
Vermont Technical College

Catalog 2009-2010

Bachelor of Science

Architectural Engineering Technology
Business Technology and Management
Computer Engineering Technology
Computer Information Technology
Computer Software Engineering
Construction Management
Dental Hygiene
Diversified Agriculture
Electromechanical Engineering Technology
Equine Studies
Sustainable Design and Technology

Associate of Applied Science

Agribusiness Management Technology
Architectural and Building Engineering Technology
Automotive Technology
Business Technology and Management
Construction Management
Dairy Farm Management Technology
Diesel Power Technology
Fire Science
General Engineering Technology
Landscape Development and Ornamental Horticulture
Telecommunications Technology
Veterinary Technology

Associate of Science

Computer Information Technology
Computer Software Engineering
Dental Hygiene
Nursing
Respiratory Therapy

Associate of Engineering

Civil and Environmental Engineering Technology
Computer Engineering Technology
Electrical Engineering Technology
Mechanical Engineering Technology

Certificate

Practical Nursing

Foreword

This catalog has been prepared to give prospective students at Vermont Technical College a comprehensive preview of the college. For updates to this publication, please refer to the Vermont Tech website at **www.vtc.edu**.

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 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 web site, **www.vtc.edu**

Should you have questions not answered in this catalog, please write to:

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

or email admissions@vtc.edu

Office Hours: 8 a.m.-4:30 p.m., Monday-Friday, except holidays

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

Non-discrimination and 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 Michael Van Dyke, Dean of the College and Title IX coordinator at (802) 728-1213 or via mail at PO Box 500, Randolph Center, Vermont 05061.

ACADEMIC CALENDAR 2009-2010

2009 FALL TERM

Thursday	August 13	Williston campus student orientation 3 pm to 7 pm VAST orientation for students on the Williston campus 3 pm to 7 pm
Tuesday	August 18	New faculty orientation
Thursday	August 20	VAST orientation for students on the Randolph campus
Friday	August 21	New students arrive Practical Nursing orientation (PN), Randolph campus Residence halls open for new students at 10 am
Saturday	August 22	All faculty meeting 8:30 am New student orientation and first year student advising Advising day for all degree students
Sunday	August 23	Returning student orientation Registration day for non-degree students Residence halls open for returning students at 9 am
Monday	August 24	Classes begin for all students on all campuses
Friday	August 28	Last day to add course(s)
Monday	September 7	Labor Day – no classes
Saturday	October 3	Open House/Alumni Day
Friday	October 9	Mid-term warnings posted Deadline for “I” grades from spring or summer Vacation begins after last class for non-PN students
Monday	October 12	Residence hall open at 1 pm for PN students only Dining hall opens at 5 pm PN Columbus Day - no classes
Sunday	October 18	Residence halls open at 1 pm Dining hall opens for dinner at 5 pm
Monday	October 19	Classes resume for non-PN students Last day for PN program students to drop courses with a “W” grade
Monday	October 26	Student evaluations begin
Monday	November 2	Last day for non-PN students to drop courses with a “W”
Thursday	November 5	Pre-registration for winter and spring terms begin

Friday	November 20	Student evaluations end Thanksgiving recess begins for all students after last class Pre-registration for winter and spring ends
Sunday	November 29	Residence halls open at 1 pm Dining hall opens for dinner at 5 pm
Monday	November 30	Thanksgiving recess ends, classes resume
Friday	December 4	PN fall term ends
Monday	December 14	Last day of classes for term
Tuesday	December 15	Final exams and presentations week begins
Saturday	December 19	Final exams and presentations week ends Residential halls close at 5 pm
Tuesday	December 22	Academic planning

2010 WINTER TERM (Practical Nursing only)

Monday	December 7	PN classes begins
Friday	December 18	PN vacation break begins
Monday	January 4	PN classes resume
Friday	February 5	PN mid-term warnings posted Deadline for make-up of “I” grades from fall PN courses
Friday	February 12	Vacation begins after last class
Sunday	February 21	Residence halls open at 1 pm Dining hall opens for dinner at 5 pm
Monday	February 22	PN student evaluations begin Classes resume
Tuesday	February 23	Last day for PN students to drop courses with a “W” grade
Monday	March 1	Pre-registration for spring2 nursing term begins
Friday	March 12	PN student evaluation period ends Pre-registration for spring2 ends
Friday	March 26	Vacation begins after last class
Sunday	April 4	Residence halls open at 1 pm Dining hall opens for dinner at 5 pm

