 1520 [Course fee: \$50]

ELT 3050 Microprocessor Techniques II (4) spring

This course is designed to extend the student's skill with digital hardware. It covers more advanced topics than can be covered in a first digital course, including advanced digital design techniques. Various design methodologies are studied, such as state machine design and the use of hardware description languages. Applications focus on the design of computer hardware subsystems such as arithmetic logic units and memory. The laboratory experiences illustrate the various methods for design entry such as schematic entry and VHDL. Additionally, simulation and testing is a major focus in the laboratory. Designs are implemented using commercial Programmable Logic Devices (PLDs); 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 2050 [Course fee: \$50]

ELT 3053 Electronics III (4) fall

This course builds on the introduction to solid state devices and analog systems in Electronics I and II and will incorporate current devices and techniques in the industry. Currently, this course is divided into four main topics: power management (including buck and boost switching power supplies, switched capacitor, low-voltage power control circuitry, and drivers); noise, electromagnetic frequency spectrum, AM modulation, frequency modulation, and receivers; RF concepts and high-frequency behavior of passive components and transmission line concepts; and Phase Lock Loop and frequency multipliers; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 2042; PHY 1042 [Course fee: \$50]

ELT 3060 Electrical Circuit Analyses (3) fall

This course reviews and extends the circuit analysis capabilities of students who have only had an introductory electrical circuits course. Topics include passive components (resistor, capacitor, inductor, transform-

ers), Kirchhoff's laws, network theorems (nodal, Thevenin, Norton, superposition), dependent sources, two port models, and transient response. This course includes alternating current concepts, three-phase concepts, and makes use of computer simulation software; 3 hours of lecture per week. Prerequisite: ELT 1031 or 2072; MAT 1520 [Course fee: \$50]

ELT 4010 Computer Architecture (3) fall

This course discusses the architecture of computer systems, both inside the CPU as well as outside. Topics include pipelines, cache, floating-point unit, RISC vs. CISC architecture, and so forth. Issues such as branch prediction, pipeline interlocks, and coordinating SMP machines are discussed. Additional topics cover the system at large (busses of various types, memory architecture, disk controllers, NICs, etc.) The emphasis is on real systems and characteristics of current technology; 3 hours of lecture per week. Prerequisite: ELT 3050 [Course fee: \$75]

ELT 4020 Digital Signal Processing (3) spring

Digital Signal Processing (DSP) theory and applications are covered from an introductory to an intermediate level. Throughout the course, the implementation of DSP algorithms and mathematical functions such as Infinite Impulse Response (IIR) filters, Finite Impulse Response (FIR) filters, correlation routines, Discrete Fourier Transforms (DFT), and Inverse Discrete Fourier Transforms (IDFT) are examined; 3 hours of lecture per week. Prerequisite: ELT 2050; MAT 2532 [Course fee: \$75]

Emergency Medical Services (EMS)

EMS 1020 The Art of Paramedicine (2) fall

This interactive course prepares students to manage the human relations challenges encountered in their careers. Discussions encourage the student to broaden views and develop an awareness of the uniqueness of self and humankind. This course explores the finer aspects of communication, listening, assertiveness, and documentation. The paramedic student also learns the importance of confidentiality; legal and ethical behavior; stress management; scene management; and the roles and responsibilities of the paramedic. Other topics covered include public health; workforce safety and wellness; the impaired provider; research in EMS; the history of EMS; and EMS systems; 2 hours of lecture per week. Corequisite: EMS 1050

EMS 1030 Pharmacology & Medication Administration for the Prehospital Professional (3) fall

This course covers the concepts of pharmacology needed to understand and safely administer standard pre-hospital medications. Topics covered include pharmacokinetics, pharmacodynamics, medication administration, drug dosage calculations, pharmacological terminology, drug legislation, drug references, toxicology, vascular access, and blood products; 3 hours of lecture per week. Corequisite: BIO 2011; EMS 1050

EMS 1040 Airway Management for the Prehospital Professional (1) fall

This course is designed to prepare the paramedic student to manage adult, pediatric, and infant airways. Emphasis is placed on excellent Basic Life Support skills and progresses through the techniques of common prehospital Advanced Life Support airway skills. Scenarios and simulation are utilized prior to advancing to clinical and field opportunities to demonstrate ALS skills; 1 hour of lecture per week. Corequisite: BIO 2011; EMS 1050

EMS 1050 Paramedic Principles & Practices I (2) fall

This interactive lab-based course assesses the paramedic student's Basic Life Support skills including BLS management, CPR, AED, and oxygen therapy. Medical Assessment and Trauma Assessment are taught at the ALS provider level and the student is challenged with simulation and scenario-based activities to incorporate this new knowledge. Upon successful completion of the applicable portions of this course, students are allowed to advance to the clinical setting (OR and ED). Paramedic lab kits are required; 5 hours of laboratory per week; graded Pass/No Pass with affective evaluation. Corequisite: EMS 1020, 1030, 1040 [Course fee: \$100]

EMS 1210 Medical Emergencies for the Prehospital Professional (4) spring

This course is designed to cover the common medical complaints encountered by the paramedic. The learner is challenged to utilize critical thinking skills to develop differential diagnoses and plans of care. Topics covered include respiratory, immunology, hematology, sepsis, endocrine, gastrointestinal, genitourinary, non-traumatic musculoskeletal disorders, allergic reactions, psychological, and neurological emergencies and conditions. Prior knowledge of anatomy and physiology and pharmacology is reinforced and enhanced. Includes Advanced Medical Life Support (AMLS). Classroom, simulation, and laboratory experiences prepare the student for clinical application of knowledge and skills; 4 hours of lecture per week. Prerequisite: EMS 1801, Corequisite: BIO 2012; EMS 1240

EMS 1220 Cardiology for the Prehospital Professional (3) spring

During this intensive course the learner gains in-depth knowledge of cardiac electrophysiology; static and dynamic cardiac rhythm interpretation; arrhythmia management; and assessment and management of com-

mon prehospital cardiac-related problems. Includes 12 lead EKG interpretation; Acute Coronary Syndrome and ST Elevation Myocardial Infarction management; and Advanced Cardiac Life Support (ACLS). Lecture, scenarios, and simulation opportunities are included to enhance learning; 3 hours of lecture per week. Prerequisite: EMS 1801, Corequisite: EMS 1240

EMS 1240 Paramedic Principles & Practices II (2)

spring

This is the laboratory and clinical component of EMS 1210 and 1220. Students are exposed to a variety of medical scenarios and simulations requiring paramedic-level assessments and interventions. Communication skills, teamwork, documentation, and transfer of theory into practice are evaluated in the lab setting. The students participate in clinical rotations in the ED, OR, ICU, maternity, pediatric, and psychiatric units. Paramedic lab kids and uniform are required; 5 hours of laboratory per week; graded Pass/No Pass with affective evaluation. Corequisite: EMS 1210, 1220 [Course fee: \$100]

EMS 1290 Paramedic Clinical Time (Extended) PRN (1)

fall/spring/summer

Students who did not complete all of the clinical objectives in the 240 scheduled hours during the regular didactic portion of the program may schedule additional time through the college to complete the necessary objectives. Locations and times will be on a case-by-case basis depending on what objectives still need to be achieved. Paramedic lab kids and uniform are required. Must be completed prior to the start of the next semester; PRN hours. Prerequisite: Completion of all didactic work

EMS 1310 Obstetrics, Gynecology, & Pediatrics for the Prehospital Professional (3)

summer

During this lecture-based course the paramedic student learns to assess and manage gynecological and obstetrical emergencies and childbirth, and to care for the pediatric patient from birth through age 18. Includes topics of abuse and neglect, pediatric resuscitation, neonatal resuscitation, and technology-dependent children; 3 hours of lecture per week. Prerequisite: EMS 1802, Corequisite: EMS 1350

EMS 1320 Trauma Management for the Prehospital Professional (3)

summer

This course guides the paramedic student through the skills and knowledge needed to assess and manage a patient with traumatic injuries and shock. Topics covered include trauma systems; blunt force trauma; penetrating trauma; hemorrhage and shock; soft-tissue trauma; burn trauma; orthopedic trauma; thoracic trauma; abdominal trauma; head, face, neck, and spinal trauma; nervous system trauma; environmental trauma; and special considerations; 3 hours of lecture per week. Corequisite: EMS 1350

EMS 1330 Emergency Medical Services Operations (2)

summer

Paramedic students develop their roles as Emergency Medical Services leaders in this course, learning about operations for ground and air ambulances; responding to Multiple-Casualty Incidents, Incident Management, and the Incident Command System; Special Rescue Operations, dealing with hazardous materials on emergency scenes; crime scene awareness; special considerations for rural EMS; and terrorism. HazMat awareness, ICS, and NIMS are completed via distance learning; 2 hours of lecture per week. Corequisite: EMS 1350

EMS 1340 Special Considerations for the Prehospital Professional (1)

summer

During this highly interactive course, students explore the challenges faced by prehospital professionals when dealing with geriatric, bariatric, and disabled clients. Normal differences seen based on age, size, and underlying medical problems are presented and students are challenged to critically think about ways to overcome the barriers to providing the best care possible. Technology-dependent patients and the logistics of emergency calls versus transfers are discussed as well; 1 hour of lecture per week. Corequisite: EMS 1350

EMS 1350 Paramedic Principles & Practices III (2)

summer

This is the lab and clinical portion of EMS 1310, 1320, 1330, and 1340. Students are exposed to a variety of trauma, special circumstances, and EMS operations scenarios and simulations to enhance their ability to respond appropriately to similar situations in the field. During these 10 weeks, students will spend time in the OR; ICU; ED; Pediatrics; Labor and Delivery; and mental health; 5 hours of laboratory per week; graded Pass/No Pass with affective evaluation. Corequisite: EMS 1310, 1320, 1330, 1340 [Course fee: \$100]

EMS 1801 Paramedic Field Experience I (1)

fall

The first semester field experience is designed to transition the student from the role of helper/BLS-provider to the team leader. During this first semester, the student will ride a total of 36 hours with a paramedic preceptor. The student will incorporate the skills learned in first semester classes. Paramedic uniform is required; 36 hours of field experience; graded Pass/No Pass with effective evaluation. Corequisite: BIO 2011; EMS 1020, 1030, 1040, 1050

EMS 1802 Paramedic Field Experience II (1)

spring

In the second semester, the paramedic student is expected to demonstrate an expanded depth of skills and knowledge, including application of new information gained in EMS 1210 and EMS 1220. The student continues to work with a preceptor to meet the objectives, including providing safe and therapeutic care, effective

communication, and demonstrating an understanding of the material covered in class. Paramedic uniform is required; 36 hours of field experience; graded Pass/No Pass with affective evaluation. Corequisite: BIO 2012; EMS 1210, 1220

EMS 1803 Paramedic Field Experience III (1)

summer

In the third semester, students spend an additional 36 hours riding with their paramedic preceptor, learning how to act as the team leader on calls and honing their professional communication skills. Students are assessed on their ability to perform the functional job description of a paramedic, as well as their ability to coordinate and manage a scene, the patient, and provide safe and effective care; 36 hours of field experience; graded Pass/No Pass with affective evaluation. Corequisite: EMS 1310, 1320, 1330, 1340, 1350

EMS 1804 Paramedic Field Internship (0)

fall/spring/summer

Students who have successfully completed all of the didactic portions of the Vermont Tech Paramedic Program may enroll in the Paramedic Field Internship. During this immersion experience, the student acts as a Paramedic under the supervision of a preceptor. The student is expected to act as the team leader: managing the scene, patient, and crew. This session is a minimum of 240 hours. Time will be extended as needed to meet the objectives of the internship portion. Students are assessed on their ability to perform the functional job description of a paramedic, as well as their ability to coordinate and manage a scene, the patient, and provide safe and effective care. Must be completed prior to the start of the next semester. Paramedic uniform is required; minimum of 240 hours, maximum of 1 year drive time; graded Pass/No Pass with affective evaluation. Prerequisite: Completion of all didactic work

English (ENG)

ENG 1042 Introduction to College English (3)

fall/spring

Students develop their reading skills by analyzing examples of professional writing in class; they develop their writing skills in internal writing and in at least five essays. Students review principles of grammar and sentence construction and are introduced to rhetorical strategies. Emphasis is placed on the process of revision through class editing of student essays. Word processing and computer network skills are taught in the laboratory section; 3 hours of lecture, 1 hour of laboratory per week. Prerequisite: Placement level 1

ENG 1060 Freshman Composition (3)

fall/spring

Students are expected to think and read critically, to write effectively, and to understand the fundamentals of literary analysis and written composition. Classroom discussion of assigned readings and the construction of related essays are stressed. A required research paper demonstrates the student's use of appropriate research materials in terms of locating, organizing, and presenting materials in standard MLA format; 3 hours of lecture. Prerequisite: Placement level 2

ENG 1061 English Composition (3)

fall

Students are expected to read and think critically, to write effectively, and to understand the fundamentals of literary analysis and written composition. Classroom discussion of assigned readings and the construction of related essays are stressed. A required research paper demonstrates the student's use of resources in locating, organizing, and presenting materials in an accepted format. The Writing Graduation Standard is assessed in this course. This course is writing-intensive; 3 hours of lecture per week. Prerequisite: Placement level 3 or higher

ENG 1070 Effective Speaking (3)

fall/spring

Students study various theories of effective oral communication with the focus on public speaking. Students develop their abilities to listen, analyze audiences, and use visual aids. For some majors, the Oral Communication Graduation Standard is assessed in this course; consult with your advisor about your major; 3 hours of lecture per week. (General Education: AH)

ENG 2080 Technical Communication (3)

fall/spring/summer

This course is a comprehensive study of the principles, methods, and forms needed to produce clear and effective communications and technical reports, both written and oral. The course stresses business correspondence and the use of graphics in documents and oral presentations. A major technical report is also required and will be used for assessment of the VTC Writing Graduation Standards; 3 hours of lecture per week. Prerequisite: ENG 1061 or equivalent

ENG 2101 Introduction to Creative Writing (3)

as required

This course encourages students to explore themselves and the world around them with a writer's eye. Along with writing their own stories, students will read stories and essays by other writers and will workshop each other's stories. This course is writing-intensive; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

ENG 2105 Creative Nonfiction (3)

as required

Course Descriptions

The course is an introduction to fundamental techniques of writing creative nonfiction, including examining point of view and use of time, place, details, and language. Students refine their writing skills through attention to the craft of writing, revision, and the reading of models. This course is writing-intensive. (General Education: AH) Prerequisite: ENG 1061 or equivalent

ENG 2130 Writing Poetry (3)

as required

This course explores the art and the craft of writing poetry and offers an opportunity to practice concepts learned in class in a variety of written exercises. While the instruction encourages students to study published poetry, the emphasis will be on writing poetry for an audience of poetry readers. The course will also cover the rudiments of narrative structure. No previous writing experience is required. (General Education: AH) Prerequisite: ENG 1061 or equivalent

ENG 2320 Themes in American Literature (3)

as required

Students read and discuss selected works of recent and earlier American literature focusing on themes such as growing up American, the immigrant experience, country life vs. city life, alienation, the pioneer experience, the impact of the western hero, and work ethic. Understanding and appreciation of the uniqueness and continuity of these themes and of the methods used by fiction writers will enhance the students' reading experience; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

ENG 2485 Literature of Peace & Pacifism (3)

as required

This course introduces students to the themes of peace, pacifism, and nonviolence in literature from the United States and around the world. Students will read and discuss classic and contemporary novels, short stories, poems, and films that respond critically to war and suggest peaceful alternatives; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

ENG 2590 Stephen King In Literature & Film (3)

as required

This course is designed to offer a critical inquiry into the films, novels, life and works of the bestselling and most popular author of our time Stephen King. Through the critical analysis of such films as *Carrie*, *Stand by Me*, *Misery*, *The Shining*, and *Storm of the Century*, among others, students will explore their personal relationship to horror fiction, while entertaining a central, pivotal question: What does horror manifestation in popular culture reveal about the American psyche? This course seeks to unravel our cultural fascination with themes of horror fiction, while exploring King's works as both a continuation of the literary Gothic canon, and a driving force in the cinematic tradition of American Horror films; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

ENG 3125 Science Fiction Literature (3)

as required

3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

ENG 3126 Science Fiction Lit: Utopias, Dystopias, & Ecotopias (3)

as required

This course introduces students to utopian, dystopian, and ecotopian visions in science fiction literature. We will read and discuss novels, short stories, and films, addressing the theme of sustainable futures or apocalypse; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent, junior standing or instructor permission

ENG 3485 The Tradition of Anti-War Literature (3)

as required

This course studies, in depth, the tradition of anti-war literature from the United States and around the world. We will read and discuss classic and contemporary novels, short stories, poems, and films which address themes of peace, pacifism, and nonviolence, responding critically to war and suggesting peaceful alternatives. 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

ENG 3490 Memoir: Telling Your Life Story (3)

as required

The purpose of this course is to teach students to discover the natural form and content of their life stories from a writer's perspective. First, students will practice the four steps of the writer's craft: observation, expression, reflection, and wordsmithing. Second, they will read memoir excerpts from classical and contemporary writers, studying different styles and forms of storytelling. Third, students will workshop each others' stories, practicing the necessary art of revision, which is the most essential and often the most difficult part of creative writing. Lastly, students will have the opportunity to perform their stories in a public reading; publishing in print and electronic media will also be covered. This class is writing-intensive; 3 hours of lecture per week. Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

ENG 3590 The Films & Novels of Stephen King (3)

as required

This advanced writing course is designed to offer a critical inquiry into the films, novels, life and works of one of the bestselling and most popular authors of our time: Stephen King. Through the critical analysis of such films as *Carrie*, *Stand By Me*, *Misery*, *The Shining*, and *Storm of the Century* (among others), students will

explore their personal relationship to horror fiction while entertaining a central, pivotal question: What does horror's manifestation in popular culture reveal about the American psyche? This course seeks to unravel our cultural fascination with themes of horror fiction, while exploring King's works as both a continuation of the literary Gothic canon and a driving force in the cinematic tradition of American horror films; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

Equine Studies (EQS)

EQS 1010 Introduction to Equine Studies I (4)

fall

Students will be introduced to the history of the horse, the equine industry, and basic stable management principles. They will combine theory and practice by providing daily horse care and stable maintenance as needed under the supervision of the instructor and the Stable Manager. Lecture topics include history of the horse; the horse industry and careers; structure and anatomy; regular health assessment; first aid; bandaging; use of restraints; safe handling practices; deworming schedules; clipping; and basic hoof care; 3 hours of lecture, 2 hours of laboratory per week. [Course fee: \$50]

EQS 1012 Introduction to Equine Studies II (2)

spring

This course introduces students to Vermont Tech and provides an overview of the Equine Studies major. Topics to be covered include an examination of the equine industry in the US; equine safety and ethics; the equine in human history; equine psychology; fundamentals of equine behavior and training; breeds and conformation; disciplines; equine management; and career options in the equine industry; 2 hours of lecture per week.

EQS 1032 Stable Management (3)

spring

Students will build upon their study of stable management principles from EQS 1031 and will continue to be responsible for daily horse care under the supervision of the Equine Center Supervisor. Lecture topics include insurance; contracts; facilities; arena footing; fencing and pasture management and rotation; basic feeding principles; fire safety; manure management; and trailering; 2 hours of lecture, 2 hours of laboratory per week.