Monday	April 5	Classes resume
Friday	April 9	PN second term ends

2010 SPRING TERM

Sunday	January 10	Registration for non-degree students, new student orientation at 9 am Placement testing for new students Residence halls open Dining hall opens for lunch at 11 am
Monday	January 11	Classes begin Late student registration begins at 8 am
Friday	January 15	Last day to add course(s)
Friday	February 12	Vacation begins after last class
Sunday	February 21	Residence halls open at 1 pm Dining hall opens for dinner at 5 pm
Monday	February 22	Classes resume
Friday	March 5	Mid-term warnings posted Deadline for make-up of “I” grades from fall Graduation applications due for May commencement
Monday	March 15	Student evaluations begin
Monday	March 22	Last day to drop courses with a “W” grade
Tuesday	March 16	Pre-registration for summer and fall begins
Friday	March 26	Vacation begins after last class
Sunday	April 4	Residence halls open at 1 pm Dining hall opens for dinner at 5 pm
Monday	April 5	Classes resume
Friday	April 9	Student evaluations end Pre-registration for summer and fall ends
Thursday	April 15	Honors Convocation at 6 pm
Friday	April 30	Last day of classes
Monday	May 3	Final exams begin
Friday	May 7	Final exams end

		Dining hall closes after lunch Residential halls close at 5 pm
Saturday	May 8	Verification of degree candidates Commencement at 2 pm
Tuesday	May 18	VAST graduation
Wednesday	May 19	Academic planning

2010 SPRING2 (Practical Nursing only)

Monday	April 12	PN classes begin
Friday	April 16	Graduation applications due for June commencement
Friday	May 14	Deadline for "I" grades from winter term Midterm warnings posted
Monday	May 17	PN student evaluations begin
Monday	May 24	No classes: Memorial Day
Tuesday	May 25	Last day for PN program course drop with a "W" grade
Friday	June 4	PN student evaluations end
Thursday	June 17	PN term ends
Saturday	June 19	PN commencement at 11 am

2010 SUMMER TERM

Monday	May 17	First summer classes begin
Friday	June 25	Vacation begins after last class
Monday	July 5	Classes resume
Monday	July 12	Last Day to Drop with a "W" grade
Monday	July 19	Summer Bridge begins
Friday	August 13	Summer Bridge ends
Monday	August 16-20	Calculus review
Friday	August 20	Summer term ends

General Information

Vermont Technical College is a public, co-educational, two- and four-year technical college with a rural residential main campus located in Randolph Center, Vermont. There is also a commuter campus in Williston with limited residential housing and nine satellite nursing campuses located throughout the state. 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 associate's degrees with majors in applied technologies and related fields; to bachelor's degrees in Architectural Engineering, Business Technology & Management, Computer Engineering, Construction Management, Dental Hygiene, Diversified Agriculture, Electromechanical Engineering, Equine Studies, Information Technology, Sustainable Design & Technology, and Software Engineering; and to a certificate in Practical Nursing.

The college 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, health care, construction, and government.

A major advantage of the associate's degree is that it affords the choice of entering employment upon graduation or continuing toward a bachelor's degree. The majority of Vermont Tech graduates go directly to work. A significant number enter bachelor's degree programs after graduation.

Vermont Tech Mission Statement

Vermont Tech is a unique institution within the VSC system, offering associate's and baccalaureate degrees, a certificate program, and continuing education in career-oriented technologies such as agriculture, applied sciences, business, engineering, and health sciences.

Vermont Tech serves its students, the state of Vermont, and the region by providing high quality, accessible, post-secondary education through broad-based curricula that prepare graduates for the workplace, for continuing formal education, and for lifelong learning.

Vermont Tech undertakes its mission guided by institutional values and focused by institutional objectives.

Institutional Values

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

Vermont Tech is dedicated to its tradition of helping students reach their full potential by developing their academic and scholarly proficiencies; 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 seeking employment and further education
- 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 collaboratively
- 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.

Location

The Vermont Technical College main campus is located on 544 acres in the rural village of Randolph Center, near the geographical center of the State of Vermont. 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 satellite campus in Williston, Vermont. The Williston campus is accessible from exit 12 off Interstate 89.

Vermont Tech also operates eleven 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 Technical College 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 Technical College has Independent School Approval for grade 12 from the Vermont State Board of Education.

Vermont Technical College 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 Technical College is accredited by the New England Association of Schools and Colleges.

The following programs are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology: Architectural & Building Engineering Technology; Architectural Engineering Technology; Civil & Environmental Engineering Technology; Computer Engineering Technology; Electrical Engineering Technology; Electromechanical Engineering Technology; Mechanical Engineering Technology. The Technology Accreditation Commission of the Accreditation Board for Engineering Technology may be contacted at 111 Market Place, Suite 1050, Baltimore, Maryland 21202-4012, telephone (410) 347-7700.

The Dental Hygiene program is accredited by the Commission on Dental Accreditation, 211 East Chicago Ave., 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.

The Practical Nursing and Associate of Science in Nursing programs are approved by the Vermont State Board of Nursing and accredited by the National League for Nursing Accrediting Commission, Inc. (NLNAC), 3343 Peach Tree Road NE, Suite 500, Atlanta, GA 30326. The Vermont State Board of Nursing may be contacted at the Office of Professional Regulation, National Life Building, North FL2, Montpelier, VT 05620-3402.