EQS 1220 Horse Judging (1)

fall

This course provides an introduction to the analysis of conformation, movement, and function as well as the theory and practice of horse and horse show judging. The course prepares students to participate on the Vermont Tech horse judging team and/or pursue certifications in judging; 3.5 hours once per month during the term.

EQS 2011 Equine Training I (3)

fall

Students learn safe and effective techniques for training the green or unbroken horse for various disciplines, as well as develop skills to critically analyze various trainers and strategies. The course includes discussion sessions during which students view and evaluate equine behavior and the training methods of professional trainers. The labs include hands-on practice of groundwork, including round-penning, classical lunging, and long lining with a strong emphasis on safety and developing a positive attitude in the horse. The training horses will be introduced to harness and/or saddle as well as desensitization training. Introduction to actual riding or driving will depend on each training horse's rate of progress; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: Two semesters of EQS 2025 or instructor permission [Course fee: \$150]

EQS 2020 Equine Lameness (3)

fall

This course is designed to teach students to recognize lameness and gait abnormalities in the horse. They will learn how to evaluate lameness using physical examination, palpation, and gait evaluation and will be exposed to veterinary diagnostic methods. They will also learn treatments for common skeletal, muscular, neurological, and hoof-related issues. The main goal is for students to become well-educated horsemen who can recognize lameness, handle the horse appropriately, and make educated decisions about treatment options. Offered every other year; 2 hour of lecture, 2 hours of laboratory per week. Prerequisite: EQS 1031, 1032; VET 1020 [Course fee: \$150]

EQS 2025 Equitation (1)

fall/spring

Emphasis in each course is placed on assisting each student's development at his/her pace and introducing all students to a variety of riding and driving methods. Students will learn about correct use of tack for various disciplines or purposes, as well as correct technique in their choice of dressage, jumping, hunt seat equitation, stock seat/Western, or driving. Not all topics will be covered in each course, but all topics will be addressed within the sequence, which every student must complete in the correct order. Note: all students are encouraged to take at least one semester of dressage, driving, and western horsemanship; 2 hours of riding lessons per week; graded Pass/No Pass. This course is repeatable for credit. [Course fee: \$500]

EQS 2041 Equine Massage I (3)

fall

This course provides an introduction to the theory and practice of equine massage. It includes intensive

Course Descriptions

study of equine anatomy, including muscular and skeletal structures. Focus is on identifying soreness and other problems affecting the equine athlete, developing strategies for addressing the problems, and applying therapeutic massage to improve the horse's mobility, range of motion, and general well-being; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: VET 1020

EQS 2801/2802 EQS Summer Internship/EQS Summer Internship Review (0/1) summer/fall

Students may participate in an equine internship of their choosing and will coordinate with the program director about the terms of the internship, including number of hours and responsibilities included. Students will keep a daily log of hours and activities, in addition to completing the required documents. There will be a 45 hour minimum required; graded Pass/No Pass. Prerequisite: Completion of freshman EQS courses [Course fee: \$250]

EQS 3012 Equine Training II (3) fall

This course focuses on refining the green-broke and the trained horse. Attention will be given to producing lightness; correcting head and body position; using the horse's body correctly; achieving balanced and correct gaits; and developing smooth transitions. Offered every other year; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: EQS 2011 with a C or better [Course fee: \$150]

EQS 3031 Riding Instruction I (3) fall

Riding Instruction I will expose students to the standards of three equitation seats: Dressage, Western, and Hunt Seat. Students will participate in detailed analysis of human and equine biomechanics; organization and planning of lessons; and implementation of skills and techniques common to all disciplines, as well as hands-on problem solving of biomechanical problems; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: Three semesters of EQS 2025 or instructor permission

EQS 3032 Riding Instruction II (3) spring

Students will focus on the processes of learning and teaching, the way in which people process information, and the elements necessary for excellent instruction. The course incorporates knowledge of human and equine biomechanics from EQS 3031 with understanding and using communication skills; evaluating and working with different learning modalities; and analysis, organization, and planning of lessons; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: EQS 3031

EQS 3042 Equine Massage II (3) spring

This course continues to build upon the foundations established in Equine Massage I, with increased attention to muscle and other tissue loosening and alignment to improve equine movement, performance, and comfort. Topics include massage practices, stretching, saddle fit (English and Western), and conformation evaluation. Laboratory sessions will provide students with the increasing responsibility for determining areas of concern, developing plans for improvement, and implementing and assessing such measures. Offered every other year; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: EQS 2041

EQS 4110 Equine Health & Diseases (3) spring

This course provides an in-depth exploration of issues relating to equine health management, including signs of health and illness; diseases and their causes; preventative and maintenance care measures; and emergency care for horses. Offered every other year; 2-3 hours of lecture per week, 2 hours of lab as required. Prerequisite: AGR 2030; VET 1020

EQS 4610 Equine Studies Senior Seminar (3) spring

Under the joint supervision of the instructor (and a mentor when necessary), students will propose, gain approval for, and complete a research project on a specific area of the equine industry. The project will include a hands-on component (unless an exception is granted by the instructor) and will conclude with a substantive written report and an oral presentation. Classes will include employment search strategies, guest speakers from various areas of the equine industry, and discussions of current issues within the industry; 3 hours of lecture per week. [Course fee: \$50]

Fire Science (FSC)

FSC 1010 Principles of Building Construction & Fire Protection (3) fall

This course provides the components of building construction that relate to fire and life safety and how understanding the building types and construction principles will improve fire suppression and fire ground safety. The emphasis of this course is on firefighter safety. The elements of construction and design of structures are shown to be key factors when inspecting buildings, pre-planning fire operations, and operating at emergencies; 3 hours of lecture per week.

FSC 1021 Firefighting Services I (6) fall

This introductory course provides an overview of fire services; career opportunities in fire fighting and related fields; philosophy and history of fire protection/service; fire loss analysis; organization and function of

public and private firefighting services; fire departments as part of local government; laws and regulations affecting the fire service; introduction to fire protection systems; and understanding fire strategy and tactics. Students will learn basic fire suppression, rescue, and extrication skills. This academic course will include competency-based skill development necessary to perform fire/rescue duties and is part one of a two-part course leading to Vermont certification as a Firefighter I & II. This certification is through the Vermont Fire Academy and are subject to their schedule; 3 hours of lecture per week, some weekend training required. Students are responsible for providing NFPA-approved gloves and hood. *Non-credit version of FSC 1021 is CED 0012.* [Course fee: \$200]

FSC 1022 Firefighting Services II (4)**spring**

Firefighting Services II continues the study of fire service nomenclature; specific firefighting techniques and functions; basic fire chemistry and physics; fire protection systems; and understanding fire strategy and tactics. Students will learn and practice basic fire suppression, rescue, and extrication skills. Upon successful completion of this course students will be eligible to apply for Vermont certification as a Firefighter I & II. This procedure includes passing a written exam, proficiency skill based testing, and participation in a live burn exercise at a Vermont Fire Academy training site. This certification is through the Vermont Fire Academy and are subject to their schedule; 4 hours of lecture per week, some weekend training required. Students are responsible for providing NFPA-approved gloves and hood. *Non-credit version of FSC 1022 is CED 0013.* Prerequisite: FSC 1021

FSC 1030 History & Impact of Fire in America (3)**fall**

This course provides an overview of the history and impact of fire in American society. Course material will include a general understanding of fire and combustion; the history of fire fighting in the US; analysis of significant fires in American history and their impact; discussion of the catastrophic theory of management as it pertained to these fires; today's impact of the urban wildfire interface; and how fire affects society and the family unit; 3 hours of lecture per week.

FSC 1220 Fire Service Leadership (3)**spring**

This course is designed to develop a foundation of leadership skills for the firefighter/officer. Course content will include the identification of leadership styles, group dynamics, diversity, conflict resolution, management change, and problem solving. This course will emphasize personal leadership development and supervisory skills using applied research, readings, group exercises, and classroom discussion; 3 hours of lecture per week.

FSC 2020 Fire Service Hydraulics & Water Supply (3)**spring**

This course provides a foundation of theoretical and mathematical knowledge to understand the principles of fluids and the use of water in fire protection and to apply hydraulic principles and formulas to analyze, plan, and solve water supply problems. Fire ground applications include pump operations, hose lines, nozzle pressures and providing adequate water supply for fire suppression, tanker shuttles, and large diameter hose; 3 hours of lecture per week. Prerequisite: MAT 1210

FSC 2210 Fire Administration (3)**spring**

This course introduces the student to the organization and management of a fire department and the relationship of government agencies to the fire service. Development of fire service leadership traits will be viewed from the perspective of the chief officer. Classroom content will include grant writing; extensive budget development and a budget presentation project; public presentation skills; and analysis of the fire department as a business in today's world; 3 hours of lecture per week.

FSC 2220 Firefighting Strategy & Tactics (3)**fall**

This course provides an in-depth analysis of the principles of fire control through utilization of personnel, equipment, and extinguishing agents on the fire ground. Students will make and document decisions based on computer generated scenarios. This course is a capstone course in the Fire Science program, drawing on knowledge and understanding of fire dynamics obtained in other courses; 3 hours of lecture per week. Prerequisite: Department permission required for non-FSC majors

FSC 2230 Hazardous Materials Chemistry & Operations (3)**spring**

This course provides basic fire chemistry relating to the categories of hazardous materials including problems of recognition, reactivity, and the health hazards encountered by firefighters. It also prepares students to determine an initial course of action for emergency responders and understand strategies, tactics, and resource management techniques for handling hazardous materials incidents. Upon successful completion of this course and supplemental field and classroom training; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: CHE 1020

FSC 2240 Fire Protection Systems (3)**spring**

This course provides information relating to the features of design and operation of fire alarm systems, water-based fire suppression systems, special hazard fire suppression systems, and water supply for fire

protection and portable fire extinguishers. Classroom activities will provide students with the opportunity to use fire extinguishers, inspect wet/dry/residential sprinkler systems, and study various alarm notification systems; 3 hours of lecture per week.

FSC 2250 Fire & Life Safety Educator (3)

fall

This course provides fundamental information regarding the history and philosophy of fire prevention; organization and operation of a fire prevention bureau; use of fire codes; identification and correction of fire hazards; use of the NFIRS system; and the relationships of fire prevention with built-in fire protection systems, fire investigation, and fire and life-safety education in community schools. Students will prepare presentations, conduct a safety day community program, and study the effects of tragic fires which led to new fire safety standards; 3 hours of lecture per week.

FSC 2260 Career Wellness: CPAT Prep (3)

fall

This course provides the student with an introductory introduction to the CPAT exam and a basis of health and wellness that is required to work in the field of public safety. The knowledge gained throughout this class will serve as a foundation for mental and physical fitness, with the goal of a safe and worthwhile public safety career. While some of the topics are specific to firefighting, parallels can be drawn between all sectors of public safety; 3 hours of lecture per week.

FSC 2820 Residential/Internship Program (3)

as required

This course is designed to provide the student with actual experience as a firefighter in a municipal fire station or an internship experience in private industry involved with fire prevention, loss control, or risk management. In the residential program, the student will perform actual firefighter duties which include station duties; fire safety instruction; fire suppression activities; responding to alarms, fire calls, motor vehicle accidents, mutual aid, and good intent calls; and special hazards incidents. Upon placement in the internship program either in private industry or fire-related service, a student will participate in prevention or risk management activities under the supervision of a supervisor or manager. Prerequisite: Vermont certification as a Firefighter I and EMT-B; department permission

Graduation Standards (GRS)

GRS 0222 Information Literacy (0)

fall/spring

This is an online tutorial and test used to meet the graduation standard requirement for information literacy. Students should complete the information literacy standard in their first year within a degree program. In order to complete the standard, students enrolled in GRS 0222 go online and complete the tutorial, then complete the online test. The tutorial and test may be repeated. To pass at the associate level, students must achieve a score of 20 to 24; to pass at the bachelor's level, students must achieve a 25 or better.

Ground Transportation Services (GTS)

GTS 1020 Engine Diagnostics & Repair (3)

fall

This course provides a comprehensive study of the theory, construction, design, and repair of the internal combustion engine. Topics discussed include engine classification; power and torque development; engine power-efficiency tests; engine performance parameters; and mechanical design and failure analysis. The mathematical solution of performance characteristics is demonstrated. Alternative engines and fuels are also discussed. The laboratory reinforces the lecture by providing engine performance diagnostic procedures and mechanical repair and overhaul procedures. System problem diagnosis and component failure analysis are continually stressed; 3 hours of lecture per week. Corequisite: Enrollment in appropriate laboratory course [Course fee: \$70]

GTS 1040 Vehicle Electrical Systems (3)

spring

This course is intended to give the student a thorough understanding of electrical systems and to teach diagnostic and troubleshooting skills. Topics include the operation and testing of storage batteries, starting systems, charging systems, ignition systems, and basic accessory systems. The student will become familiar with various types of test equipment, diagnostic charts, and vehicle wiring schematics; 3 hours of lecture per week. Corequisite: Enrollment in appropriate laboratory course [Course fee: \$50]

GTS 1120 Vehicle Electronics (3)

fall

This course will introduce the student to general vehicle electrical and electronic principles, theory, and components. Topics include Ohm's Law, circuit analysis, basic circuits, diodes, transistors, relays, and solenoids. The laboratory will use electrical test equipment to analyze and troubleshoot basic electrical circuits including warning systems, electrical accessories, battery starting, and charging systems; 3 hours of lecture per week. Corequisite: Enrollment in appropriate laboratory course [Course fee: \$75]

History (HIS)

HIS 1111 World History I (3)

as required

This course serves as an introduction to world civilizations: Mediterranean, European, Asian, American, and African. Study includes origins of the time of global expansion of civilizations; 3 hours of lecture per week. (General Education: SS)

HIS 1112 World History II (3) as required

This course serves as an introduction to world civilizations from 1500 through the present: European, Asian, African, and American. Study includes origins of the time of global expansion of civilizations and the modern evolution of world powers and world problems; 3 hours of lecture per week. (General Education: SS)

HIS 1211 American History I (3) as required

In the course, students survey major historical events as they affected the lives of the American people. Emphasis in the course is placed on the changes in institutions, values, and lifestyles that characterized the evolution of our society from a colonial, agrarian culture to that of a unified, democratic republic; 3 hours of lecture per week. (General Education: SS)

HIS 1212 American History II (3) as required

Students examine the historical roots of American society as an urbanized, technological culture and consider the problems and solutions generated by such a culture. Students also study the evolution of the US in foreign affairs to its present status; 3 hours of lecture per week. (General Education: SS)

HIS 1220 Native American Histories & Culture (3) as required

This is an interdisciplinary course exploring indigenous cultures of North America. Students will consider the pre-Columbian world; history of contacts between natives and settlers; and contemporary issues including legal sovereignty, land claim, resource policy, poverty, and cultural autonomy; 3 hours of lecture per week. (General Education: SS)

HIS 1260 Information Technology: Past, Present, & Future (3) fall

This course covers the history of computing from early mechanical devices; theoretical milestones; electronic computers of the late 1940s and 1950s; generational changes in architecture; underlying technologies; the progression from main frames to minicomputers, supercomputers, microcomputers, and embedded computers; and networking. Introductory societal and/or ethical issues, such as the digital divide, encryption, peer-to-peer file sharing, and computers and homeland security are also covered. Further focus is placed on organizational and human forces shaping the adoption of information technology and the difficulties that may be experienced during a systems implementation, a change of systems, and the impacts of computer technology on employment, health, and the community. It concludes with various trends and forces shaping information technology and probable changes that will occur from a futurist perspective. Topics include recent new technologies and their effect on people and society; basic concepts of future studies; and the application of future studies to make a prediction regarding new technologies; 3 hours of lecture per week. (General Education: SS for non-computer majors)

HIS 2070 Vermont History (3) as required

This course surveys the history of Vermont from early days to the present. Students explore economic, political, social, and cultural themes with a focus on what makes this region unique; 3 hours of lecture per week. Prerequisite: ENG 1061 or equivalent

HIS 2150 History of the US in the Sixties (3) as required

This course explores the movements and events of the US during one of the most tumultuous decades: the 1960s. Through documentary films and other media, readings, websites, and discussion, students will study such topics as the civil rights movement, assassination, the student movement, the impact of the Vietnam War, and the music, art, and literature that are the hallmarks of a decade marked by social activism and political and cultural upheaval. Through individual and group reading, study, and presentation, students will learn of the continuation of the environmental, women's, and civil rights movements. (General Education: SS) Prerequisite: ENG 1061 or equivalent

HIS 2270 Society & Environment in History (3) as required

This course provides an exploration of the response to environmental challenges by various societies in history and why societies fail and perish or succeed and survive. The course will consider social and cultural adaptation to environmental conditions and challenges and will analyze the relationship and interaction between society and environment in the development of sustainable communities. (General Education: SS) Prerequisite: ENG 1061 or equivalent

HIS 3165 Vermont History & Government (3) as required

This course provides a close look at Vermont's historical, social, and economic development, its problems as a republic, the struggle for statehood, and its constitution and government today. The instruction observes Vermont's place in American civilization from its inventive, cultural, educational, literary, and political contributions; 3 hours of lecture per week. Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

Humanities (HUM)

HUM 2020 Bioethics (3) as required

This course provides an exploration of ethical issues from beginning-of-life to end-of-life, from legal, medical, and philosophical perspectives. Topics include assisted reproduction; abortion; euthanasia; genetic experimentation and cloning; and homosexuality; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

HUM 2040 The Holocaust (3) as required

Students in this course will examine the Holocaust thematically through a variety of media: psychology, history, literature, and sociology; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

HUM 2070 The Vampire in Literature, Culture, & Film (3) as required

The image of the vampire has long held sway with popular imagination. Since the publication of Bram Stoker's *Dracula* in 1897, the vampire has become a staple of popular culture, appearing in literature, advertisements, cartoons, music, television shows, and film. This course examines the role of the vampire in literature, culture, and film. Through the reading of texts and the viewing of films, students will understand the fundamental aspects of Gothic literature and formulate their own ideas as to the importance of the vampire archetype. In addition, students will learn to identify vampirical elements in literature and film and will enhance their knowledge and understanding of the vampire's role in popular culture. This class is writing-intensive; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

HUM 2080 The Literature & Culture of Witchcraft (3) as required

Grounded in the early European historical context of Witchcraft and the Colonial American experience of Witchcraft, this course engages students in an exploratory and critical dialog that examines Witchcraft as it is represented in various types of literature (including plays, short stories, poetry, court documents, journal entries, and novels), culture, and film. Witchcraft stereotypes and hysteria often represent the societal anxieties and beliefs of the culture in which they appear and offer a rich subject for academic study. By drawing from the readings and films assigned throughout the semester, as well as personal research and reflective and critical analysis, students will develop their own unique discourse in regards to the literature and culture of witchcraft and its unique contribution to contemporary and past culture. This class is writing-intensive; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

HUM 2160 Humor in Literature, Film, & Writing (3) as required

In this rhetoric course, students first examine how humor works in literature and film and then use these tools in their own creative writing. The art of writing with style and of perfecting one's singular voice for various humorous purposes (including social, political, and persuasive) is taught through critical analysis of successful comedic literature and film, everything from *Lysistrata* to *Annie Hall*. Students will mix rhetorical strategies learned in their composition classes with comedic devices by writing stories, rants, parodies, reviews, and dramatic dialogue. Culminating projects will include assembling a course portfolio of creative work and writing a longer analytical essay. This course is writing-intensive; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

HUM 2170 The Culture of Sustainability (3) as required

This course introduces students to the culture of sustainability. We will read and discuss the literature and philosophy of sustainability, simplicity, and deep ecology and consider more mindful approaches to sustainability in our own lives; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

HUM 2330 Peace Studies (3) as required

This course introduces students to the ideas, principles, and practices of peacemaking. We will examine the literature and philosophy of peace and nonviolence in the context of historical experience and learn practical ways of peacemaking through the practice of mindfulness. (Students may not receive credit toward graduation for both HUM 2330 and 3330); 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

HUM 2350 Mindfulness, Meditation, Stress Reduction (3) as required

This course introduces students to the principles and practices of mindfulness, meditation, and mindfulness-based stress reduction. We will examine the literature and philosophy of mindfulness watch films, and practice meditation and stress-reduction techniques. This course is writing-intensive; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

HUM 3025 Myth: The Ties That Blend & Bind (3) as required

This course encourages students to explore a variety of myths from ancient cultures with special attention to their influence on and reflection of social beliefs and structures. Additionally, the course highlights the

common elements shared by all mythic structures as a means of examining the global human experience and search for meaning throughout the ages. This course is writing-intensive; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

HUM 3050 Theories of Science & Technology (3) as required

This course explores a variety of historical and philosophical perspectives on science and technology. Special emphasis is placed on the relationships of science, technology, social and political structures, and individual responsibility. Topics include the nature of science and technology; elitism in science and technology; goals and control; and the role of the individual scientist or technician; 3 hours lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

HUM 3060 Cyberethics (3) as required

This course introduces students to the fundamentals of ethical inquiry and the ethical implications of developments in computer technology; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent

HUM 3070 The Vampire in Literature, Culture, & Film (3) as required

The image of the vampire has long held sway with popular imagination. Since the publication of Bram Stoker's *Dracula* in 1897, the vampire has become a staple of popular culture, appearing in literature, advertisements, cartoons, music, television shows, and film. This course examines the role of the vampire in literature, culture, and film. Through the reading of texts and the viewing of films, students will understand the fundamental aspects of Gothic literature and formulate their own ideas as to the importance of the vampire archetype. In addition, students will learn to identify vampirical elements in literature and film and will enhance their knowledge and understanding of the vampire's role in popular culture. This class is writing-intensive; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

HUM 3210 Folklore, Literature, & Legends of New England (3) as required

Grounded in academic theory and focusing on the literature, folklore, and legends of New England, this course explores broad issues of representation, cultural, social, and political issues and the shaping of a uniquely New England culture and people. Through the study of folklore in its various forms; classic and contemporary literature by New England authors; and oral legends, students will gain a broader understanding of New England, its history and culture and of their own role in shaping the culture and world in which they live. This class includes a field trip designed to immerse students in the living history of New England and is writing-intensive; 3 hours of lecture per week. Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

HUM 3330 Peace Studies & Peacemaking (3) as required

This course studies the ideas, principles, and practices of peacemaking in depth. We will examine the literature and philosophy of peace, pacifism, and nonviolence in the context of historical experience and learn practical ways of peacemaking through mindfulness, nonviolent communication, and nonviolent conflict resolution. (Students may not receive credit toward graduation for both HUM 2330 and 3330); 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

HUM 3490 Crime & Punishment in Film & Literature (3) as required

This course introduces students to the fundamental legal and ethical issues in American crime and criminal justice through film and literature. The course examines the dilemmas in crime and punishment. Students discuss literature and films in the context of the humanities; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

HUM 4010 East & West Holistic Healing (3) online

This course introduces student to holistic healing, complementary and alternative therapies, energy and elemental work, multicultural perspectives, and traditional healers. Students will understand, evaluate, and appreciate traditional, holistic models of health and healing, as well as complementary and alternative therapies, and will learn and apply at least one chosen modality in their healing work.

Interdisciplinary (INT)

INT 0010 Effective Learning (2) fall/spring

This course will introduce students to the behaviors and skills necessary for academic success. Through a series of readings, journals, lectures, and essays, students will develop skills in setting goals; developing a sense of personal ownership and responsibility, and self-awareness, along with the more mechanical skills of note-taking and organization. Particularly appropriate for students on academic probation, the learning acquired will enable them to achieve and maintain good academic standing. Credits do not count toward graduation; 2 hours of lecture per week.

INT 1005 Self, Career, & Culture (3)

spring

This is an interdisciplinary course designed for freshman that investigates the relationships between individuals, their careers, and the social environments in which they live. This course explores the interactions between Self and Society and helps to explain the nature of the individual and individual as a student; the nature and impact of the students program on society; the relationship among educational disciplines and society; the role of the individual and the student's career in society; and the responsibilities of citizenship; 3 hours of lecture per week.

INT 3060 Leadership Studies (3)

as required

Leadership Development Studies curriculum delivers a diverse, interdisciplinary approach to leadership instruction. Grounded in the humanities, the curriculum is relevant to all in this modern age. The curriculum combines the study of great leaders portrayed in the humanities by writers, historians, and film-makers from ancient times to modern-day; a novel and experiential learning approach to defining and rediscovering your leadership qualities; 3 hours of lecture per week. (General Education: AH)

Landscape (LAH)

LAH 1020 Introduction to Horticulture (3)

fall

This survey course introduces the principles and practical applications of horticulture. Students become familiar with the basic science that forms the foundation of horticulture and use this information to understand how horticulture is applied. Topics include plant classification; plant structures; plant physiology and development; plant environments; plant propagation; harvesting and post-harvest preservation; and crop improvement; 3 hours of lecture per week.

LAH 1021 Landscape Graphics (3)

fall

The purpose of this course is to familiarize students with a broad range of graphic techniques as well as the specific tools necessary for each. Specific coursework includes an introduction to drafting; conventions of landscape and architectural drawing(including their intentions, capabilities, and use); three dimensional drawing techniques; tonal value and texture rendition; various media and their specific uses; lettering; and color rendering for presentations; 6 hours of studio per week. [Course fee: \$20]

LAH 1030 Woody Ornamentals (3)

fall

This course covers the identification of approximately 100-130 native and cultivated woody plants found in northern New England. In addition, plant characteristics, landscape use, cultural requirements, and plant associations are explored. Emphasis is placed upon both plant identification and the plant selection process. Drawing as part of learning is encouraged. Offered every other year; 2 hours of lecture, 3 hours of laboratory per week.

LAH 1031 CAD for Landscape Applications (2)

spring

This course introduces the use of computer-aided drafting (CAD) as a drafting, documentation, production, and presentation tool for landscape design. Students will become familiarized with a variety of software applications such as AutoCAD, Photoshop, InDesign, and Illustrator. Specific coursework will cover topics such as photo overlay; manipulation; layout; file management; image management and interpretation; composition; and presentation drawings. All work will build upon foundational understanding of digital files, organizational systems, and protocols; 3 hours of laboratory per week. Prerequisite: LAH 1021, Corequisite: LAH 2011

LAH 1040 Greenhouse Management (3)

spring

This course covers the fundamentals of commercial greenhouse production. Control of the greenhouse environment and the effects this has on plant growth are stressed. Students learn about greenhouse construction, heating/cooling, growing media, fertilization, watering, pest control, and the production of container-grown crops. Laboratory exercises are conducted in the greenhouse or at the facilities of local growers; 2 hours of lecture, 3 hours of laboratory per week.

LAH 1050 Introduction to Soils (4)

fall

Subject areas covered include soil formation and classification and the ways in which chemical, physical, and biological properties of soil affect plant growth. The course also examines issues related to soil temperature, aeration, organic matter, and till. Practices best suited to erosion control and nutrient management are explored. Students learn about soil testing and the most effective liming and fertilizing practices for sustainable management. The college, home gardens, and local farms are used in soil and fertilizer analysis; 3 hours of lecture, 2 hours of laboratory per week.

LAH 2010 Landscape Construction Practices (3)

fall

This course introduces students to the materials and methods of landscape construction and management. Emphasis is placed on how general design intentions are developed at the plan and detail level, resolved through sound principles of construction, and professionally documented according to conventional stan-

dards. Specific coursework includes surveying; map making; construction of freestanding and retaining walls; construction of patios and walkways; grading (earthworks); and the principles of statics and mechanics as they apply to landscape design. Theory and practice are emphasized equally; 6 hours of studio per week. Prerequisite: LAH 2011 [Course fee: \$20]

LAH 2011 Introduction to Landscape Design (3) spring

The goal of this course is to introduce students to the basic principles of landscape design in order to build a fundamental knowledge of, and fluency in, the issues and language of design and its application. The coursework is based on a progression of basic design principles that build to an increasingly sophisticated understanding of design and its application with a strong emphasis on the interrelatedness of architectural built form and landscape built form. Throughout the course, verbal and graphic communication of ideas and solutions are emphasized. Individual design projects are developed under faculty supervision and are then presented to a jury of faculty and distinguished practitioners. Additionally, students receive an overview of landscape architectural history and are exposed to the work of practitioners in the field; 6 hours of studio per week. Prerequisite: ARE 1210 or CPM 1021 or LAH 1021 [Course fee: \$20]

LAH 2012 Landscape Design II: Planting Design (3) spring

This course focuses upon the art and science of planting design, with essential emphasis given to process and practice (site analysis; design process and synthesis; development of an appropriate plant palette; production of planting plans; specifications and contract documents; and cost estimating and bid documents). Students will be expected to develop appropriate plant palettes that are responsive to site characteristics; functional and structural requirements of individual plant species; and design intent. Assignments will focus upon design principles and elements in planting designs, historical precedent, and current issues relevant to planting design. Attention will be given to observation, assessment, and the practice of designing as a method of gaining knowledge about the theory and practice of planting design. The delivery of the course content will be through lectures, group discussions, field trips, laboratory assignments, readings, and juried presentations; 6 hours of studio per week. Prerequisite: LAH 2011 [Course fee: \$20]

LAH 2020 Plant Propagation (3) fall

Students in this course study the principles that explain and control plant propagation, as well as practice plant propagation techniques in the laboratory. Propagation by seeds, cuttings, grafting, layering, and other common methods is explored. Special emphasis is placed on the newest techniques in plant tissue culture; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: LAH 1020 [Course fee: \$10]

LAH 2030 Herbaceous Plant Materials (3) fall

The primary objective of this course is to familiarize students with approximately 100 to 150 native and introduced herbaceous plants including perennials, annuals, biennials, bulbs, and turf grass. Emphasis is placed upon identification; aesthetic and functional uses in the landscape; plant culture and maintenance; transplanting; and planting design and composition. Offered every other year; 2 hours of lecture, 3 hours of laboratory per week.

LAH 2801/2802 LDSH Summer Internship/LDSH Summer Internship Review (0/1) summer/fall

After successful completion of the first year core curriculum, students are required to experience horticulture or design in an employment setting. With the aid of program faculty and staff, students will arrange a summer job/practicum that will broaden their understanding of real world horticulture and design. Prerequisite: Completion of freshman year or instructor permission [Course fee: \$250]

LAH 3011 Agroecology (3) spring

The objective of this course is to develop students' understanding of agricultural and landscape systems from an ecological context. The course aims to provide students with a deeper understanding of the complexity of ecosystems and the incorporation of these into management practices for agroecosystems. Ecosystem structure and function; organism interactions; genetic and bio-diversity; and indicators of sustainability will be explored. Upon completing this course, students will be able to propose sustainable landscape management practices based on ecological principles. Students will develop critical and analytical thinking and communication skills by participating in course discussion and written work; 3 hours of lecture per week. Prerequisite: LAH 1020; LAH 1050 or SDT 3130

LAH 3013 Landscape Design III: Residential Design (3) spring

This course focuses upon the art and science of residential landscape design with emphasis given to the integration and application of design principles and process. Through projects of varying scope and increasing complexity, students will evaluate and synthesize information gathered from a formal site analysis that identifies physical, economic, and social factors; the client interview; external research; and program development. Utilizing process-based design; three-dimensional representation and thought; and figure-ground relationships, students will develop conceptual and schematic design solutions that are responsive to both site and context, the client's wishes, and to the inter-relatedness of architectural and landscape architectural built form. Construction documentation and regulatory constraints will also be addressed. Students will

present their ideas using a combination of verbal presentations; diagrams; models; hand- and computer-generated drawings; and written analysis. Delivery of course content will be through lectures, slide shows, readings, group discussions, field trips, design projects, and juried presentations; 6 hours of studio per week. Prerequisite: LAH 2012

LAH 3051 Permaculture (3)

spring

Permaculture (permanent agriculture) is the conscious design and maintenance of agriculturally productive systems that have the diversity, stability, and resilience of natural ecosystems. As a design philosophy, it offers practical solutions based upon the careful observation of natural patterns and the assemblage of conceptual, material, and strategic components into a design that functions to benefit life in all its forms. Bringing together best practices of research in the field of permaculture and integrated land use planning, this course challenges students to examine, analyze, and apply principles of permaculture design to a variety of projects of varying scale, context, and complexity. Delivery of course content will be through lectures, slide shows, readings, group discussions, field trips, and case studies; 3 hours of lecture per week. Prerequisite: LAH 1050, 3010

LAH 4010 Sustainable Landscape Principles II (3)

fall

This course builds upon knowledge gained in LAH 3010, with emphasis given to the integration and application of sustainable principles to specific design projects of varying scope and increasing complexity. Utilizing design and management strategies that exemplify natural processes and are resilient to ecological, economic, and cultural stresses, students will develop design solutions to residential, institutional, and civic scale projects. These projects will concentrate on landscape design strategies aimed at water conservation and management, methods for reducing the operating energy of buildings and sites, management of invasive species, retrofitting existing landscapes, and best practices for sustainable land management (including materials selection, organic lawn care, and best available equipment). Students will present their ideas using a combination of verbal presentations; diagrams; models; hand- and computer-generated drawings; and written analysis. Delivery of course content will be through lectures, slide shows, readings, group discussions, field trips, design projects, and juried presentations; 6 hours of studio per week. Prerequisite: LAH 3010 or instructor permission [Course fee: \$25]

LAH 4020 LDSH Capstone (2)

fall

This capstone course integrates the knowledge and skills developed through coursework and life experience. Additionally, it focuses upon the attitudes and skills essential for career success within the broad field of horticulture and design. Specific coursework includes: job search, including researching the job market and targeting the specific discipline area within the horticulture/design field the student is interested in pursuing; writing a resume and cover letter; and preparing either a portfolio or business plan. In addition, students are introduced to a broad spectrum of practicing professionals from all walks of the landscape design and horticultural fields; 1 hour of lecture, 2 hours of laboratory per week. Prerequisite: Senior standing

Mathematics (MAT)

Students who have shown exceptional mathematical ability may be placed into Calculus as their initial mathematics course at Vermont Tech. If this course is completed successfully, then prior requisite courses for Calculus will be waived.

MAT 0200 Pre-Tech Mathematics (4)

as required

This course prepares students for entry-level college mathematics courses. Credits do not count toward graduation. Prerequisite: Placement level 0 or 1

MAT 0720 Mathematical Skills for Technology (5)

as required

A beginning course in numeracy and algebra designed to develop mathematical skills knowledge. Includes working with fractions; decimals; ratios and proportions; basic geometry; algebraic laws; polynomials; exponents; linear equations; and factoring. Provides a foundation for further study of mathematics as well as for coursework in many technical and scientific fields; 4 hours of lecture, 2 hours of laboratory per week. Credits earned in this course do not apply toward any degree-granting program.

MAT 1040 Mathematics for Allied Health (2)

spring

This course gives an introduction to basic concepts in general mathematics; ratio; proportions; variation; statistics; two- and three-dimensional geometry, especially as related to volume; dosages and solutions; and US-metric conversions; 2 hours of lecture per week. Prerequisite: Placement level 1

MAT 1100 Mathematics for Technology (3)

spring

This course provides an introduction to technical mathematics for students in the construction program. It is designed for students whose academic background includes only an introduction to algebra and geometry. Topics covered include a review of arithmetic; percentages; dimensional analysis; scientific notation; sign numbers; order of operations; basic algebra (including exponents, radicals, factoring, algebraic fractions); ratio and proportions; systems of equations (2 x 2 only); graphing of equations; formulas; linear and quadratic

equations; vectors; geometry; radians right triangle trigonometry; and the law of sines and cosines; 3 hours of lecture per week. Prerequisite: Placement level 2 or C- or better in MAT 1210

MAT 1111 Introduction to Technical Mathematics I (5) fall

This course is the first of a two course sequence giving an introduction to technical mathematics. It will provide the skills necessary to be successful in technical mathematics. It is designed for students who have taken two years of high school algebra who do not place into MAT 1420. Topics covered include fundamental algebraic concepts; geometry; right triangle trigonometry; factoring and algebraic functions; systems of equations; quadratic equations; radicals; and exponents. Credit is not awarded for both MAT 1420 and MAT 1111 toward graduation; 5 hours of lecture per week. Prerequisite: Placement level 3; department permission

MAT 1112 Introduction to Technical Mathematics II (5) fall

This course is the second of a two semester sequence giving an introduction to technical mathematics. It will provide the skills necessary to be successful in technical mathematics. Topics covered include a review of factoring and algebraic functions; exponents and radicals; exponentials and logarithms; trigonometric functions of any sized angle; oblique triangles and vectors; graphing trigonometric functions; trigonometric identities; and complex numbers. Credit is not awarded for both MAT 1420 and MAT 1112 toward graduation; 5 hours of lecture per week. Prerequisite: MAT 1111 with a C- or better; department permission

MAT 1210 Principles of Mathematics (3) fall/spring

This course is a review of general mathematics principles and an introduction of concepts for the solution of agricultural, agribusiness, and business problems. Topics covered include calculator use; basic algebraic operations; solution of linear and quadratic equations; geometry concepts of line, area, and volume; variation; trigonometry of right triangle; growth; compound interest; debt amortization; probability; and statistics; 3 hours of lecture per week. Prerequisite: Placement level 2 or C- or better in MAT 0200

MAT 1221 Finite Mathematics (3) fall/spring

This course introduces the student to use of a variety of mathematical tools to solve applied problems. Topics may include functions; graphing; linear models; matrices and linear systems of equations; linear programming; exponential models; elementary probability and statistics; and the math of finance; 3 hours of lecture per week. Prerequisite: Placement level 3 or C- or better in MAT 1100 or MAT 1210

MAT 1311 Precalculus I (3) fall/spring

This course is a the first in a two-semester sequence of technical mathematics that stresses the relation of mathematics to engineering applications and development of an appreciation of the importance of precision in mathematical thought. It covers the use of a graphing calculator; basic geometry; solution of linear and quadratic equations; right triangle trigonometry; algebraic fractions; logarithms; and exponential functions; 3 hours of lecture per week. Prerequisite: Placement level 3 or C- or better in MAT 1100 or MAT 1210

MAT 1312 Precalculus II (3) spring/summer

This course is the second in a two-semester sequence of technical mathematics that stresses the relation of mathematics to engineering applications and development of an appreciation of the importance of precision in mathematical thought. It covers the use of a graphing calculator; algebraic fractions; exponents and radicals; ratio, proportion, and variation; logarithms; exponential functions; trigonometric functions; laws of sines and cosines; vectors; operations with complex numbers; trigonometric identities and equations; and graphs of trigonometric functions; 3 hours of lecture per week. Prerequisite: C- or better in MAT 1311