The Respiratory Therapy program is accredited by the Commission on Accreditation of Allied Health Programs, 1361 Park Street, Clearwater, FL 33756, 727-210-2350, in collaboration with the Committee on Accreditation for Respiratory Care Programs, 1248 Harwood Rd., Bedford, Texas 76021-4244, 817-283-2835.

Vermont Academy of Science and 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.

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. VAST students are also expected to adhere to all policies and procedures outlined in the 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 fees, including room and board for students who choose to live on campus, are the responsibility of the student.

Campus Facilities

Main Campus

The main campus is located in Randolph Center and the school has a long history of education, both as a teacher training school and a post-secondary agricultural institution. Today, it is a rural, residential campus specializing in technology education.

With four residence halls, two dining facilities, academic buildings equipped with laboratories for numerous technical majors, and conference facilities, 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.

Other Campuses

Williston Campus

Located at Blair Park in Williston, 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 throughout northwestern Vermont.

The Williston campus is rapidly expanding with new electrical, physics, anatomy, biology, and chemistry labs and state-of-the-art CAD and computer labs. It currently houses all of the college's allied health programs including dental hygiene, nursing, and respiratory therapy. Also available are degree programs in electrical engineering, computer engineering, aeronautical engineering, and business management. The campus also maintains a Vermont Interactive Television studio and supports a wide array of degree and non-degree workforce-education programs for area businesses.

Putnam/Bennington Campus

The Putnam Memorial School of Practical Nursing was established in 1946 by the Board of Corporators of the Putnam Memorial Hospital. It was the eighth school of practical nursing in the country to be nationally accredited by the National Association for Practical Nurse Education and Service.

The school is on the grounds of the Southwestern Vermont Medical Center in downtown Bennington. All clinical facilities are within walking distance, and daycare is located in the school building.

Thompson/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 1998, the school relocated from a house on Harris Place to its new facilities in the Vermont Agriculture and Business Education center.

Admissions

The admission process includes a review of all transcripts, letters of recommendation, extra-curricular experiences, 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's policy of rolling admissions 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. Admission to certain programs is exceptionally competitive and decisions on applicants to these programs are not normally made until the entire applicant pool has been reviewed. Applications are reviewed beginning February 1 for Practical Nursing (PN) and Veterinary Technology applicants; beginning March 1 for Dental Hygiene applicants; February 15 for Respiratory Therapy; and March 15 for Associate Degree Nursing (ADN) applicants. Please call the Office of Admissions to confirm these deadlines.

Admission Deposit

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. After these dates, deposits will be accepted on a space-available basis. The deposit is credited toward the first semester's bill.

SAT/ACT Requirements

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 Applicants

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

- Completed application (available online at www.vtc.edu)
- \$37 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 equivalence exam (G.E.D.)
- SAT I or ACT results

Transfer Applicants

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

- Completed application (available online at www.vtc.edu)
- \$37 application fee (payable to Vermont Technical College)
- Official high school transcript or official scores from a high school equivalency exam (G.E.D.)
- Official transcript(s) from all colleges previously attended, whether seeking transfer credit or not
- Official transcript(s) from any other Vermont State College attended prior to the 2002 summer term
- SAT I or ACT results, if available

VAST Applicants

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

- Complete Application (available online at www.vtc.edu)
- \$37 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 on official letterhead: one from a teacher and one from a guidance counselor or principal
- Personal interview
- Vermont Tech placement test results
- An essay about why you are applying to VAST. Discuss:
 - 1) How do you think attending the Academy will help you reach your goals?
 - 2) What can you contribute to the Vermont Tech community?
 - 3) Describe a significant event in your life and how it has affected you.

Nursing, Allied Health, Respiratory Therapy, and Dental Hygiene Applicants

If you are applying to one of the Allied Health programs, please submit:

- Completed application, including location to which you seek admission; indicate any alternate locations you would consider attending.
- \$37 application fee (payable to Vermont Technical College)
- Official high school transcript or official scores from a high school equivalency exam (G.E.D.)
- Official transcript(s) from all colleges previously attended, whether seeking transfer credit or not
- SAT I or ACT results, if available
- 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
 - Potential to competently and compassionately deliver health care to patients across the lifespan

Letters from family members cannot be accepted

- Vermont Tech placement test scores
- All Practical Nursing, Nursing, Dental Hygiene, and Respiratory students are required to pass a background check prior to June 1
- *(Nursing Only)* Prior to start of classes, provide proof of current Health Provider CPR certification
- *(Nursing Only)* If returning to complete a Practical Nursing program after a year, 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 he or she will not be readmitted to the program. Students who have been out of the program for more than a year must repeat all nursing clinical courses in the program.

Additional Requirements for Associate's Degree in Nursing

- A copy of your current LPN license (without any sanctions/restrictions)
- If a graduate of a non-college PN program or a graduate of a Vermont LPN program prior to 1997, you must show completion of college-level equivalency for: Anatomy & Physiology (8 credits); Nutrition (3 credits); and Concepts of Human Growth & Development (3 credits)
- 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 3.2 or higher. If a LPN graduate, you must have a GPA of 3.0 in your LPN coursework. BIO 2120, ENG 1061, MATH 1040, PSY 1010 and an approved Arts/Humanities elective may be taken after LPN graduation to improve your GPA to a 3.0 level
- If you are in the LPN program, you must submit two signed recommendations on letterhead that address your:
 - 1) Clinical competence
 - 2) Work ethic
 - 3) Potential transition to a RN role, particularly with respect to leadership, management, and accountability
 - 4) Interpersonal skills

Current PN students must have submitted a Summary of Clinical Performance document. This document must be completed by each clinical faculty member.

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

Three-Year Options

Vermont Tech has developed three-year options (3YOs) in selected associate's degree programs for applicants who need to complete math, science, or English prerequisites. The 3YO allows students to become competent and proficient in these important areas while easing the academic load during the first few semesters. Students enjoy full freshman status in their chosen majors from the first day of classes and experience the curriculum in the same sequence as their peers.

A student may choose the 3YO upon applying or the college may place students in a three-year curriculum based on the Vermont Tech placement test results.

If a prospective student lacks any of the requirements for admission to a qualifying associate's degree program, he or she should consider the 3YO.

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, and/or trying out a college course in a non-threatening venue.

Currently, the VSC receives support from GEAR-UP and the State of Vermont's Next Generation Initiative to sponsor dual enrollment programs around the state. Each Vermont high school student is allowed two vouchers to pay for college level courses. The voucher covers the entire tuition, making the college course tuition free. Students may use their vouchers at any participating college.

More information about the VSC Dual Enrollment program and free tuition for Vermont high school students is available at www.vsc.edu and a list of participating Vermont Regional Technical Centers is available at www.fastforward.vsc.edu

International Students

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

- Completed application (available online at www.vtc.edu)
- \$37 application fee (payable to Vermont Technical College)
- Official secondary school transcript. The transcript must arrive directly from the school on official letterhead in a sealed envelope. We also request that it be translated into English
- Official college/university transcript (if applicable) with course by course evaluation by Education Consultants and Evaluators International (www.eceinternational.com), World Education Services (www.wes.org), or equivalent international transcript evaluator
- Official Testing of English as a Foreign Language (TOEFL) scores (if English is a second language). The minimum score required on the TOEFL test is 500 for the paper test and 173 for the computer based test
- Official financial statement indicating your ability to pay one full year of tuition, room, and board. Proof must be provided on official blank letterhead and is needed before an I-20 can be issued

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 \$500 deposit before issuing your I-20. The \$500 will be credited to the fall semester bill

English for Speakers of Other Languages (ESOL)

According to language acquisition experts, non-native speakers of English need 5–7 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-1041. The ESOL student must achieve at least a “B” and demonstrate improved skills in two post-course placement tests in order to advance into ENG-1042.
- ESOL students who place in higher level English courses will benefit from structured time at the Writing and Communication Centers. 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 place into ENG-1061 or its equivalent may require extra terms to complete their degree program.
- Students at all sites have access to ESOL support.

Vermont Tech Program	Degree	Prerequisites
Agribusiness Management Technology	AAS	algebra I; algebra II recommended (chemistry preferred)
Architectural & Building Engineering Technology	AAS	algebra I; algebra II; geometry; lab physics or lab chemistry (physics preferred)
Architectural Engineering Technology	BS	same as above, or completion of Vermont Tech's AAS program in Architectural/Building or Civil/Environmental Engineering Technology (or equivalent)
Automotive Technology	AAS	algebra I; geometry; algebra II recommended; lab physics or lab chemistry recommended
Business Technology & Management	AAS	algebra I; algebra II recommended
Business Technology & Management	BS	same as above or a two-year degree in applied science or engineering; computer skills including proficiency in keyboarding, word processing, and spreadsheets
Civil & Environmental Engineering	AE	algebra I; algebra II; geometry; lab physics or lab chemistry
Computer Engineering Technology	AE	algebra I; algebra II; geometry; lab physics or lab chemistry (physics preferred)
Computer Engineering Technology	BS	completion of Vermont Tech's AE in Computer Engineering Technology or equivalent
Construction Management	AAS	algebra I; geometry; algebra II recommended; lab physics or lab chemistry recommended
Construction Management	BS	associate's degree in architecture, civil engineering, or construction
Dairy Farm Management Technology	AAS	algebra I; algebra II recommended; two years of science (chemistry preferred)
Dental Hygiene	AS	algebra I; algebra II; geometry; lab biology; lab chemistry; two letters of recommendation; freshman level English placement; criminal background check
Dental Hygiene	BS	same as above or an AS in Dental Hygiene; departmental recommendation
Diesel Power Technology	AAS	algebra I; geometry; algebra II recommended; lab physics or lab chemistry recommended.
Diversified Agriculture	BS	algebra I; algebra II recommended; two years of science (chemistry preferred)
Electrical Engineering Technology	AE	algebra I; algebra II; geometry; lab physics or lab chemistry (physics preferred)