MAT 1340 Algebra & Trigonometry (5) as required

This course is a one semester course covering the necessary topics in algebra and trigonometry that will provide the skills necessary to be successful in technical mathematics. It covers the topics of both MAT 1111 and MAT 1112 in one semester and is designed to be a bridge course for students who have completed a lower level math or who are off-sequence and have not placed into MAT 1420. Credit is not awarded for both MAT 1420 and MAT 1340 toward graduation; 5 hours of lecture per week. Prerequisite: Placement level 3 or a grade of C- or better in MAT 1100 or 1210 or 1221; department permission

MAT 1420 Technical Mathematics (5) fall/spring/summer

This course stresses the relation of mathematics to engineering applications and development of an appreciation of the importance of precision in mathematical thought. It covers use of the graphing calculator; linear and quadratic equations; exponents and radicals; logarithms; exponential functions; right triangle trigonometry, laws of sines and cosines; vectors; operations with complex numbers; trigonometric identities and equations; and graphs of trigonometric functions; 5 hours of lecture per week. Prerequisite: Placement level 4 or a C- or better in MAT 1112 or 1340; department permission

MAT 1520 Calculus for Engineering (4) fall/spring/summer

This course presents basic concepts of plane analytical geometry and calculus. Topics include differentiation and integration of algebraic, trigonometric, exponential, and logarithmic functions with emphasis on technical

Course Descriptions

applications; maximum and minimum word problems; related rate; and applications of the integral to include area and volume. The course may be taken by DVD with department permission; 4 hours of lecture per week. Prerequisite: Placement level 5 or C- or better in MAT 1420 [Course fee: \$20]

MAT 2021 Statistics (3)

spring

This course is an introduction to the basic ideas and techniques of probability and statistics. It is designed to prepare students to interpret quantitative information and to make statistical decisions. Topics include descriptive statistics; probability; characteristics of the normal distribution; mean and standard deviation; and steps in hypothesis testing; 3 hours of lecture per week. Prerequisite: Placement level 3 or C- or better in MAT 1100 or 1210

MAT 2120 Discrete Structures (3)

spring

This course introduces discrete structure in computer science. The instruction covers such topics as sets, set logic, relations, functions, proof techniques, induction, logic, graphical representations, and algorithms; 3 hours of lecture per week. Prerequisite: Placement level 3 or a grade of C- or better in MAT 1210 or 1221

MAT 2532 Calculus II (4)

fall/spring/summer

A continuation of Calculus; includes techniques and applications of integration; indeterminate forms and improper integrals; sequences; and series; 4 hours of lecture per week. Prerequisite: A grade of C- or better in MAT 1520

MAT 2533 Calculus III (4)

fall

This course provides students with an opportunity to continue their study of calculus and covers the traditional third semester topics in calculus: vectors, partial derivatives, multiple integrals, vector analysis, and differential equations; 4 hours of lecture per week. Prerequisite: A grade of C- or better in MAT 2532

MAT 3170 Applied Mathematics for Engineering (3)

spring

This course introduces selected topics of advanced mathematics and applies them directly to areas of electrical and mechanical engineering analysis. The curriculum includes key methods of solution of both first and second order differential equations that are most useful in engineering analysis. Electrical and mechanical systems are modeled and their outputs are predicted using systems of integral and differential equations. LaPlace transforms and numerical methods of solution are also covered; 3 hours of lecture per week. Prerequisite: A grade of C- or better in MAT 2532

MAT 3720 Topics in Discrete Mathematics (3)

spring

This course introduces fundamental topics in discrete mathematics that offer theoretical support for a variety of computer applications. Applications such as algorithm development and analysis, error analysis, data encryption, and combinatorics that are best understood with a foundation in logic and proof theory, set theory, probability, number theory, and the structure of modern algebra. This course will introduce the mathematical concepts and then follow them with some application of the concepts to computer science and computer technology; 3 hours of lecture per week. Prerequisite: MAT 2532 or a grade of C- or better in MAT 1312 and 2120 or 1520 and instructor permission

Mechanical Engineering Technology (MEC)

MEC 1000 Freshman Seminar (1)

fall

This seminar presents an introduction to the mechanical engineering technician career and to the skills of lifelong learning. Introductory design projects, research, laboratory experiments, student presentations, speakers from industry, and field trips help develop teamwork, communications, and study skills and give an overview of the broad field of mechanical engineering technology; 1 hour of seminar per week; graded Pass/No Pass.

MEC 1010 Introduction to Mechanical Engineering Technology (1)

fall

The course presents an introduction to the field of mechanical engineering technology; the knowledge and skills that define the discipline; and possible career options. As part of the course, students learn and practice the use of spreadsheets to present and analyze information related to the field. Exercises are based around the field of mechanical engineering and expose the student to various topics (materials, energy, strength, fluids, heat, etc.) through exercises where information and numerical data are acquired, organized, analyzed, and presented. Other topics that are discussed include career options, professional development, ethics, leadership, teamwork, and time management; 2 hours of laboratory per week.

MEC 1011 Design Communication I (2)

fall

The course provides a basic understanding of the principles and technology of mechanical drawing and computer modeling as methods of documenting and communicating mechanical designs. The concepts of geometric construction; orthographic projection; sectional and auxiliary views; dimensioning; and fasteners are covered using hand-drawing techniques and basic drafting tools. Basic proficiency is also developed in

computer-aided design (CAD) using a two-dimensional documentation software and a three-dimensional parametric solid-modeling software. The computer operating system, file management techniques, and e-mail are also introduced; 6 hours of laboratory per week.

MEC 1012 Design Communication II (3)**spring**

In this course, students gain proficiency in communicating mechanical designs using hand drawing and computer modeling, building on the fundamentals learned in the previous course. In addition, students gain skills in project management and teamwork. Students work in teams on short- and long-term mechanical design projects, maintaining electronic design notebooks and project web pages. Students practice two-dimensional and three-dimensional computer modeling and web authoring; 6 hours of laboratory per week. Prerequisite: MEC 1011

MEC 1020 Manufacturing Processes (2)**fall/spring**

This course will introduce the student to machine tools, measuring instruments, and machining operations and how they relate to the manufacturing process. The concept of the job shop and production plant will be studied and the relationship of design, production control, and manufacturing will be demonstrated. Computer-aided manufacturing (CAM) will be introduced; 1 hour of lecture, 3 hours of laboratory per week. [Course fee: \$35]

MEC 1021 Manufacturing Processes Lab (1)**fall/spring**

This course will introduce the student to machine tools, measuring instruments and machine operation and how they relate to the manufacturing process; 3 hours laboratory per week. [Course fee: \$35]

MEC 1040 Introduction to Materials Science & Engineering (3)**spring**

The structural nature and various mechanical properties governing the selection, use, and behavior of engineering materials, both metallic and non-metallic, are studied in this course. In the laboratory, students evaluate and control material properties through various testing, mechanical, and thermal procedures; 2 hours of lecture, 3 hours laboratory per week. Prerequisite: PHY 1041 or equivalent [Course fee: \$15]

MEC 1050 Computer Applications for Mechanical Engineering (1)**fall**

This course introduces the student to the college network, Microsoft, e-mail, and the internet. Focus is on the mechanical applications for spreadsheets; analysis and organization of electronic data; data acquisition and analysis; and presentation of technical information using various computer application; 2 hours of laboratory per week.

MEC 1060 Metrology & Inspection Techniques (3)**as required**

This course is designed to provide students with the fundamental concepts of modern dimensional metrology and related inspection techniques; 2 hours of lecture, 3 hours of laboratory per week.

MEC 1070 Tool Geometry & Productive Metal Cutting (1)**as required**

This course is designed to help students develop an understanding of the theory and practical applications of modern cutting-tool technology. After successfully completing this course, participants will be competent to recognize and define the various geometries associated with cutting tools and how they relate to the material and manufacturing process; 4 hours of laboratory per week.

MEC 1080 Introduction to GMAW (MIG) Welding Processes (3)**fall/spring/summer**

Through this course, the student will gain an understanding of the joining of metals through a variety of welding methods as well as the national codes that apply to the methods. The student will learn the basic components of each machine and will learn to read blueprints specifically related to welding processes. A central component of this course is a lab in which the student will learn to use many of the techniques and machines discussed in the lecture. This course will help prepare students for American Welding Society (AWS) entry-level certifications; 2 hours of lecture, 3 hours of laboratory per week. [Course fee: \$450]

MEC 1090 Introduction to GTAW (TIG) Welding Processes (3)**fall/spring/summer**

Through this course, the student will gain an understanding of the joining of metals through a variety of welding methods as well as the national codes that apply to the methods. The student will learn the basic components of each machine and will learn to read blueprints specifically related to welding processes. A central component of this course is a lab in which the student will learn to use many of the techniques and machines discussed in the lecture. This course will help prepare students for American Welding Society (AWS) entry-level certifications; 2 hours of lecture, 3 hours of laboratory per week.

MEC 2010 Fluid Mechanics & Fluid Systems (3)**fall**

This course examines the interrelationships between the nature of fluid properties; the behavior of fluids at rest and in motion; and the utilization of fluids to effectively accomplish a wide range of useful purposes. Laboratory experience and observation develop a working knowledge of fluid properties, fluid behavior, and fluid systems for power transmission and control; 2 hours of lecture, 3 hours of laboratory per week. Prereq-

quisite: CIS 1050; MEC 1010; PHY 1041, Corequisite: MAT 1520

MEC 2035 Statics & Strengths of Materials (4)

fall

Statics involves the study of vector forces, resultants, and moments and their effect on mechanical systems and structures that are not moving. In static systems, forces and moments (torques) are balanced and known forces can be used to solve for the moments or forces in various parts of a structure. Strength of materials will familiarize students with axial and shear stress and strain; thermal deformation; torsion; shear; bending moments; beam stresses; and deflections. The course will also include the use of computer applications to solve stress and bending problems; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1520; MEC 1011, 1050; PHY 1041 [Course fee: \$35]

MEC 2040 Computer-Aided Technology (2)

fall

Students develop skills to program CNC lathes and milling machines. Software linking CAD programs with CNC machines, industrial pick-and-place robots, and Flexible Machining Systems are presented. In addition, the student is kept up-to-date on current developments in computer-aided technology; 1 hour of lecture, 3 hours of laboratory per week. Prerequisite: MEC 1011, 1020, 1050 [Course fee: \$45]

MEC 2050 Thermodynamics & Heat Transfer (3)

spring

The purpose of this course is to help the student to acquire a familiarity with the first and second laws of thermodynamics, the equations of state, perfect gas processes, and various power cycles. The student will develop some skill in applying these principles to the analysis of devices which utilize the power cycles such as the Otto, Diesel, Rankine, and vapor-compression cycles. Conduction, convection, and radiation heat transfer are also introduced; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1520; MEC 2010; PHY 1041 or 2041

MEC 2065 Kinematics & Dynamics (4)

spring

In dynamic systems, where objects and mechanical assemblies are moving, the accelerations and velocities are considered in order to analyze the motion and forces on an object. The students in this course should acquire a thorough understanding of the displacement, velocity, acceleration, and force characteristics of plane motion and the associated graphical and computer-aided methods of analysis; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1420; MEC 1011, 1050; PHY 1041

MEC 2070 Machine Design Components (3)

as required

This course familiarizes the student with the various types of machine elements that are used in mechanical design and helps them understand the design intent based on functionality, strength, and durability; 2 hours of lecture, 3 hours of laboratory per week.

MEC 2071 Machine Design (2)

spring

Through this course, the student will gain an understanding of the application of mechanical parts such as screws, gears, shafts, bearings, chains, belts, clutches, and brakes to the design of mechanical devices; 2 hours of lecture per week. Prerequisite: MEC 2035, Corequisite: MEC 1021, 2065

MEC 2150 Introduction to Solar PV Technology (3)

spring

This course introduces the basics of solar photovoltaic technology including solar resource assessment; PV materials and modules; systems components; system sizing and design basics; mechanical mounting systems; installation methods; and performance analysis. Advanced topics current to the industry will also be discussed. The course prepares a student to take the NABCEP PV Solar Entry-Level Knowledge Certificate Exam; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: ELT 1031 or instructor permission

MEC 2170 Renewable Energy Heating (3)

spring

This course provides an overview of heating systems that utilize solar, biomass, and geothermal energy. The principles of each type of technology are discussed as well as common topics including hydronic heating; system sizing; pumps and circulators; heat exchangers and storage tanks; sensors and controllers; plumbing components; integration; and performance analysis; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: PHY 1041 or equivalent

MEC 2720 Mechanical Projects (3)

spring

Through this course, the student will gain an understanding of the application of mechanical parts such as screws, gears, shafts, bearings, chains, belts, clutches, and brakes to the design of mechanical devices. A central component of this course is a team-based project to design and fabricate a mechanical system. This course is the capstone experience for the Mechanical Engineering Technology program; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: MEC 1020, 2035, Corequisite: MEC 2065 [Course fee: \$75]

MEC 3010 Wind Power (3)

fall

This course introduces the concepts of wind power and associated technology. The topics addressed include the principles of wind energy and resource assessment; rotor and blade designs; and the mechanical

and electrical principles of wind turbine systems, the different types of applications, and the economics and current policies related to wind power. The laboratory portion of the course involves the installation of anemometry equipment and data evaluation; fabrication and testing of simple rotors and turbine systems; and monitoring and evaluation of installed systems; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: PHY 1041 or instructor permission

MEC 3020 Manufacturing Processes & Machine Design (3) spring

This course integrates concepts in manufacturing processes with elements of machine design. Fabrication techniques using manufacturing tools such as mills and lathes are covered, as well as an introduction to computer-aided manufacturing. Design implications of selected components such as gears, bearings, chains, belts, clutches, brakes, and couplings are discussed. The course culminates with a project that employs the practical applications of many of the covered topics; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: Junior standing in the BS.ELM program [Course fee: \$40]

MEC 3021 Manufacturing Processes II (3) spring

This course focuses on advanced manufacturing and production processes. Topics covered include concurrent and reverse engineering methods; automation in manufacturing; abrasive and grinding techniques; electrical discharge machining; hot wire, CNC welding, and plasma processes; 3D printing; and other emerging methods; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: MEC 1011, 1020

MEC 3031 Materials Processes (3) fall

A fundamental aspect of manufacturing is the processing of materials into products. This course focuses on the processes by which materials are economically processed into different shapes. The overall goal is to develop an understanding of the principles and practical knowledge of different materials processes and be able to apply that knowledge when considering the geometry, functionality, and materials required for a product. Topics covered address processes for metal, polymers, and ceramics and include machining, casting, forming, joining, sheet metal, extrusion, additive methods (3D printing), and coating processes; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: MEC 1020

MEC 3040 Bioenergy (3) fall

This course provides an overview of bioenergy technologies that can be used to replace current fossil-fuel-based heating systems while contributing to the production of renewable electricity and transportation fuels. Solid, liquid, and gaseous biofuels are introduced, though the course focuses on wood and grass biomass and anaerobic digestion of organic wastes. A variety of feedstock resources, processing, and characterization methods are covered along with various systems used for energy conversion by combustion/oxidation. Policy, permitting, transportation, economics, nutrient recovery, carbon cycling, and life cycle analysis are compared and contrasted. Case studies focus on systems installed in Vermont; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: PHY 1041 or instructor permission; SSC 2030

MEC 3041 Advanced CNC Machining (3) spring

This course develops proficiency in the use of professional-grade computer-aided manufacturing software and in the use and operation of CNC machine tools. Topics covered include the history and development of CNC machining, current technology, development of programs, setups, tool lists (cutting, precision measurement), material lists, fixtures, schedules, orders of operation, safety hazards, and preventive maintenance; 1 hour of lecture, 4 hours of laboratory per week. Prerequisite: MEC 1011, 2040

MEC 4010 Quality Assurance (3) fall

This course focuses on the principles and methods of quality assurance including measurement, control, improvement, and management, focusing on applications in the manufacturing field. The course introduces the scope and function of quality assurance including basic definitions; statistics; quality policy and objectives; manuals and procedures; concept of variation; inspection and sampling techniques; meteorology process control methods; and the elements of reliability; 3 hours of lecture per week. Prerequisite: MAT 2021

MEC 4020 Lean Manufacturing (3) spring

This course develops proficiency in the methods and processes used for lean manufacturing. Topics covered include the fundamental principles of lean methods including the continuous recognition and elimination of waste in operations and reducing time from order to delivery while maintaining or improving product quality. This course focuses on gaining the understanding of lean principles, practices, and techniques from both a technical standpoint and a people perspective which is needed in order to lead an organization to lean operation and sustain the improvement. Classroom sessions will include exercises designed to simulate real-world applications to clarify concepts and techniques; 3 hours of lecture per week. Prerequisite: MAT 2021

MEC 4721 Capstone Design Project I (3) fall/spring

This course integrates the knowledge and skills developed through academic study and work experience to develop a design and plan for a system or process related to their field of study. The lectures focus on the process and tools used to create a team-based design to a specified problem. The laboratory sessions

focus on learning and exercising methods to create and communicate design concepts, documentation, and presentations. The course also includes information on career options and the skills essential for career development through presentations by practicing professionals from their field of study; 1 hour of lecture, 4 hours of laboratory per week. Prerequisite: Completion of at least 40 credits in the major area of study

MEC 4722 Capstone Design Project II (3)

spring

This course integrates developed knowledge and skills with the focus on developing a technical design and plan for a system or process including considerations of economics; operations and management; and sustainability. This team-based project work will include identifying project specifications and developing a technical design, including plans for implementation; operation and maintenance; economics; and sustainability. Other elements that are covered and addressed in the project include policy and standards; planning and design assessment; and communication of technical plans and results; 1 hour of lecture, 4 hours of laboratory per week. Prerequisite: MEC 4721

MEC 4801/4802 MEC Internship/MEC Internship Review (0/1)

summer/fall

The internship requires students to spend at least 5 weeks equivalent in a professional setting, preferably related to their field of study. MEC 4802 reviews the activities and responsibilities that a student experienced through an internship. This course is offered in the semester following the internship to award credit for completed work. Graded Pass/No Pass. Prerequisite: Junior standing or instructor permission

Music (MUS)

MUS 1010 Music Appreciation (3)

as required

This course is a survey of how classical music and opera have developed over the last thousand years. Students learn to identify different periods of music and to analyze musicians' interpretations of classical pieces. The course explores how cultural, economic, social, and political systems have supported or suppressed composers and their music; 3 hours of lecture per week. (General Education: AH)

MUS 1028 Introduction to Rock & Roll (3)

as required

This course is a survey of rock and roll music from its origins through contemporary rock. Students will discuss the social, economic, and political conditions that influenced the development of rock music and the artists who have contributed to its form. Through extensive listening, students will explore a variety of rock styles from 1950s through the present; 3 hours of lecture per week. (General Education: AH)

Nursing (NUR)

NUR 0111 Principles & Practices of Nursing I Lab (4)

fall

This is the laboratory component of NUR 1111; 12 hours of clinical/laboratory per week, including math for meds. Corequisite: NUR 1111 [Course fee: \$110]

NUR 0121 Principles & Practices of Nursing II Lab (4)

winter

This is the laboratory component of NUR 1121; 12 hours of clinical/laboratory per week. Corequisite: NUR 1121

NUR 0131 Principles & Practices of Nursing III Lab (4)

spring 2

This is the laboratory component of NUR 1131; 18 hours of clinical/laboratory per week for the spring term. Corequisite: NUR 1131 [Course fee: \$70]

NUR 1010 Pharmacology for Nursing (3)

winter

This course acquaints the student with classifications of drugs according to body systems and the use of these drugs for the purpose of restoring or maintaining health. Orem's Self-care Theory is integrated into practical application vis-a-vis a client's pharmacological needs. The course begins with basic terminology and progresses to the process of medication administration. The student studies standards and legislation as they relate to drugs. The role of the nurse, the nursing process, nutrition, and principles of ethics as they relate to pharmacology are included in the curriculum. A basic study of pharmacokinetics helps the student to understand how drugs are absorbed, transported, metabolized, and excreted. A review of pharmacotherapeutics helps the student to realize how drugs are utilized by the human body and how the client's age and unique characteristics affect this process; 3 hours of lecture per week. Prerequisite: BIO 2011, Corequisite: BIO 2012; NUR 0111, 1020, 1111

NUR 1020 The Nurse-Client Relationship (3)

fall

The content of this course is designed to assist the nursing student to cope with the human relations challenges encountered in his/her career. Discussions encourage the student to broaden views and develop an awareness of the uniqueness of man. The course implements the philosophy and objectives of the program by stressing the importance of Orem's Self-care Deficit Theory for the psyche as well as the body and presents basic principles, concepts, and information regarding communication, listening, and assertiveness. The student also learns the importance of confidentiality and ethical behavior as part of the interdisciplinary team.