Program Admission Requirements

Vermont Tech Program	Degree	Prerequisites
Electromechanical Engineering	BS	same as above or completion of Vermont Tech's AE program in Electrical Engineering Technology or Mechanical Engineering Technology (or equivalent)
Equine Studies	BS	algebra I; algebra II recommended; biology; lab chemistry
Fire Science	AAS	algebra I; geometry; algebra II recommended; lab physics or lab chemistry recommended.
General Engineering	AAS	algebra I; algebra II; geometry; lab physics or lab chemistry (physics preferred).
Computer Information Technology	AS	algebra I; algebra II; geometry; lab physics or lab chemistry
Computer Information Technology	BS	same as above or completion of Vermont Tech's AS in Information Technology or equivalent
Landscape Development & Ornamental Horticulture	AAS	algebra I, algebra II recommended: two years of science (lab course preferred)
Mechanical Engineering Technology	AE	algebra I; algebra II; geometry; lab physics or lab chemistry (physics preferred)
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 and 40 for algebra; freshman level English placement; 2 letters of recommendation; Summary of Clinical Performance documents; high school level lab chemistry or college level microbiology; criminal background check
Practical Nursing**	C	strongly recommend minimum of high school level chemistry, biology, and algebra I (within last 10 years); minimum Accuplacer scores of 70 for arithmetic and 40 for algebra; freshman level English placement; 2 letters of recommendation; criminal background check
Respiratory Therapy	AS	minimum of high school level chemistry, biology, and algebra I (within last 10 years); minimum Accuplacer scores of 70 for arithmetic and 40 for algebra; freshman level English placement; 2 letters of recommendation; criminal background check
Computer Software Engineering	AS	algebra I; algebra II; geometry; lab physics or lab chemistry
Computer Software Engineering	BS	same as above or completion of Vermont Tech's AS in Software Engineering or equivalent

Vermont Tech Program	Degree	Prerequisites
Sustainable Design and Technology	BS	acceptance or a degree in architecture; civil engineering, electrical, or mechanical engineering; landscape/horticulture; or dairy farm management; department recommendation
Telecommunications Technology*	AAS	algebra I; algebra II; geometry; lab physics or lab chemistry
Veterinary Technology**	AAS	algebra I; algebra II recommended; biology; lab chemistry
AAS: Associate of Applied Science	AE: Associate of Engineering	
AS: Associate of Science	BS: Bachelor of Science	
C: Certificate Program		

* *Industry-sponsored program offered at the facilities of sponsoring organizations; contact the Technology Extension Division with questions*

** *Apply early; admission competitive*

Placement Testing

Students who are provisionally accepted are required to take placement tests in writing and mathematics. The test is scheduled during the spring and summer. Test results are used to ensure that students are placed in the correct courses at registration.

Students who have completed bachelor's degrees in the United States or have met the English and mathematics program requirements may be exempted.

If a student's skills are below minimum levels, he or she 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 by contacting the Office of the Academic Dean. Students with disabilities should contact a Learning Skills Specialist to discuss possible test accommodations.

Students who place into a three-year mathematics or English sequence may still be accepted into programs that do not offer the three-year option. These students may require an additional year to complete their associate's degree requirements.

Acceptance guidelines for nursing and respiratory therapy include placement into freshman level English and minimum Accuplacer scores of at least 70 and at least 40 on algebra. Testing may be waived if an applicant has previous assessment testing from another VSC or if the applicant has approved transfer credit in math and English.

Student Registration Schedules/Class Listings

Vermont Tech courses are available online at <http://blackboard.vsc.edu>. Click on the *VSC Courses/Catalog* tab at the top of the page.

Students who have a username and password may view schedules, grades, and limited demographic data. New students who do not have a username and password may view course offerings for the upcoming semester using the *Search for Sections* tab without logging in.

All of the Vermont Tech terms start with the letter "T". For example, *T08FA* translates to the Fall 2008 term at Vermont Tech.

First-year students will be registered by staff and faculty after they have reviewed placement testing results, prior credit information is received, and the tuition deposit is paid. Registration for continuing students is completed in the prior term.

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 course work 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 may register for classes through the registrar's office.

Non-degree students are not eligible for federal financial aid.

Related Academic Information

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.

There is a \$25 fee for evaluation of transcripts outside of the VSC. This evaluation is normally completed after the student's acceptance of the offer of admission and the fee is billed to the student's account. Early transcript evaluation can be made for applicants who pay the evaluation fee in advance.

Generally, credit for applicable college courses taken may be granted for those courses completed with a grade of "C-" or better; however, the transferred grades will not be computed into a student's Vermont Tech GPA.

Courses taken at an accredited institution on a pass-fail basis may be transferred. However, 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 of 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 selected, 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 will be returned to the registrar's office 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

- No more than 50% of the total technical course credits in an academic program may be obtained by advanced standing

Summer Programs

Vermont Tech offers a number of summer courses which usually include physics, calculus, technical communication, microbiology, English for speakers of other languages, and computer programming. There is also an intensive, four-week summer bridge program. This is a preparatory program in math, physics, computers, and English.

Academic Affairs

Orientation

Prior to the start of the fall and spring terms, the college will send accepted applicants detailed instructions on orientation and class registration. 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 them 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 their advisor, they should contact the registrar.

Attendance Requirements

Students are expected to meet the attendance requirements set by each instructor for each class in which they are enrolled. Failure to meet attendance requirements may result in removal from the class roster without punitive grades through the 60% point of the course. After the 60% point, students may be dismissed from the course with a failing grade.

In cases of excessive and willful absences and upon the recommendation of the instructor and the department chairperson, students may be dismissed from the college.

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.

Grading System

Grade	Quality Points
A+	4.0
A	4.0
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 Failure	0.0
P Pass.....	0.0
NP..... No Pass.....	0.0
I Incomplete.....	0.0
AU Audit.....	0.0
W Withdrawn.....	0.0
CR Credit (challenge, AP, waiver, etc.).....	0.0
TR Transfer Credit Received	0.0

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

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 courses taken count as GPA credits only in the term taken. They are not calculated in the cumulative GPA.

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 registrar's office. 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 three weeks following the end of a term. Transcripts will not be sent for a student who has not satisfied financial obligations with the College.

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 GPAs and class rank. If a grade other than an earned grade (“W”, “NG”) 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.

The English, mathematics, electrical, and physics departments all have courses that have been created for students pursuing the three-year options in various majors. These are “stretched” versions of courses in the two-year programs. If a student who has taken a course designed for the three-year option repeats the equivalent course(s) in the two-year format, or vice-versa, the more recent grades and credit will be substituted in computing the 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. During the second week, degree students may drop with the advisor’s 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:

- 1) during the normal add/drop period will be dropped from the roster and will receive no grade.
- 2) after the normal add/drop period and until the 60% point of a course will receive a grade of “W”.

- 3) after the 60% point or who fail 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 registrar's office 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 registrar's office or off-campus site office
- complete an exit interview with the Financial Aid office

Leave of Absence

To take a leave of absence once the term has started, a student must request the leave in writing through the registrar's office 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 course work, private study, or on-the-job experiences equivalent to a Vermont Tech course may receive credit by examination. Approval by the department chairperson is required.

Documentation must be submitted to the department chairperson at least three weeks prior to the planned date of testing. After review and acceptance by the chairperson, 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 course work must comply with all of the above criteria and must document new course work, 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. There are two sets of class levels used at Vermont Tech, one for Three-Year Option students and a second for all others. Non-degree students have no class standing.

3YO Programs

1st year
2nd year
3rd year

Earned Credits

0-25.99
26-50.99
Above 50.99

Level

3FR
3SO
SO

All Other Programs

1st year
2nd year

Earned Credits

0-29.99
30-59.99

Level

FR
SO

3rd year	60-89.99	JR
4th year	Above 89.99	SR

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 or greater may be approved for a load of up to 24 credits in a term.

Students with a cumulative GPA from 2.00 to 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 2.0 or better (1.75 for students with less than 30 GPA 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 rather is used to identify students who may need additional services or help.

Academic Dismissal

Degree students will be academically dismissed for a minimum of one term for:

- 1) Receiving a term or cumulative GPA below .70
- 2) Not achieving good standing while on probation (i.e., on probation for more than one semester)
- 3) Withdrawing from Vermont Tech while on probation

Students may also be dismissed at any time when the department chair and/or Academic Dean determine(s) that continued enrollment is not appropriate, e.g., violation of cheating or plagiarism policy.

Student 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 and must enroll in and pass the Effective Learning course.

Appeal of Academic Dismissal

A student who believes that he or she has significant mitigating circumstances shall submit a letter to:

Academic Appeals Committee (AAC)
c/o Vermont Technical College
PO Box 500
Randolph Center, VT 05061.

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 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 readmission through the admissions office after they have met the conditions set for them at the time of dismissal. Readmission requires the approval of the Dean of the College.

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 Vermont Tech admissions office and inform them of their intention to return to Vermont Tech. Admissions will advise the student whether they need to complete a new application or whether they can preregister for the upcoming semester with the registrar. This determination is based on length of absence, program requirements, and other academic considerations.

Returning after Dismissal

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

- 1) Students have met the requirements placed upon them at the time of dismissal
- 2) Students notify admissions in writing (by October 15 for spring or by March 15th for fall) of their intent to return to Vermont Tech
- 3) Students are approved for re-admission by the Office of Admissions

Upon receiving notification from 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 admissions outlining course work and/or suggested course work prior to re-admission. Admissions will forward returning student information to the registrar, student housing, and financial aid.