Additional presentations include: the community; the family; cultural diversity; sexual harassment; death and dying; and the impaired professional; 3 hours of lecture per week. Prerequisite: Instructor permission

NUR 1111 Principles & Practices of Nursing I (5) fall

This course provides an opportunity for the student to acquire the selected knowledge and skills necessary to meet the basic self-care needs of the assigned client in both long term care and acute care settings. Course content emphasizes the role of the practical nurse in the recognition, description, and maintenance of health. Orem's Self-care Theory is integrated into practical application during lectures and in NUR 0111. Application of the nursing process in the care of clients with self-care deficits is the focus, with emphasis on data collection. Additional topics presented include: roles of various healthcare team members, concepts of effective communication, and effective maintenance of a safe and therapeutic environment. Initially, nursing arts laboratories are used for skill demonstration and practice with advancement toward clinical application; 5 hours of lecture per week. Corequisite: BIO 1030, 2011; NUR 0111, 1020 [Course fee: \$110]

NUR 1121 Principles & Practices of Nursing II (5) winter

This course offers the student an opportunity to reinforce and build upon previously learned information. The goal is to provide safe, competent, standard nursing interventions to clients experiencing recurring health-care problems in acute and long-term care settings. The student learns to care for groups of clients utilizing the nursing process to organize and implement nursing care. The student selects appropriate goals toward meeting the client's self-care needs. Observational experiences are provided in certain specialty areas. The student is expected to demonstrate increasing ability to perform standard nursing interventions in the clinical environment with decreasing need for supervision; 5 hours of lecture per week. Prerequisite: BIO 1030, 2011; NUR 0111, 1020, 1111, Corequisite: BIO 2012; NUR 1010; PSY 1050

NUR 1131 Principles & Practices of Nursing III (5) spring 2

This course explores integrative concepts in nursing and in the developing family. The student expands knowledge and increases skills necessary to meet the self-care deficits of individuals experiencing common healthcare problems with an emphasis on parent/child care and mental health. In addition to continuing to use the nursing classroom laboratory, the student also learns through selected clinical experiences in obstetric, pediatric, and medical-surgical settings. The student demonstrates skill in problem solving through the use of the nursing process with a focus on implementation and evaluation of nursing care; 7.5 hours of lecture per week for the spring term. Prerequisite: BIO 1030, 2012; NUR 0121, 1121; PSY 1050, Corequisite: NUR 0131 [Course fee: \$70]

NUR 2010 LPN to RN Transition/Trends in Nursing (2) fall

This course is designed to assist the student in recognizing both personal and professional challenges that arise in the process of transitioning from the role of the practical nurse to that of the registered nurse. Additionally, issues and trends important to contemporary nursing are evaluated and analyzed. Theories regarding the transition process, role development, and the process of change are applied to personal adaptation, professional issues, and role differentiation in terms of responsibilities and scope of practice for the LPN and ADN. Current issues are examined through assigned reading, written submissions, and lively discussions. The student will ultimately develop an individual philosophy of differentiated nursing practice; 2 hours of lecture per week. Corequisite: NUR 2030, 2040, or department permission

NUR 2011 Advanced Pharmacology (1) spring

This course assumes that students have retained knowledge gained in NUR 1010. It is a body-system-oriented approach to analyzing the use of particular medications for complex medical/surgical conditions in clients across the lifespan. The clinical component of this class is demonstrated in NUR 2140. The student will integrate and evaluate the effectiveness of each client outcome as it relates to his/her pharmacological needs; 1 hour of lecture per week. Prerequisite: BIO 2120; NUR 2030, 2040, Corequisite: NUR 2130, 2140, or department permission

NUR 2030 Principles & Practice of Nursing IV (3) fall

This course is divided into three content areas: health promotion and physical assessment (3 weeks); maternity nursing (6 weeks); and psychiatric nursing (6 weeks). The first part assumes prior knowledge of normal physiological and developmental parameters and focuses on assessing abnormal conditions and encouraging a maximum level of self-care by promoting healthy behaviors. Such topics as the importance of an accurate and complete health history including a psychosocial, cultural, and spiritual assessment and a health risk appraisal are covered. Laboratory and acute care clinical experiences are provided. The second part assumes previous learning of the normal and expected conditions relating to the maternity client. Assessment of, planning care for, implementing interventions for, and evaluation of the normal antepartal, intrapartal, and postpartal client at the level of the registered nurse are covered. The content builds on this and focuses on abnormal conditions and the expanded role of the registered nurse. Clinical experiences in inpatient and outpatient settings are provided. Students assist the maternity client and family to recognize their self-care needs. The third part offers the student an opportunity to gain the tools necessary to assess, plan, and evaluate interventions in the care of the client population dealing with mental health needs. Stu-

dents select appropriate roles to be assumed in assisting clients to meet their mental health self-care needs. The student is expected to perform therapeutically in the clinical setting; 3 hours of lecture per week. Prerequisite: PN License or coursework or department permission, Corequisite: NUR 2010, 2040 [Course fee: \$110]

NUR 2040 Principles & Practices of Nursing IV Laboratory (2) fall

This course is the laboratory component of NUR 2030; 6 hours of clinical/laboratory per week. Corequisite: NUR 2030 [Course fee: \$60]

NUR 2130 Principles & Practices of Nursing V (5) spring

This course offers students the opportunity to learn about clients across the lifespan experiencing complex acute medical surgical illnesses and chronic self-care deficits. Experiences are also provided in intensive care, the emergency room, and a home health agency. The student demonstrates skills in decision-making through the use of the nursing process with an emphasis on implementation and evaluation. The student also selects the appropriate roles to be assumed in meeting the client's self-care needs. The student is expected to perform therapeutically in the clinical area with a decreasing need for instructor supervision; 5 hours of lecture per week. Prerequisite: BIO 2120; NUR 2010, 2030, 2040, Corequisite: NUR 2140 [Course fee: \$330]

NUR 2140 Principles & Practices of Nursing V Laboratory (4) spring

This course is the laboratory component of NUR 2130; 12 hours of clinical/laboratory per week. Corequisite: NUR 2130 [Course fee: \$70]

NUR 3100 RN to BSN: Online Transition (1) fall

This is the first class in the progression of the BSN program and will include: Orientation to the baccalaureate degree nursing program, including program orientation; orientation to VSC library and student resources; discussion and use of effective on-line communication and netiquette; and development and presentation of baccalaureate-level presentations.

NUR 3110 Nursing Informatics (3) fall

Nursing Informatics helps the baccalaureate nursing student gain insight into ethics, safety, research, professional networking, telemedicine and the future of informatics in nursing. Nursing Informatics helps the baccalaureate nursing student to gain understanding of the ways in which information technology supports the acquisition of nursing knowledge with specific consideration given to the nursing role as a knowledge worker. The baccalaureate nursing student will appreciate the application of nursing informatics in achieving patient centered care.

NUR 3120 Palliative & End-of-Life Care (2) fall

Palliative & End-of-Life Care will provide students with knowledge surrounding pain control, symptom management of various organ systems, and therapeutic communication with patients and their families. This course will detail collaborations with ancillary teams and options for non-medical approaches to symptom management. Through a series of case studies and online discussions, students will have a chance to role-play encounters and detail interventions in complex cases using current evidence-based practices.

NUR 3140 Pathophysiology & Assessment (4) fall

This course provides refinement of associate-degree nurses' physical assessment skills focusing on the assessment differences needed to recognize abnormal findings across the life span, especially with at-risk populations. Communication, health histories, and psychosocial impacts will also be explored in the development of holistic health assessment skills. Additionally this course will focus on an introduction to the basic concepts of pathophysiology. Students examine the phenomena that produce alterations in human physiologic function and the resulting human responses.

NUR 3210 Healthcare Systems (3) spring

The baccalaureate nursing student will gain an understanding of the ways healthcare is delivered, with emphasis on cost, access, and outcomes. The student will explore the role of the nurse within the health-care delivery "system" and with respect to other members of the healthcare team. This course will assist the student in discovering the history of health-care delivery in America and will encourage the student to evaluate the efficacy of the US system. At the completion of this course the student will be able to articulate a vision of health-care delivery that examines the contributions of nursing professionals.

NUR 4011 Teaching/Learning in Healthcare for Allied Health (3) spring

Effective healthcare has a philosophical basis in and a long history of providing patients with necessary, accessible, and useful healthcare education. This course provides students with a basis for and ability to recognize the teaching/learning needs of their patients.

NUR 4012 Health Promotion Across the Lifespan (3) spring

This course will focus on the role of the nurse in promoting health and reducing risk behaviors of individuals

and families across the lifespan. Examples of nutrition, physical activity and stress management will be examined with an emphasis on the impact of genetics, values, lifestyle, environmental and cultural influences. Collaboration with other healthcare providers, integration of practice and policy while developing interventions, and client teaching as essential functions of the nurse are emphasized.

NUR 4110 Research & Evidence-Based Practice (4)

fall

Nursing is both an art and a science, delivered using evidence-based nursing practices. This course provides the students an opportunity to review, critique, and assess nursing research to enhance the practice of evidence-based patient care to become knowledgeable nursing research consumers to enhance the nurse practice.

NUR 4120 Guided Research (1)

fall

NUR 4130 Nursing Leadership & Management (6)

fall

This course prepares the students to assume their nursing leadership and management roles with a focus on their interactions with the health-care team members in future work settings. It familiarizes the students with management theories, organizational behavior theories and leadership styles that are relevant to the practice of nursing management. It explores the elements of the management process as well as change-management strategies and their applications. Coursework enhances students' leadership skills in maintaining best practices and standards of care. Nursing units in hospitals are the framework used for the application of the theories and knowledge base included in this course; 3 credits theory, 3 credits preceptorship.

NUR 4210 Global Health & Population-Based Healthcare (3)

spring

There is a great need for nurses who understand global connectedness and the causes and consequences of the distribution of health, illness, injury, and disease. The health of the world's inhabitants has been impacted by pandemics, environmentally caused disease, terrorism, and disasters, and nurses are being called upon to care for and improve the lives of affected individuals. This course presents an overview of global health from the viewpoint of nursing. The emphasis of the course will be underdeveloped countries and topics will include: measures of the disease burden, ethics and human rights, environmental health and safety, disparities in the health of women and children, communicable diseases, nutritional challenges, intercultural communication, health and literacy of the marginalized adult, and cultural competency skills.

NUR 4410 Community Health (6)

spring

This course explores the role of the nurse generalist in the community setting, focusing on the prevention of disease and the promotion of health in population aggregates. Additionally, this course examines community theory, change theory, epidemiology, and health-care resources which support disease prevention and health promotion. These healthcare resources will provide a basis for public-health nursing and the ability to apply this knowledge base to care for, promote, maintain and restore the health of communities. Emphasis will be placed on effective community health practice through assessment, program planning and nursing care for individuals, families, and vulnerable populations. The changing needs of an increasingly culturally diverse population within the social context of community systems are also examined along with the environmental, economic, political, and legal constraints to the health of community systems. Course content integrates concepts from nursing and the public health sciences. Students will conduct an in-depth community assessment employing basic epidemiological principles and data collection strategies. Students will utilize the nursing process while engaging in health promotion and maintenance strategies in a variety of community-health settings and in assessing and planning interventions for high-risk populations. Students will implement a community-change project based on their assessment of their community utilizing change theory; 4 credits theory, 2 credits preceptorship.

Philosophy (PHI)

PHI 1010 Introduction to Philosophy (3)

as required

In examining the history of philosophy from Socrates to Sartre, students look at the diverse perspectives, methods, and conclusions of significant philosophers, both classical and contemporary, concerning selected topics in metaphysics, epistemology, ethics, political philosophy, and aesthetics. Class discussion of reading is directed toward an increased understanding of significant contemporary problems in light of the relevant philosophical issues; 3 hours of lecture per week. (General Education: AH)

PHI 1030 Introduction to Logic (3)

as required

This course encompasses the principles and conditions of correct reasoning, including the relationship between language and thought, deductive arguments, and the methods of inductive inference. Throughout the course, the student will be expected to apply these principles in analyzing arguments; 3 hours of lecture per week. (General Education: AH)

PHI 1040 Introduction to Ethics (3)

as required

This course introduces some of the major ethical theories about morally right action, the morally good person, and the just society. Such theories may include ethical absolutism, ethical relativism, ethical egoism,

utilitarianism, formalism, and rights theory. Topics may be drawn from contemporary moral issues, such as capital punishment, abortion, and euthanasia; 3 hours of lecture per week. (General Education: AH)

Physics (PHY)

PHY 1030 General Physics (4)

fall/spring

This one-semester, general physics course has the purpose of introducing the student to basic classical physics. Topics include Newtonian mechanics, elasticity, fluids, heat transfer, gas laws, some thermodynamics, and DC/AC circuits; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1210 or placement level 4 or equivalent

PHY 1041 Physics I (4)

fall/spring

The purpose of this course is to give the student in engineering technology a thorough study of the basic principles of physics. Topics covered in this course are systems of measurement; dynamics (including motion, acceleration, forces producing motion, work, energy, and power); momentum and the conservation laws; statics (including concurrent and non-concurrent forces); and fluids (including properties of gases, fluid pressure, density, buoyancy, and hydraulics). Previous successful completion of a course in physics is highly desirable; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1100 for PPT students, Corequisite: MAT 1311 for non-PPT students

PHY 1042 Physics II (4)

fall/spring

The purpose of this course is to give the student in engineering technology a thorough study of the basic principles of physics. Topics covered in this course are systems of measurement; dynamics (including motion, acceleration, forces producing motion, work, energy, and power); momentum and the conservation laws; statics (including concurrent and non-concurrent forces); and fluids (including properties of gases, fluid pressure, density, buoyancy, and hydraulics). Previous successful completion of a course in physics is highly desirable; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1311; PHY 1041

PHY 2041 Fundamentals of Physics I with Calculus (4)

fall/spring

This course is an alternative for PHY 1041. It is intended to give the students in engineering technology who have demonstrated an above-average ability in verbal and mathematics skills a course with the application of calculus as its math component. Those skills are shown through science preparation, algebra, trigonometry, and basic physics. Topics covered in this course include system of measurement; dynamics (including motion, acceleration, forces producing motion, work, energy, and power); momentum and the conservation laws; statics (including concurrent and non-concurrent forces); fluids (including properties of gases, fluid pressure, density, buoyancy and hydraulics). Previous successful completion of a course in physics is highly desirable; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1312, Corequisite: MAT 1520

PHY 2042 Fundamentals of Physics with Calculus II (4)

fall/spring

This course is a continuation of PHY 2041 for electrical engineering technology, mechanical engineering, and computer engineering students. Emphasis is on understanding basic physical concepts in practical situations and in subsequent technical courses developed in the students major field of study. The fundamental structure of the course is designed to provide the student a firm foundation for the study of semi-conductor technology. Topics include thermodynamics; wave motion; electrical and magnetic fields; light; and solid state physics; 3 hours of lecture, 3 hours of laboratory per week. Corequisite: MAT 1520

PHY 3121 Introduction to Modern Physics (3)

spring

This calculus-based course continues the study of classical physics and introduces the student to topics in modern physics such as special relativity, atomic theory, solid state physics, nuclear physics, and some elementary particle theory; 3 hours of lecture per week. Prerequisite: MAT 1520; PHY 1042 or equivalent

Political Science (POS)

POS 1020 American Politics & Government (3)

as required

The course is a survey of the American political system with emphasis on the origins and function of the federal government and its branches and on the American political process. The nature, scope, and authority of state and local government are also covered; 3 hours of lecture per week. (General Education: SS)

POS 2110 State & Local Government (3)

as required

This course provides a study of the principles and problems of American government at the state and local level; 3 hours of lecture per week. (General Education: SS) Prerequisite: ENG 1061 or equivalent

Psychology (PSY)

PSY 1010 Introduction to Psychology (3)

fall/spring

This course is a study of the biological foundations and the basic psychological processes and concepts

involved in human behavior, as well as an examination of the problems involved in personality adjustment and interpersonal relations; 3 hours of lecture per week. (General Education: SS)

PSY 1050 Human Growth & Development (3)

winter

This course is designed to teach the developmental stages of humans from infancy through the aging process. Course content includes general and specific principles and concepts of growth and development, as well as physical, motor, cognitive, and psychosocial characteristics of the various developmental stages. The course implements the philosophy and objectives of the program by stressing the importance of the changes that occur at each stage of the life span. There is no specific clinical laboratory, but the student is expected to apply acquired principles and concepts in determining needs and implementing care of the client through all phases of the age continuum. The unique safety needs and healthcare maintenance needs of each developmental stage are emphasized; 3 hours of lecture per week. (General Education: SS)

PSY 2110 Educational Psychology (3)

summer

An examination of the principles and theories of learning as they apply to the developmental changes of the child. Special emphasis will be placed on how the child learns and ways of producing optimal conditions for childhood learning; 3 hours of lecture per week. (General Education: SS)

PSY 3070 Abnormal Psychology (3)

summer

This course focuses on the symptoms, causes, and treatment of a wide variety of psychological disorders, such as mood disorders, anxiety, schizophrenia, personality disorders, somatoform disorders, dissociative disorders, childhood disorders, eating disorders, sexual disorders, and organic brain syndromes. Historical views of understanding and treating abnormal behavior, and diagnostic methods used to classify disorders, are also explored. Prerequisite: PSY 1010

Respiratory Therapy (RSP)

RSP 1000 Respiratory Therapy Program Orientation (1)

fall

This course focuses on academic success strategies needed to succeed in the respiratory therapy program. The history of respiratory medicine and science will be presented and students will review the issues of quality in respiratory care including communication techniques and implications of ethical and legal issues; 1 hour of lecture per week.

RSP 1010 Foundations of Respiratory Care (3)

fall

Cardiopulmonary anatomy and physiology is introduced as the basis for understanding clinical applications of respiratory care, thus encouraging students to understand the rationale for making clinical decisions that involve patient assessment and therapeutic measures; 3 hours of lecture per week. Corequisite: RSP 1011

RSP 1011 Respiratory Care I (4)

fall

Students will review the issues of quality in respiratory care and be introduced to the concept of evidence-based medicine as it applies to the skills and techniques of managing and treating patients with respiratory needs. Students will be introduced to routine bedside care and patient safety, including the patient interview, measurement of vital signs, body mechanics, and infection control procedures. Students will learn and practice some of the assessment skills required to make an objective evaluation of the patient's condition or response to therapy. Students will begin to develop the competence required to deliver specific respiratory care therapeutics to patients; 3 hours of lecture, 2 hours of laboratory per week. Corequisite: RSP 1010 [Course fee: \$125]

RSP 1012 Respiratory Care II (4)

spring

In this course, students will learn the skills and techniques of managing and treating patients with respiratory needs. The clinical effects of various types of respiratory therapy and diagnostic techniques are explored. Oxygen therapy, aerosol therapy, and respiratory drugs are thoroughly discussed. Hyperinflation therapy, pulmonary hygiene and chest physical therapy, as well as techniques of airway management are included. In the laboratory, students will apply their classroom knowledge of the above subjects; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: BIO 2011; RSP 1000, 1011

RSP 1210 Respiratory Anatomy & Physiology (3)

spring

This course teaches the basic physiology of the pulmonary system. The physiological principles underlying various therapeutic, diagnostic, and monitoring procedures in respiratory care will be detailed. Students will interpret patient data, solve problems, and analyze patient cases using these physiological concepts; 3 hours of lecture per week. Prerequisite: BIO 2011; RSP 1011, Corequisite: RSP 1012, 1601

RSP 1601 Respiratory Clinical Field Experience (2)

spring

This is a field experience of one day per week that allows the student to become familiar with the hospital setting and perform basic respiratory therapy in non-critical areas of the hospital; 8 hours clinical per week; graded Pass/No Pass. Prerequisite: BIO 2011; RSP 1011, Corequisite: RSP 1012, 1210

RSP 2011 Cardiopulmonary Disease I (5)

fall

Analysis of respiratory disturbances requires an understanding of the etiology, pathophysiology, and clinical signs of the disease, thus leading to a plan for treatment. The study of cardiopulmonary disease will begin with a presentation of advanced clinical assessment techniques. Measures used to evaluate ventilation, hemodynamics, oxygen transport, and tissue oxygenation will be discussed in relation to respiratory assessment of the critically ill patient. Chest radiographs and electrocardiographs will be presented; 5 hours of lecture per week. Prerequisite: RSP 1012, 1210, 2801, Corequisite: RSP 2013, 2802

RSP 2012 Cardiopulmonary Disease II (5)

spring

This course is a continuation of RSP 2011 and presents additional diseases affecting the pulmonary system. For each disease, emphasis is placed on etiology, pathogenesis, pathology, pathophysiology, and clinical features. A case study approach is utilized to enhance the student's ability to exercise judgment in handling patient complaints; collecting and examining data; formulating treatment options; assessing patient responses to treatment; and modifying therapy; 5 hours of lecture per week. Prerequisite: BIO 2120; RSP 2011, 2013, 2602, Corequisite: RSP 2603, 2802

RSP 2013 Respiratory Care III (4)

fall

This course leads the student through an ordered approach to modern ventilator care. A systematic development of mechanical ventilation competencies is laid out concept upon concept. Noninvasive and invasive monitoring of the patient on mechanical ventilation is also presented. In the classroom, students will apply these concepts to patient care scenarios. In the laboratory, students will complete a series of mechanical ventilation and critical care monitoring competencies; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: RSP 1012, 1210, 2801, Corequisite: RSP 2011, 2602

RSP 2602 Respiratory Clinical Field Experience II (4)

fall

This is a field experience of two days per week that allows the student to work in clinical areas in which they have received instruction. Students will be directly and indirectly observed performing respiratory care in the critical care and non-critical care settings; 16 hours of clinical per week; graded Pass/No Pass. Prerequisite: RSP 2801, Corequisite: RSP 2011, 2013

RSP 2603 Respiratory Clinical Field Experience III (6)

spring

This course is designed to provide supervised clinical experience in the critical care and specialty service areas of the hospital and in the community. There is a strong emphasis on intensive care techniques and procedures. Instruction will take place in the adult, pediatric, and neonatal areas. Students will be introduced to infant and pediatric mechanical ventilation and home care. Students will continue to gain proficiency in adult care throughout the medical system; 24 hours of clinical per week; graded Pass/No Pass. Prerequisite: RSP 2011, 2013, 2602, Corequisite: RSP 2012, 2802

RSP 2801/2802 Respiratory Internship/Respiratory Internship Review (0/1)

summer/spring

The summer field experience is two days a week and allows students to practice in clinical areas in which they have received instruction. Students explore non-traditional roles for respiratory therapists, volunteer their time in a selected area of practice outside of the traditional hospital practice, and summarize their experiences in written and oral reports. Students create a case study presentation while applying evidence-based medicine guidelines; 16 clinical hours per week for thirteen weeks and 32 volunteer hours; graded Pass/No Pass. Prerequisite: Department permission/RSP 2801 [Course fee: \$250]

Sustainable Design (SDT)

SDT 3121 Sustainable Design & Technology Studio I (3)

fall

Through short team projects, all Sustainable Design and Technology students will begin to solve interdisciplinary problems in sustainable design, applying basic concepts learned in the Sustainable survey courses and the technical courses in each discipline. Students will work in interdisciplinary teams on projects that focus on each discipline. Student teams will participate in a stepped process involving problem evaluation, design alternatives, calculations, graphic representation, and presentation to the class and a professional panel. The course introduces students to the design of low-energy systems in small buildings and provides tools for analysis in the schematic phase; 6 hours of studio per week. Prerequisite: SDT 3010 [Course fee: \$25]

SDT 4112 Green Sites Technical Survey (3)

fall

This course introduces students to issues related to environmentally responsible site design. Students will gain a broad view of issues related to sustainable site development including environmental resource identification, site permitting, civil design parameters, utilities, ecological landscape design, and agricultural potential. Use of natural features and best practices will be highlighted, utilizing GIS and real-world scenarios; 2 hours of lecture, 2 hours of studio per week.

Social Science (SSC)

SSC 2010 Science, Technology, & Society (3)

as required

This course explores the ways that science and technology are related to the broader social context of human civilization. Case studies illustrate the social and environmental impacts of science and technology, as well as the ways that social structures influence the development of science and technology. Guest lecturers discuss the responsibility of the individual technician. Students give oral presentations and engage in class debates; 3 hours of lecture per week. (General Education: SS) Prerequisite: ENG 1061 or equivalent

SSC 2030 Energy Systems & Sustainability (3)

fall

This course studies the historical, societal, economic, and technological factors that drive the development of a sustainable energy infrastructure; 3 hours of lecture per week. (General Education: SS) Prerequisite: ENG 1060

SSC 2120 Gothic Themes & Social Issues in Film (3)

as required

Since the creation of the earliest copyrighted motion picture in January of 1894, filmmakers have knowingly or unknowingly chronicled the fears, anxieties, and cultural changes inherent within American culture. No film genre has captured or reflected these cultural changes as aptly or as in-depth as American horror. History and film scholars alike both contend that these films are "one of the best measures of the American consciousness". This course chronologically examines the changes and shifts in American cultural attitudes and values and explores the fears that accompany them. It asks students to reflect on how these attitudes, values, and fears are reflected in pertinent films of each decade and to what extent these films also validate and cause further shifts within American culture; 3 hours of lecture per week. (General Education: SS) Prerequisite: ENG 1061 or equivalent

SSC 2130 Labor Studies (3)

as required

This course explores labor unions; work and technology; and their impacts on American history; 3 hours of lecture per week. (General Education: SS) Prerequisite: ENG 1061 or equivalent

SSC 2710 Social & Economic Class & Educational Experience (3)

fall

In this course, students will develop an understanding of the dynamics of economic class differences, particularly generational poverty, and the influence of economic class in work and school environments. Students will explore the history of Lyndon Johnson's "War on Poverty" and the TRiO programs developed by the federal government to alleviate the challenges of economically disadvantaged students attempting to obtain a higher education. Students will relate these theoretical and historical perspectives to their own educational experiences as students and as peer tutors. Finally, each student will have the opportunity to practice the skills needed to effectively communicate and work with people from a wide variety of socioeconomic backgrounds as is necessary in today's workforce. This class is appropriate for all majors; 2 hours of lecture, 1 hour supervision meeting per week. Prerequisite: 24 completed credits; GPA greater than 2.5 in previous semester; instructor permission

SSC 2720 The Social Ecology of Food (3)

fall

This course examines social, cultural, political, economic, environmental, and ethical issues related agriculture and food production, distribution, and consumption, and invites students to consider more mindful approaches to food in their own lives; 3 hours of lecture per week. Corequisite: ENG 1061 or equivalent

SSC 3010 Community Service: Local & Global (3)

as required

This course explores the concepts of community, service, and honor through rigorous study of current cultural events and trends; literature (political, religious, and aesthetic); and each student's own ethics and values. The course begins with an overview of historical definitions of service in our country and in other cultures so that students are better able to understand their opinions and actions within a historical and global context. Most importantly, a major segment of this course involves direct service, providing students with ongoing hands-on experience for reflection and analysis along with their reading, writing, research, and classroom discussion; 3 hours of lecture per week. (General Education: SS) Prerequisite: ENG 1061 or equivalent; junior standing or instructor permission

SSC 3045 News & Newspapers (3)

as required

This course explores the nature of news: what is news, who controls news, how news is presented, and the many ways that news and newspapers affect our daily lives. Emphasis is placed on how news can contribute to being an informed citizen as well as how news can be manipulated to influence public opinion and policy. The course is offered online. (General Education: SS) Prerequisite: ENG 1061 or equivalent, junior standing, or instructor permission

SSC 3120 Gothic Themes & Social Issues in Film (3)

as required

Since the creation of the earliest copyrighted motion picture in January of 1894, filmmakers have knowingly or unknowingly chronicled the fears, anxieties, and cultural changes inherent in American culture. No film

genre has captured or reflected these cultural changes as aptly or in-depth as the American horror film. History and film scholars alike both contend that they are "one of the best measures of the American consciousness." This course chronologically examines the changes and shifts in American cultural attitudes and values and explores the fears that accompany them. It asks students to reflect on how these attitudes, values, and fears are reflected in pertinent films of each decade and to what extent these films also validate and cause further cultural shifts within American culture. The course is offered online and is writing-intensive. (General Education: SS) Prerequisite: ENG 1061 or equivalent, junior standing, or instructor permission

Veterinary (VET)

VET 1020 Animal Anatomy & Physiology (4)

spring

Covered in this course are the anatomy and physiology of organs and organ systems in animals. There is emphasis on basic physiology common to domestic animals; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: BIO 2320 [Course fee: \$20]

VET 1030 Animal Care & Restraint (3)

fall

This course teaches the principles of animal management which are fundamental to animal health. The student is introduced to the basics of animal behavior; handling; and restraint; feeding; housing; and disease prevention. Laboratories stress hands-on experience with the handling, restraint, physical exam, and administration of medications to common domestic species and to laboratory animals. Proficiency in performance of laboratory tasks is evaluated; 2 hours of lecture, 3 hours of laboratory per week.

VET 1040 Animal Diseases (4)

spring

Bacterial, viral, fungal, and parasitic diseases are discussed with a review of disease prevention practices. Laboratories concentrate on diagnostic techniques including microbiology; fungal cultures and evaluations; parasitological specimen collection and processing; necropsy procedures; specimen handling; and shipping specimens to other laboratories; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: BIO 2320; VET 1030

VET 1051 Animal Care I (1)

fall

This course is designed to give students hands-on experience in the daily care and maintenance of farm, laboratory, and pet animals. Students are assigned times to care for the colony dogs, cats, laboratory animals, birds, sheep, horses, and dairy animals under supervision. This course is repeatable for credit; selected hours throughout the term; graded Pass/No Pass.

VET 1052 Animal Care II (1)

spring

This course is designed to give students hands-on experience in the daily care and maintenance of farm, laboratory, and pet animals. Students are assigned times to care for the colony dogs, cats, laboratory animals, birds, sheep, horses, and dairy animals under supervision. This course is repeatable for credit; scheduled hours throughout the term; graded Pass/No Pass. Prerequisite: VET 1051 or instructor permission

VET 1060 Laboratory Techniques (4)

spring

Students learn to perform venipunctures, complete blood counts, urinalyses, serum chemistries, and supplemental hematologic evaluations on all species studied in VET 1030. Proficiency in performing tasks in the laboratories is emphasized; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: BIO 2320; VET 1030

VET 2011 Veterinary Clinical Techniques I (4)

fall

Students learn the stages of anesthesia and how to induce and monitor anesthesia under the direct supervision of a veterinarian. Surgical nursing skills associated with aseptic technique and proper protocols in the surgery suite are covered. Pre- and post-op monitoring, record keeping, and client education skills are practiced. Students perform blood work, urinalysis, and fecal examination on animals that are scheduled to be anesthetized as medically indicated. Some preparatory work and patient monitoring is required outside of scheduled lab time; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: VET 1020, 1030, 1040, 1060, 2801

VET 2012 Veterinary Clinical Techniques II (3)

spring

This course provides instruction in radiography of both large and small animals. The laboratories review anesthesia while the students learn to position animals for radiographs and develop, handle, and store the films. Ancillary techniques such as dentistry procedures are also covered. Students perform blood work, urinalysis, and fecal examination on animals that are scheduled to be anesthetized as medically indicated and perform post-anesthesia monitoring. Some preparatory work and patient monitoring is required outside of scheduled lab time; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: VET 2011, 2050, 2070

VET 2030 Animal Nutrition (2)

fall

This course familiarizes the student with various nutrients and their metabolism. Diet formulation for com-

mon domestic and laboratory animals is covered, including species variation in nutritional requirements. The use of prescription diets for small animals is discussed. Practical information regarding client education for feeding both large and small animals is presented. Nutritional-related diseases are also discussed; 2 hours of lecture per week. Prerequisite: BIO 2320; VET 1020

VET 2040 Reproduction & Genetics (3)**spring**

This course provides instruction in genetics and comparative reproductive physiology of domesticated animals. Reproductive management is covered, including heat detection; determination of pregnancy; management of pregnant animals and parturition; and reproductive failure. Students gain information on how to assist veterinarians with reproductive and obstetrical procedures; 3 hours of lecture per week. Prerequisite: BIO 2320; VET 1020, 2070

VET 2050 Applied Laboratory Methods (4)**fall**

Students learn medical nursing skills including bandaging, responding to medical emergencies, performing CPR, handling trauma cases, preparing animals for certain diagnostic procedures, obtaining an EKG, completing blood transfusions, and offering fluid therapy. Cytological specimens are collected and evaluated; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: VET 1020, 1040, 1060

VET 2060 Veterinary Office Procedures (3)**spring**

Students review material on professionalism and interactions with clients that they have been introduced to in other courses. This course then provides additional information on interpersonal communication, professional correspondence, legal issues regarding medical records, organizing an office, financial record keeping, and OSHA compliance. Practical information on evaluating a potential job position and getting and keeping a job is presented; 3 hours of lecture per week. Prerequisite: Sophomore standing in VET program or instructor permission

VET 2070 Pharmacology & Toxicology (3)**fall**

Calculation of drug doses, dispensing, and administration of medications are reviewed. The metabolism of commonly-used veterinary medications and their beneficial and potential harmful effects on the body are covered. Students become familiar with common poisonous substances and plants and gain information on assisting the veterinarian in treating toxicity cases; 3 hours of lecture per week. Prerequisite: VET 1020, 1040, 1060

VET 2080 Animal Behavior (2)**spring**

This course is designed to give veterinary technology students grounding in the natural behaviors of the common domestic species. Included are the neural, genetic, and endocrine bases for these behaviors. In addition, many aspects of clinical behavioral medicine also are covered. Included are patient history-taking; reviews of common behavioral problems of dogs and cats; patient evaluation; behavior modification; and drug therapy; 2 hours of lecture per week. Prerequisite: Sophomore standing in VET program or instructor permission

VET 2090 Veterinary Technician National Exam Seminar (1)**spring**

This course is a comprehensive review of the core curriculum material presented in the first three semesters of the veterinary technician program. The purpose is to prepare students for standardized professional examinations, such as the Veterinary Technician National Exam (VTNE); 2 hour of seminar each week; graded Pass/No Pass. Prerequisite: VET 2011, 2030, 2050, 2070

VET 2720 Veterinary Supervisor (1)**fall/spring**

This supervisory course is required for all veterinary technology students. This course is repeatable for credit; graded Pass/No Pass. Prerequisite: Sophomore standing; two semesters of VET 1051

VET 2801/2802 Summer Externship/Externship Review (0/1)**summer/fall**

Students are enrolled in the externship after successful completion of the first-year core curriculum. The externship consists of a summer practicum of a minimum of 300 hours. Students may attend one or more sites in order to gain the appropriate experiences. Successful completion of the externship is required for graduation. After successful completion of the summer externship, students are enrolled in the externship review seminar in the subsequent and fall term. The review is a letter-graded one credit course. Prerequisite: Sophomore standing/VET 2801 [Course fee: \$250]

Independent Study/Special Topics (XXX)**XXX X710 Special Topics****as required**

These courses are for one-time or special offerings that do not have an approved course number. They may be in any subject area and the credits may vary. The special topics course requirements and evaluation criteria are developed by the instructor, subject to department approval. Details of specific course content are available from the department chair for the subject offered.

XXX X910 Independent Study

as required

Independent Study is designed to provide a student with the opportunity to work individually with a faculty member in a subject area or on an individual research project that is normally not available in the student's regular coursework. Independent study is initiated by the student discussing the proposed project with the instructor with whom the student wishes to work. An Independent Study Contract form must be filled out and can be obtained from the Registrar. The form requires signatures from the student, department chair/director, and the Academic Dean.