- Returning students desiring financial aid will have to appeal to the Office of Financial Aid to have their aid reinstated
- Returning students must complete a housing contract to live on campus
- Returning students will be on probation and receive increased supervision and academic support for a minimum of one semester

Changing Programs

If a student wishes to change programs, he or she must petition through the registrar's office and be approved by the appropriate department chairperson.

Dual or Multiple Majors

If a student wishes to receive credit for a second degree or major, he or she must petition through the registrar's office. If approved, the student must successfully complete at least 15 credit hours for an associate degree or 30 credit hours for a bachelor's degree of course work beyond the first major for each successive major. This course work will include all courses required in the successive major(s) that are not required in the first.

Regular course schedules are optimized for students with one program and major taking a full course load. Because of this, dual majors typically require a minimum of an extra year at Vermont Tech.

All students with multiple majors will be awarded one degree with the additional majors annotated on his or her diploma.

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 Dean of Academic Affairs.

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

Graduation Requirements

- 1) Have a 2.00 cumulative GPA
- 2) Complete 30 of the last 39 credits at Vermont Tech
- 3) Complete at least 50% of the coursework at Vermont Tech or 15 credits minimum for programs of less than two years
- 4) Satisfy all financial obligations to Vermont Tech
- 5) Apply for graduation

The department chairperson 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.

- 1) Students who successfully complete all graduation requirements and are recommended by their departments will graduate and receive a diploma.
- 2) Students who have completed all but a few of the graduation requirements, have applied to walk or graduate on their application, and have the recommendation of their department and the college faculty 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 college faculty approval and the next commencement.

Term Honors

At the end of each term, degree students who have attained the following term GPA 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 academic honors:

3.5 Deans' List 4.0 President's List

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 four national honor societies:

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:

- 3.5 cumulative GPA with no incomplete grades
- Sophomore status
- Must be working toward an associate 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:

- Cumulative GPA of 3.5 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 3.3 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.

Alpha Chi is an academic honor society that recognizes and promotes excellence in scholarship among college and university students of good character. Classified as a general honor society, meaning that it accepts members from all academic fields, Alpha Chi inducts no more than the top ten percent of junior, senior, and graduate students at member institutions.

Graduation Honors

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

- 1) Have 30 credits for an associate degree and 60 credits for a bachelor's degree completed within the VSC
- 2) Have achieved the following cumulative GPA for all coursework:

Cum Laude	3.5
Magna Cum Laude	3.7
Summa Cum Laude	3.9

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

- 1) Complete 50% of the degree requirements within the VSC system
- 2) Have achieved the following cumulative GPA for all coursework:

3.0	Honors
3.5	High Honors

Honesty and 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, and/or assignments.

Student Support Center

A number of services are provided by the staff at the Student Support Center to help students meet their academic, personal, and career goals.

These include academic counseling, study skill assistance, Learning Center services, services for students with disabilities, and the Student Support Services/TRIO Program. Students enrolled in programs at sites other than Randolph Center or Williston should contact their site coordinator to arrange for tutoring, career information, placement, counseling, and disabilities services.

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 personal, academic, and career counseling; assistance in transferring to bachelor's degree programs; improving study skills; developing reading and writing skills; individual tutoring; workshops; peer advising; support groups; cultural events; and field trips.

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 individual help with writing and study skills.

Referrals for individual tutoring with professionals in specific courses are also available.

Support and Counseling

The Student Support Center focuses on wellness for emotional and mental health. The center offers workshops, mentoring, and support groups on stress, adjusting to college, academic success, 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 should contact the Dean of the College, who will assist them in locating appropriate community treatment resources.

Services for Students with Disabilities

Prior to enrollment, students with any type of disability are encouraged to identify their disability to the Learning Skills Specialist to arrange necessary accommodations. Incoming Vermont Tech students with pre-existing mental illness should consider contacting the Learning Skills Specialist to discuss potential residential or academic accommodations.

Interviews and phone calls to address particular concerns are welcome at any time during the admissions process and while attending Vermont Tech. All information regarding a disability is kept in strict confidence and is never entered on a student's academic record.

Available services include: academic counseling; student support group; classroom accommodations; and assistance in obtaining auxiliary aids.

Career/Transfer Center

The Career/Transfer Center provides assistance with career and college transfer decision-making and job placement; occupational information; college information; and individual assistance and workshops on writing resumes, job hunting strategies, and job interviews.

Vermont Tech maintains close ties to industries through field trips, an annual career fair, mentoring, and guest speakers, so spring is a busy recruiting season on campus.

The Learning Center

The Learning Center provides a wide range of academic services, including tutoring, test review sessions, supplemental instruction, and study groups.