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AAS, Vermont Technical College

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Rick Brown

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Assistant Director of Facilities
AE, Vermont Technical College
BS, Castleton State College

Bonnie Chamberlin

Manager of Apprenticeship Programs, CEWD
BA, MA, Vermont College of Norwich University

Jean-Marie Clark

Associate Dean, Williston Campus
BA, Rivier College
MSA, St. Michael's College

Carrie Clement

Communications Coordinator
AAS, Vermont Technical College

William Coberly

LAN/System Administrator
BS, Weber State University

Teja Cooper

Project Manager, CEWD
BS, Trinity College

Alexander Costa

Coordinator of Student Activities
BA, Westfield State University

Susan Currier

Librarian
BA, Trinity College
MEd, Keene State College

Charles Dana

Field Foreman, Farm

Erica Dana

Academic Office Coordinator

Zina Dana

Landscape/Horticulture Technician
AAS, Vermont Technical College

Rosemary W. Distel

Associate Academic Dean
AAS, Vermont Technical College
BS, University of Vermont
MAEd, Castleton State College

Eileen Donovan

Controller
BS, University of Vermont

Skye Erskine

Academic Support Counselor
BA, Keene State College
MA, Johnson State College
MA, St. Michael's College

Paul Evans

Senior Desktop Support Technician
AE, Vermont Technical College

Nick Farrington

Grounds Supervisor

Geoffrey Finkels

Laboratory Technician, Civil Engineering
AAS, Eastern Maine Technical College

Brenda Flint

Staff Accountant II
AAS, Vermont Technical College
BA, Johnson State College

Emile Fredette

Director of Public Safety

Susan A. Fredette

Assistant Director of Admissions
AAS, Vermont Technical College

Robert B. Fredricksen

Assistant Chief Technology Officer
AE, Vermont Technical College

Jennifer Gile

Assistant Director of Admissions
BS, Vermont Technical College

Michelle Girouard

Project Manager, CEWD
AS, BS, Vermont Technical College

Denise Giroux

DHY Clinical Administrator, Williston Campus
BS, University of Vermont

Robin Goodall

Learning Specialist
BS, University of Vermont
MA, Castleton State College

Michelle Graham

Executive Assistant to the President
AAS, Vermont Technical College

Ellen B. Grimes, RDH

Director of Dental Hygiene
BS, University of Bridgeport
MA, Montclair State University
MPA, EdD, University of Vermont

Nancy Guild

Assistant to the Dean of Student Affairs

Angela Hildenbrand

Coordinator of Student Accounts
AAS, Vermont Technical College

Ben Hulbert

Admissions Counselor
BA, Montana State University

Polly Hunt

Staff Accountant

William Ix

Senior Desktop Support Technician

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Stable Manager

Caitlin Janus

Assistant Stable Manager

Jane Kearns

Director, Hartness Library

BA, University of Western Ontario
MLS, Rutgers University

Dan Koloski

Director of Biodigester Operations

Sarah Levin

Registrar

AA, Adirondack Community College
BS, SUNY Oswego
MEd, Springfield College

Hilary Linehan

*SHAPE Facility Manager
Coordinator of Intramurals*
BS, Marquette University

Judy Luce

Associate Director of Financial Aid

Cory Lussier

*Assistant Director of Admissions/Campus Visit
& Outreach Coordinator*
BS, University of Vermont

Theodore R. Manazir

Director of Facilities
BS, University of Vermont

Cynthia Martindill, RN, CNE

Associate Dean of Nursing
BSN, Case Western Reserve University
EdD, CAGS, Plymouth State University
MEd, University of Houston
MSN, Houston Baptist University

Jessica Mascola

Human Resources Specialist
BS, Castleton State College

Catherine McCullough

Director of Financial Aid
AS, Champlain College
BA, Johnson State College

Shawn McElwain

*Assistant Director of Admissions/
Transfer Coordinator*
BA, BS, MS, SUNY Plattsburgh

Tracy McGuinness

Director of Clinical Education
BSRT, Saint Mary of the Plains College

Sharon McMahon, CVT

Laboratory Technician, Veterinary Technology

Stephanie Nault

Herd Manager, Farm
AAS, BS, Vermont Technical College

Jennifer Norton-Magnan

Director of Athletics
BS, Johnson State College

Dianne Percy

Education Training Specialist
BS, University of Vermont
MEd, University of Vermont

Sue Polen

Director of Academic Support Services
BS, SUNY Cortland
MEd, Norwich University

Kelly Rue Riso

Director of Payroll & Employee Services
AS, Lasell College
BS, University of Phoenix

Robert Royce

Laboratory Technician, Electrical Engineering
AAS, Vermont Technical College

Linda Runnion

Assistant to the Academic Dean
BA, Willamette University
CT, Woodbury College

Shelly Russ

Assistant Registrar

Linda Segovia

Math & Science Skills Specialist
BA, Florida Atlantic University

April Shaws

Librarian II
BA, College of St. Rose
MLIS, University of South Carolina

Robert Sivret, RN

Health Services Coordinator
BSN, University of Vermont

Anne Smeglin

Nursing Site Director, Bennington
BSN, Mt. St. Mary College
MSN, Sage Graduate School

Douglas Smith

Aviation Program Director
BS, Purdue University
MS, University of Wisconsin

Roberta (Byrd) Staples

*Custodial Supervisor
Conference Set-up Coordinator*

Michelle Stearns, RN

Nursing Site Director, Williston
MSN, Norwich University

Jamie Stone

Accounts Payable Supervisor
AS, Community College of Vermont

Mary Jeanne Taylor

Conference, Events, & Camp Coordinator
BA, Dickinson College

Faye Tolar

Director of Respiratory Therapy
BA, Indiana University
MEd, Trinity College
RSP Specialty, Northwestern Medical School

Jessica Van Deren

Director of Admissions
BA, Trinity College of Vermont
MS, Duquesne University

Seth Warren

Coordinator of Student Activities
Residence Hall Director
BA, Plymouth State University

Molly Willard

Project Manager: Agricultural Training, CEWD
BS, University of Vermont
MEd, Johnson State College

Carrie Wright

Project Manager, CEWD
AAS, BS, Vermont Technical College

Michael Wright

Laboratory Technician, Mechanical Engineering
AAS, Vermont Technical College

Emeritus Faculty

Byron H. Angell

Professor of Mathematics, Emeritus
BA, University of Vermont
MAT, Norwich University

Calvin Blessing, DVM

Professor of Agriculture, Emeritus
BS, Lafayette College
DVM, Cornell University

Paul Calter

Professor of Mathematics, Emeritus
BS, Cooper Union School of Engineering
MS, Columbia University

Ned E. Herrin, Jr., PE (deceased)

Professor of Civil & Environmental Engineering Technology, Emeritus
BSCE, University of New Hampshire
MSCE, Purdue University

Alan W. Ricketts (posthumous)

Professor of Electrical & Computer Engineering Technology, Emeritus
BS, MS, EE, Mass Institute of Technology

Kenneth J. Vandermark

Professor of Electrical & Computer Engineering Technology, Emeritus
BS, Clarkson College of Technology
MS, Rensselaer Polytechnic Institute

Harold G. Wirtz, PE

Professor of Civil & Environmental Engineering Technology, Emeritus
BSCE, University of Iowa
MS, University of Wisconsin

W. Robert Wonkka

Professor of Mathematics, Emeritus
AB, Wesleyan University
MEd, Harvard University

Full-time Faculty

Sheila C. Bannister (2007)

Associate Professor: Dental Hygiene
BS, Northeastern University
MEd, Johnson State College

Sherry Barnard, RN (2013)

Associate Professor: Nursing
BSN, Sacred Heart University
MSN, Walden University

Stephen P. Belitsos (2000)

Professor & Chair: Diesel
BS, University of Massachusetts, Amherst

Sarah Billings-Berg, RN (2009)

Assistant Professor: Nursing
BS, MSN, Norwich University

Tina M. Blust, RN (2006)

Associate Professor: Nursing
AS, Saddleback Community College
BS, Southern Vermont College
MSN, University of Phoenix

Carl Brandon (1977)

Professor: Science
BS, Michigan State University
MS, PhD, University of Massachusetts

Nancy P. Budd, RN (2000)

Professor: Nursing
AAS, SUNY, Fulton Montgomery Com Col
BSN, MA, Norwich University
MSN, Medical University of the Americas

Peter C. Chapin (1986)

Professor: Computer & Information Systems
BSEE, Western New England College
MSEE, University of Illinois
PhD, University of Vermont

Jeremy Cornwall (2013)

Assistant Professor: Mechanical
BS, MS, University of California: Davis

J. Mark Corrao (1976)

Professor: Electrical & Computer
BSEE, University of Maine
MSEE, Purdue University

Tracie Crawford, RN (2015)

Assistant Professor: Nursing
ADN, Vermont Tech
BSN, University of Vermont

Kimberly Crowe (2013)

Assistant Professor: Agriculture
BS, University of Illinois: Chicago
DVM, St. Matthews University

Craig A. Damon (2007)

Associate Professor:
Computer & Information Systems
BA, Bowdoin College
PhD, Carnegie Mellon University

Linda M. Davis (1989)

Professor: Mathematics
BS, SUNY Albany
MA, Norwich University

John W. Diebold, LS (2005)

*Associate Professor & Chair:
Civil & Environmental*
AE, Vermont Technical College
BS, Norwich University
MS, University of Vermont

Stephanie Dorosko (2012)

Assistant Professor: Science/Vet Technology
BA, Trinity College
DVM, PhD, Tufts University

Janet S. Dupont, RN (2000)

Associate Professor: Nursing
BS, Houghton College
BSN, University of Vermont
MEd, St. Michael's College
MSN, Loyola University
PhD, Capella University

Christopher R. Dutton, VMD (2005)*

*Director of the Institute for
Applied Agriculture & Food Systems,
Associate Professor: Agriculture*
BA, Middlebury College
VMD, University of Pennsylvania

Marlys E. Eddy (2007)

Associate Professor & Chair: Landscape
BA, MS, University of Vermont

Ralph M. Esposito (2002)

*Professor & Chair:
Electrical & Electromechanical*
BEE, Villanova University
ScM, PhD, Brown University

Mary E. Findley (2007)

Associate Professor: EHSS
BA, Southern Vermont College
MA, Norwich University

Matthew D. Gallagher (2003)*

Associate Professor & Co-Chair: Computer
BS, University of Vermont
PhD, Dartmouth College

Kathy M. Gray, RN (2009)

Assistant Professor: Nursing
BA, Hamling University
BSN, University of Minnesota

Jean F. Hakim (2009)

*Associate Professor & Chair:
Computer & Information Systems*
BS, Seton Hall University
MS, New Jersey Institute of Technology

Linda Havey (2015)

Assistant Professor: Nursing
ADN, Vermont Tech
BSN, Drexel University
MSN, Norwich University

Jeffrey Higgins (1987)

Professor: EHSS
BS, SUNY, Plattsburgh
MS, Iowa State University
EdD, University of Vermont

Mary K. Hill, RN (2010)

Assistant Professor: Nursing
BSN, MSN, South University

Leslie Hills, RDH (2004)

Associate Professor: Dental Hygiene
BS, MEd, University of Vermont

Roger L. Howes (1999)

Professor: Mechanical
BA, Dartmouth College

Gregory Hughes (1991)

Professor: Business, Ombudsperson
BS, Villanova University
MBA, University of Vermont
JD, Vermont Law School

David B. Jarmy (1979)

Professor: Electrical & Computer
BS, University of Wales, College of Swansea

Benjamin R. Johnson

Faculty Librarian
BLS, Boston University
MLS, University of Oklahoma

Ethan Johnson (2011)

Assistant Professor: Automotive
AS, Vermont Technical College

John N. Kidder, Jr. (2002)

Associate Professor: Mechanical
BA, Occidental College
MS, University of Vermont
PhD, University of Washington

John H. Knox (1972)

Professor & Chair: Mathematics
BS, Norwich University
MA, University of Vermont

Jason LaCroix (2004)

Associate Professor: Mathematics
BA, Western New England College
MS, University of Vermont

Sosten Lungu (2007)

Associate Professor: Agriculture
BS, University of Zambia
MS, PhD, Mississippi State University

Michael Marceau (2002)

Associate Professor: Electrical & Computer
BS, MS, University of Vermont

Tina K. Marshall, RDH (2004)

Associate Professor: Dental Hygiene
BS, MEd, University of Vermont

Louise B. Maynard, PE (1991)

Professor & Chair: Mechanical
BSME, Tulane University

Brad J. Miller, PE (1989)

Professor: Architectural & Building
BS, Kansas State University
MA, California State University
MA, Norwich University

Russell Mills (1981)

Professor: EHSS
BA, Wesleyan University
PhD, Indiana University

John Thomas Murphy, PE (2001)

Professor: Electrical & Computer
BS, Pennsylvania State University
MA, Vermont College of Norwich University

Andrew R. Myrick (2005)

Associate Professor: Construction
BS, MA, University of Vermont

Alexander Northern (2012)

Assistant Professor & Chair: Fire Science
BA, University of Connecticut
MPA, New York University
JD, Vermont Law School

John J. O'Donnell, Jr. (1984)*

Professor: Science
BS, University of New Hampshire
MS, Michigan State University

Mary L. O'Leary (2009)

Assistant Professor: Civil & Environmental
BA, SUNY, Buffalo
MS, Cornell University

Jeremy Ouellette (2013)

Assistant Professor:
Computer & Information Systems
BS, St. Lawrence University
PhD, Dartmouth College

Robert L. Palmer (2007)

Assistant Professor & Chair: Automotive
AS, Vermont Technical College

Jason Pelletier, RN (2014)

Assistant Professor: Nursing
ADN, Vermont Tech
BSN, University of Vermont
MSN, University of Phoenix

Amanda Perkins, RN (2013)

Assistant Professor: Nursing
AS, LPN, ADN, Vermont Technical College
BSN, MSN, Chamberlain College of Nursing

David F. Pollock (1989)

Professor: Science
BS, Bishop's University
PhD, McMaster University

Connie Powell (2014)

Assistant Professor: Nursing
AS, Illinois Central College
BSN, MSN, Franklin Pierce University

J. Chris Reilly, PE (2007)

Associate Professor & Chair: Architectural
BS, MS, University of Kentucky

Rachel E. Repstad (2005)

Associate Professor: Mathematics
BS, Johnson State College
MS, University of Vermont

Joan Richmond-Hall (2001)

Professor: Science
Program Director: Sustainable
AB, Smith College
PhD, Boston University

Meredith L. Roberts (2004)

Associate Professor: Nursing
BA, Salem College
BSN, George Mason University
MSN, University of Phoenix

Albert L. Robitaille, PE (1989)

Professor: Civil & Environmental
BS, Manhattan College
MS, Rutgers University

Allan S. Rodgers (2007)

Professor: Business
BA, MEd, University of Massachusetts
MBA, Boston University

Scott A. Sabol, PE (1999)

Professor: Architectural
BA, BE, Dartmouth College
MS, Pennsylvania State University

Michelle Sama (2012)

Assistant Professor: Science
BS, Marist College
PhD, University of Kentucky

Anna Seaver, RN (2015)

Assistant Professor: Nursing
BA, Mount Holyoke
BSN, UMass: Amherst
MSN, UMass: Boston

Amy W. Sharpe (1994)

Professor: Mathematics
BS, Clarkson College of Technology
MS, University of Vermont

Christopher J. Smith (2009)

Assistant Professor: EHSS
BA, Green Mountain College
MEA, Goddard College
MEd, Union Institute & University

Inge Smith-Luce (2012)

Assistant Professor: Nursing
ADN, Vermont Technical College
BA, University of Vermont
BSN, Chamberlain College of Nursing

Amy H. St. Denis, DVM (1991)

Professor & Chair: Veterinary Technology
AAS, Essex Agricultural & Technical Institute
BS, University of Massachusetts
DVM, Purdue University School of Veterinary Medicine

Andre J. St. Denis (1982)

Professor: Electrical & Computer
BA, SUNY, Plattsburg
MS, University of Illinois

Craig S. Stalnaker, RVT (1995)

Professor: Veterinary Technology
BS, MS, Texas A&M University

Carolyn V. Stannard-Carlo (1998)

Professor: Nursing
BS, SUNY, Plattsburgh
MS, SUNY, Institute of Technology at Utica/Rome

Elizabeth Steele, RN (2014)

Assistant Professor: Nursing
ADN, Vermont Tech
BSN, University of Vermont
MSN, Walden University

Jessica Stewart Riley (2010)

Assistant Professor & Program Director:
Equine Studies
AS, Vermont Technical College
BS, University of Vermont

Carroll A. Stokes (1998)

Assistant Professor & Chair: Science
BS, Johnson State College

Lori R. Stroutsos (2009)

Assistant Professor: Business
BS, Castleton State College
MFA, Vermont College of Norwich University

Lisa Sullivan, RN (2013)

Assistant Professor: Nursing
BS, University of Vermont
ADN, MSN, Excelsior College

Deborah L. Swartz, RN (1994)

Professor: Nursing
BSN, University of Vermont
MSN, University of Phoenix

Joyce W. Twing (1989)

Professor: Business
AAS, Berkshire Christian College
BS, Central Connecticut State College

Chengjun Wang (2012)

Assistant Professor:
Computer & Information Systems
BS, Shandong University
ME, Chinese Academy of Science
PhD, Auburn University

Joseph T. Witt, III (2006)

Associate Professor & Chair: Construction
AS, BS, Vermont Technical College
AS, University of Massachusetts

Eric Wolinsky (2009)

Assistant Professor: Construction
BA, Ohio State University
MEd, Vermont College

**Instructor is on sabbatical for all or part of the 2015-2016 academic year*

For a listing that includes part-time faculty, go to <http://www.vtc.edu/meet-vtc/directory>

Staff

Travis Allen

Mechanical Systems Technician
AAS, SUNY Cobleskill

Sarah A. Ballou

Admissions Specialist
AAS, Vermont Technical College

Ghislaine Baker

Financial Aid Specialist II
AB, Community College of Vermont

Cynthia Berry

Administrative Secretary, CEWD

John Brault

Security Officer II

Gordon D. Burch

Custodian/Housekeeper II

Beth Camp

Student Support Services Specialist

Michael Chase

Farm Technician

Elizabeth Clark

Financial Aid Specialist II
AAS, BS, Vermont Technical College

Thor E. Christensen

Public Safety Officer II

Gerri-Lyn Cohen

Nursing Program Staff Assistant
AAS, American Institute of Court Reporting
AAS, Phoenix College

Frederick Collins

Public Safety Officer II

Florence (Maria) Cornell

Mailroom Supervisor

Candy Daniels

Acquisitions Coordinator
BA, MEd, Castleton State College

Dominic Delia

Security Officer II
AS, Ashworth University

Patricia Gast

Records Specialist III
AS, Champlain College

Sefik Gosto

Public Safety Officer II
AS, Mostar Technical Center

Kim Hannon-Brobst

Remote Access Services Coordinator
BA, Marlboro College
MA, California Institute of Integral Studies

John Hernandez

Public Safety Officer

Brian Ingalls

Public Safety Officer

Jonathan Keith

Public Safety Officer II
Vermont State Police Academy

Violeta Kribstock

Custodian/Housekeeper II

Cecilia Legacy

Custodian/Housekeeper II

Leigh Lyon

Custodian/Housekeeper III

Pamela Mandell

Nursing Program Staff Assistant
BA, University of Iowa
MFA, Warren Wilson College

Marc McPhetres

Vehicle Mechanic

Russell Messier

Maintenance Technician

Bruce Mitchell

Public Safety Officer II

Corey Morrill

Custodian/Housekeeper II

David Race

Mechanical Systems Technician I

Gary Rogler

Public Safety Officer II

Rita Rotta

Custodian/Housekeeper II

Sandra Sargent

Nursing Program Staff Assistant

Troy Seckington

Public Safety Officer II

Katie Steward

Circulation Coordinator
BA, Sarah Lawrence College

Denise Taff

Nursing Program Staff Assistant

Julie Taylor

Technical Services Librarian

Donna Teasdale

Office Manager
BBA, Pace University

Karen Tetreault

Senior Staff Assistant

Marla Tillberg

Accounting Specialist II
BS, University of Vermont

Curt Ukasick

Senior Mechanical Systems Technician

Professional Tutors

Jason E. Blanchet

Barbara J. Cain

Charles E. Degenkolb

Catherine Farrick

Maxine E. Fidler

Kathleen M. Friedland

Sara L. Hand

Frances M. Koucky

James Lawrence

Cindy B. Lindemann

Samuel E. Liss

Tim Macke

Amy R. Rodjenski

Linda M. Segovia

David G. Tabor

Advisory Committees

Agribusiness Management Dairy Farm Management

Michael Audet
Ledge Haven Farm, Orwell, VT

Louise Calderwood
Sterling College, Craftsbury Common, VT

Ransom Conant
Riverview Farm, Richmond, VT

Brett Denny
VT Dairy Herd Improvement Association

Alison Hooper
Ayers Brook Goat Dairy, Randolph, VT

Sam Lincoln
Lincoln Farm, Randolph Center, VT

Keith Sprague
Sprague Ranch, Brookfield, VT

Architectural & Building Engineering Technology

David Anderson '96
Green Mountain Coffee Roasters, Waterbury, VT

David Burley
Department of State Buildings, Montpelier, VT

Michael Buscher
T. J. Boyle & Associates, Burlington, VT

Pete Gagnon '04
ENGVT, Richmond, VT

Peter Gibbs
Engineering Ventures, Inc., Burlington, VT

David Gover
PC Construction Co., Essex Junction, VT

Keith Robinson, AIA '86
Black River Design, Montpelier, VT

G. William Root, Jr., P.E.
GWR Engineering, P.C., Shelburne, VT

David Roy '87
Wiemann-Lamphere Architects, Colchester, VT

Susan Sytsma '80
Susan Sytsma Design, Randolph, VT

Automotive Technology

Rodney Brooks
Performance Unlimited, Woodstock, VT

Bob Cody, Jr.
Cody Chevrolet, Montpelier, VT

George Dykstra
VT Auto Dealers' Association, Montpelier, VT

Jason George
Snap-On Industries, Colchester, VT

Marilyn Miller
VT Auto Dealers' Association, Montpelier, VT

Casey Northrup
KC Performance, East Montpelier, VT

Baxter Weed
Cold Hollow Career Center, Enosburg Falls, VT

Adam Wiggett
Wiggett's Auto, Randolph Center, VT

Gerry Whitney
South Burlington Chrysler, South Burlington, VT

Business Technology & Management

Steve Beaulieu
Sentinel Funds, Inc., Montpelier, VT

Christine Gray
Hewlett-Packard Co., Brookfield, VT

Bruce MacDonald
Crystal Rock/VT Pure Springs, Burlington, VT

Bonnie Mallin
People's Bank, Burlington, VVT

Frank G. McDougall, Jr.
Dartmouth Hitchcock Medical Center, Lebanon, NH

Connie Peck
Blue Cross/Blue Shield of VT, Berlin, VT

David Sanguinetti
National Life of VT, Montpelier, VT

Civil & Environmental Engineering Technology

Paul Beyor '75
Agency of Transportation, Montpelier, VT

John D. Forcier, P.E.
Forcier Consulting Engineers, Colchester, VT

Dave Hoyne, P.E.
Agency of Transportation, Montpelier, VT

Patricia Kules, R.L.S.
Little River Survey Company, Stowe, VT

William Kules, P.E.
Little River Survey Company, Stowe, VT

Gary A. Santy, P.E. '78
Stantec Consulting, South Burlington, VT

John Stevens, P.E., Professor Emeritus
Norwich University, Northfield, VT

Rob Townsend, R.L.S., P.E.
American Consulting Engineers & Surveyors, Williamstown, VT

Mike Weigand, P.E.
Carrara & Sons, Middlebury, VT

Dave Whitney, P.E.
EcoSolutions, Burlington, VT

Computer Engineering Technology

Jeremy Audette
Red Hat, South Burlington, VT

Advisory Committees

Wolfgang Hokenmaier
Green Mountain Semiconductor, Essex Jct., VT

Doug Lewellen
Nania Memories, Williston, VT

Andrew O'Brian
Greensea Systems Inc., Richmond, VT

Cody Orr
State of VT, Montpelier, VT

Michael Premsegar
IBM (Global Foundries), Essex Jct., VT

Brendan Simpson
Alegra Microsystems, Manchester, NH

Jack Smith
IBM (Global Foundries), Essex Junction, VT

Computer & Information Systems

Cullen Barber
VT Systems, Essex Junction, VT

Carol Bloomhardt
General Dynamics, Burlington, VT

Erik Bokelberg
IBM Corporation, Essex Junction, VT

Brian Boyle
AllScripts, South Burlington, VT

Tyler Carr
Systems & Software, Colchester, VT

Tom Cook
IBM Corporation, Essex Junction, VT

Justin Cozzens
NextGate.com

Dan Davis
QPID Health

Hillary Halleck
Red River, Claremont, NH

Lou Krieg
Green Mountain Software, Colchester, VT

J. David Liliedahl
NTT Data, Inc., Montpelier, VT

Jeanne Trinko Mechler
IBM Corporation, Essex Junction, VT

Peter C. Nikolaidis
Paradigm Consulting Co., Bethel, VT

Reed Parker
People's United Bank, Burlington, VT

Construction Practice

Katie Bancroft '08
E.F. Wall & Associates, Inc., Barre, VT

David Bogue
Professional Construction, Colchester, VT

Robert Carrera, Jr.
Carrera Construction, Rutland, VT

John Connor
Connor Contracting, Inc., Berlin, VT

Chad Contaldi '97 & '99
Miller Construction, Inc., Windsor, VT

Marc Kerner
Infinite Construction, New York, NY

Jon Pizzagalli, PC
Burlington, VT

Joe Poston
Wright Construction Co., Inc., Mt. Holly, VT

Tim Regan
Whiting Turner Company, Towsen, MD

Eugene Reid
Canaan High School, Canaan, VT

Dan Stover
ABC NH/VT, Concord, NH

Richard Wobby
AGC VT, Montpelier, VT

Dental Hygiene

Sheila Bannister
Northfield, VT

Chelsea Brooks, SDH

Cassandra Coakley, DDS
Montpelier, VT

Becky Diedrich
Montpelier, VT

Jane Geider, RDH
Barre, VT

Ellen B. Grimes, RDH, MA, MPA, EdD
South Burlington, VT

Renay L. Ivens, DDS
Fairfax, VT

Amy Rodjenski, RDH
Williston, VT

Brad Turner, DDS
Burlington, VT

Diesel Power Technology

Roland Bellavance
Bellavance Trucking, Barre, VT

Ward Butler
Milton CAT, Inc., Richmond, VT

Tom Chase
Bellavance Trucking, Barre, VT

Randy Clark
Clark's Truck Center, Underhill, VT

Ed Cleary
J&B International Trucks, Colchester, VT

Tim Dussault
R.R. Charlebois Inc., Milton, VT

George Dykstra
VT Auto Dealers' Association, Montpelier, VT

Alex Gay
Program Graduate, Ashby, MA

Jason George
Snap-On Industries, Colchester, VT

Steve Root
J&B International Trucks, Colchester, VT

Mike Sheldon '79
Sheldon Trucks Inc., Williston, VT

Dick Smith
Milton Cat, Inc., Richmond, VT

Dave Stebbins
Green Mountain Kenworth, Shelburne, VT

Bobby Wood
Woods CRW Corp., Williston, VT

Electrical Engineering Technology

Ted Beach
Creare, Hanover, NH

Craig Bibeau
United Technology Corp., Vergennes, VT

Sam Colwell
LED Dynamics, Randolph, VT

Eddie Cyr
Federal Aviation Administration, S. Burlington, VT

Roger Dandurand
IBM Corporation, Essex Junction, VT

Bryan Deep
Federal Aviation Administration, S. Burlington, VT

Danielle Gleim
Hypertherm, Hanover, NH

Wolfgang Hokenmaier
Being Advanced Memory, Williston, VT

Orville Johnson
Federal Aviation Administration, S. Burlington, VT

Kelly Koloski
Creare, Hanover, NH

Doug Lewellen
Nanya Technology Corp., Burlington, VT

Fred Lichtenfels
Goodrich, Inc., Vergennes, VT

Ed McGann
VT Electric Power Co., Inc., Rutland, VT

Randy Mead
Control Technologies, South Burlington, VT

Don Pakbaz
IBM Corporation, Essex Junction, VT

Tate Picard
Hypertherm Inc., Hanover, NH

Bruce Pilvelait
Creare, Inc., Hanover, NH

Terrence Reynolds
Control Technologies, Inc., South Burlington, VT

Emeric Rochford
NRG Systems, Inc, Hinesburg, VT

Matt Stacy
SBE, Inc., Barre, VT

Dale Williams
NRG Systems, Inc., Hinesburg, VT

Electromechanical Engineering Technology

Ted Beach
Creare, Hanover, NH

John Butterfield, P.E.
Hallam Associates, South Burlington, VT

Sam Colwell
LED Dynamics, Randolph, VT

Roger Dandurand
IBM Corporation, Essex Junction, VT

Kelly Koloski
Creare, Hanover, NH

Doug Lewellen
Nanya Technology Corp., Burlington, VT

Medina Maric
Dynapower Co., LLC, South Burlington, VT

Randy Mead
Control Technologies, South Burlington, VT

Ward Nial
United Technology Corp., Vergennes, VT

Jeff Petter
Northern Power, Waitsfield, VT

Glenn Peura
United Technology Corp., Vergennes, VT

Bruce Pilvelait
Creare, Inc., Hanover, NH

Terrence Reynolds
Control Technologies, South Burlington, VT

Peter Rowan
Hazelett Strip-Casting Corp, Colchester, VT

Emeric Rochford
NRG Systems Inc., Hinesburg, VT

Matt Stacy
SBE, Inc., Barre, VT

Gene Steinfeld
Rhino Foods Inc., Burlington, VT

Scott Teuscher
Applied Research Associates, Inc., Randolph, VT

David Timian
Applied Research Associates, Inc., Randolph, VT

Dale Williams
NRG Systems, Inc., Hinesburg, VT

Equine Studies

Ann Williams Clafin
River Run Farm, Bradford, VT

Mary Jane Nau
Shelburne, VT

Terry Rose
Braintree, VT

Katherine Selby
The Equestry, New Haven, VT

Fire Science

Chief Ken Morton
Williston Fire Department, Williston, VT

Ben O'Brien
PFFV, S. Burlington, VT

Chief John Litevitch
VT Fire Academy, Pittsford, VT

Student/Alumnus

Landscape Design & Sustainable Horticulture

Andre Blais
Stowe, VT

Nate Carr
Church Hill Landscape, Charlotte, VT

Cal Felicetti
Chippers, Woodstock, VT

Sarah Holland
River's Bend Design, Moretown, VT

Rebecca Lindenmeyer
L.A.N.D. Group, Addison, VT

Joan Lynch
Inner Gardens, Middlebury, VT

Charlie Nardoizzi
Shelburne, VT

Dr. Leonard Pery
UVM Extension, Colchester, VT

Jack Rossi
Woodstock, VT

Mechanical Engineering Technology

John Currier
Dartmouth College, Hanover, NH

Charlie Dykes
Hazelett Strip Casting, Colchester, VT

Dana Howe '99
G. W. Plastics, Bethel, VT

Phillip Pouech
NRG Systems, Hinesburg, VT

Steve Quenneville
Applied Research Associates, Randolph, VT

Ryan Whitney
Elund Co., Burlington, VT

Nursing Programs

BSN

Susan Boyer, RN, MEd, FAHCEP
VT Nurses in Partnership, Windsor, VT

Lynn Dickinson
VSC Board of Trustee, St. Albans, VT

Pat Donehower, RN, MSN
VNA, Colchester, VT

Anna Gerac, RN, MSN
Randolph, VT

Pat Menchini, RN MSN
Randolph, VT

Suzanne Murdock, RN, MSN
UVM Medical Center, Burlington, VT

Donald Swartz, MD
UVM, Burlington, VT

Mary Val Palumbo, DNP, APRN, GNP-BC
UVM, Burlington, VT

Central Region

Mary Anne Douglas, RN,BS, CPHN
Berlin Health & Rehabilitation Center, Berlin, VT

Janice F. Hansen, MSN, MA, RN
Norwich University, Northfield, VT

Katrin Helgason, Scheduling Coordinator
VT Interactive Technologies, Randolph Center, VT

Walter Peterson, RN
Stowe, VT

Tara Starzec, RN
Woodridge Nursing Home, Barre, VT

Teresa Voci
Blue Cross & Blue Shield of VT, Montpelier, VT

Gail Washburn, RN
Central VT Medical Center, Barre, VT

Alison White, RN, MHA, NEA-BC
Gifford Medical Center, Randolph, VT

Nancy Zeno, RN
Central VT Medical Center, Barre, VT

Northeast Kingdom Region

Bruce Amsden, BS
VT Interactive Technologies, Newport, VT

Thomas Anderson,
Lyndon State College, Lyndonville, VT

Dr. Joseph Bertolino,
Lyndon State College, Lyndonville, VT

Celine Champine, RN
North Country Career Center, Newport, VT

Seleem Choudhury, MSN, MBA, RN, CEN
Northeast VT Regional Hospital, St. Johnsbury, VT

Shannon Devereux, MAE
VT Interactive Technologies, Springfield, VT

Jennifer Gundy
Community College of VT, Newport, VT

Justin Hare, RN
Genesis, Lebanon, NH

Debra P. Hastings, PhD, RN-BC, CNOR
Dartmouth-Hitchcock Medical Center, Lebanon, NH

Diana Lafountain, MSN, RN
The Pines, Lyndonville, VT

Krystina Laychak, MSN, RN
The Manor, Morrisville, VT

Jill Lord, MSN, RN,
Mt. Ascutney Hospital, Windsor, VT

Ellen Niles, RN
Maple Lane Nursing Home, Barton, VT

Laura Remick, MEd., CHES
Area Health Education Center, St. Johnsbury, VT

Patricia Russell, RN
Union House, Glover, VT

Wendy Windsor, MAPC
*Dartmouth-Hitchcock Medical Center
 Lebanon, NH*

Northwest Region

Jane Catton, RN, MSN
Northwestern Medical Center, St. Albans, VT

Susan Fortin, RN
Birchwood Terrace Healthcare, Burlington, VT

Darlene Murphy
Community College of VT, Winooski, VT

Ellen Read, RN
Franklin Cty Home Health Agency, St. Albans, VT

Michelle Parent
VT Interactive Technologies, Williston, VT

Janet McCarthy, BSN, MSA, RN
Franklin County Home Health, St. Albans, VT

Suzanne K. Murdock, RN, MSN
UVM Medical Center, Burlington, VT

Marilyn Savoy
Franklin Grand Isle Workforce, St. Albans, VT

Jane Suder, MSN, RN
Franklin County Rehab Center, St. Albans, VT

Douglas Sutton
UVM Medical Center, Burlington, VT

Southeast Region

Pam Bullock
Community College of VT, Brattleboro, VT

Rebecca Burns, RN
Pine Heights, Brattleboro, VT

Eileen Glover, MSN, RN-BC
Brattleboro Retreat, Brattleboro, VT

Laurie Madden, RN, BSN
*Cedarcrest Center for Children with Disabilities
 Keene, NH*

Kate O'Connor
Chamber of Commerce, Brattleboro, VT

Andrew Robinson
Brattleboro, VT

Wanda Scully, RN
Vernon Green Nursing Home, Vernon, VT

Mary Urquhart, RN
Brattleboro Memorial Hospital, Brattleboro, VT

Southwest Region

Billie Lynn Allard, RN, MS
Southern VT Healthcare, Bennington, VT

Megan Beattie-Cassan, RN '05
Northshire Medical Center, Manchester, VT

Gail Colgan, BSN, RN
*Bennington Health & Rehabilitation Center
 Bennington, VT*

Carol Conroy, MSN, RN, MBA, CN OR
Southwestern VT Medical Center, Bennington, VT

Pat Crossman, RN '06
VT Veterans' Home, Bennington, VT

Christina Cullinane, RN, BSN, CCRC
VT Veterans' Home, Bennington, VT

Peg Daly RN BS SD-CLTC
Southwestern VT Healthcare, Bennington, VT

Colleen Dewey, RN
VT Veterans' Home, Bennington, VT

Sandra J. Driscoll, MS, RN, GCNS-BC
Southwestern VT Medical Center, Bennington, VT

Millie Dunn, MS, RN
Manchester Home Health, Manchester, VT

Carol Hoard
Southwestern VT Medical Center, Bennington, VT

Jeannie Jenkins, MS
Community College of VT, Bennington, VT

Barbara Richardson, MS, RN-BC, CCRN
Southern VT Healthcare, Bennington, VT

Kathryn Slade, RN, BSN
*Southwest VT Career Development Center,
 Bennington, VT*

Drew Totten, RN, BSN, BS,
Southwestern VT Medical Center, Bennington, VT

Professional Pilot Technology

Greg Bean
Former Heritage VT Flight Academy

George Coy
Border Air, LTD, Swanton, VT

Captain Jennifer Davis
Cape Airlines

Advisory Committees

Ted Dudley
Delta Air Lines, Inc, Colchester, VT

Richard Ferno, '64
VTFlight Academy, Burlington, VT

Captain Steve Krieger
jetBlue Airways

Julian Kulski
Continental Airlines, Burlington, VT

Norris LaClair
Chief Pilot, Pizzagalli Aviation, Burlington, VT

Captain Larry Miller
jetBlue Airways

Jon Pizzagalli
Pizzagalli Construction, VT

Hobart Tomlinson
Heritage Aviation Safety Officer, Burlington, VT

Respiratory Therapy

Becky Bacon, RRT
*Champlain Valley Physicians Hospital,
Plattsburgh, NY*

Ryan Clouser, MD
Dept. of Medicine, UVM, Burlington, VT

Mary Dawson, RRT
UVM Medical Center, Burlington, VT

Elizabeth Denton, RRT
UVM Medical Center, Burlington, VT

Darick Duquette, AS, RRT
UVM Medical Center, Burlington, VT

Jason Fahey, RRT
North Country Medical Center, Newport, VT

Susan Fredette
VT Technical College, Randolph Center, VT

April Gagne, RRT
UVM Medical Center, Burlington, VT

Jennifer Gile
VT Technical College, Randolph Center, VT

Michelle Hickey, AS, RRT
Rutland Regional Medical Center, Rutland, VT

Brad Holcomb, BS, RRT
UVM Medical Center, Burlington, VT

Steven Hurd, AS, RRT
North Country Medical Center, Newport, VT

Veronika Jedlovsky, MD
North Country Medical Center, Newport, VT

Matt McNally, RRT
Dartmouth Hitchcock Medical Center, Lebanon, NH

Tracy McGuinness, BS, RRT
VT Technical College, Williston, VT

Betsy McLane
Burlington Technical Center, Burlington, VT

Philip Petty
VT Technical College, Randolph Center, VT

Rebecca Ryan
*American Lung Association, VT Chapter,
Williston, VT*

Faye Tolar, MEd, RRT
VT Technical College, Williston, VT

Renewable Energy

David Franks
Sunwood Systems, Waitsfield, VT

John Budreski
SunCommon, Waterbury, VT

Zac Kerin
ReKnew Energy, Royalton, VT

Veterinary Technology

Ruth Blauwielke, DVM, PhD
UVM, Burlington, VT

Nancy Clements
Berlin Veterinary Clinic, Montpelier, VT

Abbey Dattilio
Neurology Dept, UVM, Burlington, VT

Kristin M. Haas, DVM
Agency of Agriculture, Montpelier, VT

Karen Gabarino
Johnson, VT

Ted Johnson, DVM
VT-NH Veterinary Clinic, East Dummerston, VT

Betsey Kelley
Randolph, VT

Steven B. Metz, DVM
Shelburne Veterinary Hospital, Shelburne, VT

Thomas L. Munschauer, DVM
Middlebury Animal Hospital, Middlebury, VT

Martha Rose
Butler Company, Orford, NH

Kurt S. Schultz, DVM, MS, DACVS

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A

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