Tutoring, offered on a drop-in, on-call, and scheduled basis, is especially popular. Many students use the Learning Center when they need to ask quick questions in physics, review for a calculus final, enhance their understanding of DC circuits, or brush up on rusty computer skills, study with classmates, or work in a quiet place.

Writing and Communication Center (WCC)

The WCCs offer one-on-one tutoring for any Vermont Tech student who wants to strengthen reading, writing, oral presentation, or study skills. The WCCs also provide access to a variety of assistive technology software programs and hardware designed to help students with scanning, editing, or dictating documents; having documents read aloud by the computer for editing or test-taking; and developing or organizing information. In addition, the ESOL computer programs are housed in the WCCs, providing opportunities for students to study and practice vocabulary, grammar, and pronunciation.

Public Notice Designating Directory Information

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 in the registrar's office prior to the start of the third full week of classes. Forms requesting the withholding of directory information are available in the registrar's office.

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 Right-to-Know

Students will receive graduation rate information during orientation. This information is available to prospective students upon request.

Student Records Review and Release

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 Student Handbook explains in detail the procedures to be used by the institution for compliance with the provisions of FERPA. 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 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 institution 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 course work 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.

Students enrolled in the LPN program are not eligible for the VSC enrollment consortium because of the divergent calendar of the LPN 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 2009-2010

Estimated Costs of Attendance

Students are responsible for familiarizing themselves with the costs 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 fulltime enrollment (12-19 credits per semester) and are subject to change.

Cost Chart One: Fall & Spring Terms

All programs except Nursing & Dental Hygiene

See cost charts two and three for Nursing and Dental Hygiene expenses

	Vermont Residents		Non-Vermont Residents		RSP/NEBHE Program	
	Term	Year	Term	Year	Term	Year
Tuition	\$4,980	\$9,960	\$9,504	\$19008	\$7,494	\$14,928
Double Room****	2,325	4,650	2,325	4,650	2,325	4,650
Board (Gold meal plan)	1,579	3,158	1,579	3,158	1,579	3,158
Student Activity Fee*	102	204	102	204	102	204
Facilities Fee*	260	520	260	520	260	520
Matriculation Fee**	104	208	104	208	104	208
Health Insurance***	<u>931</u>	<u>1,431</u>	<u>931</u>	<u>1,431</u>	<u>931</u>	<u>1,431</u>
Total	\$10,281	\$20131	\$14,805	\$29,179	\$12,765	\$25,099

* Applies to all matriculated students.

** New students only; fall semester rate is \$200, spring incoming rate is \$100; 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 \$931 applies to spring semester incoming students only. \$1,431 is the annual rate for all fall semester students.

**** Room charges for Randolph Center campus, see Other Estimated Expenses for Williston campus

Other Estimated Expenses

Books, transportation, personal needs	\$1,325 (term) \$2,650 (year)
Automotive student tools	\$2,200 (year)

Equine Riding Arena Costs	\$1,200 (year)
NECI Room- Williston Campus	\$5,888 (year)
(No meal plan at Williston campus)	

Cost Chart Two: Nursing

For further information concerning estimated costs of attendance for the nursing programs, contact the Business Office at 1-800-600-9830. Program costs are based on annual full-time cost of the program.

	Associate Degree Nursing (two semesters)			Practical Nursing (three semesters)		
	VT Residents	Non Residents	RSP/NEBHE Program	VT Residents	Non Residents	RSP/NEBHE Program
Tuition	\$9,960	\$19,008	\$14,928	\$13,695	\$26,136	\$20,526
Double Room	4,650	4,650	4,650	5,700	5,700	5,700
Board (Gold meal plan)	3,158	3,158	3,158	4,211	4,211	4,211
Student Activity Fee*	204	204	204	285	285	285
Facilities. Fee*	520	520	520	718	718	718
Matriculation Fee**	208	208	208	208	208	208
Health Insurance***	<u>1,431</u>	<u>1,431</u>	<u>1,431</u>	<u>1,431</u>	<u>1,431</u>	<u>1,431</u>
Total	\$20,131	\$29,179	\$25,099	\$26,248	\$38,689	\$33,079
Total Off-Campus	\$12,323	\$21,371	\$17,261	\$16,337	\$28,778	\$23,168
Room/Board****	\$7,808	\$7,808	\$7,808	\$9,911	\$9,911	\$9,911

* Applies to all matriculated students

** New students only; cost is fall semester rate

*** Required for all full-time students not covered by another medical plan

**** Room charges for Randolph Center campus; see Other Estimated Expenses for Williston campus

Other Estimated Expenses

Books, transportation, personal needs	\$1,325 (term) \$2,650 (year)
Nursing uniforms	\$250 (year)
NECI Room- Williston Campus	\$5,888 (year)

Cost Chart Three: Dental Hygiene

	Vermont Residents		Non-Vermont Residents		RSP/NEBHE Program	
	<u>Term</u>	<u>Year</u>	<u>Term</u>	<u>Year</u>	<u>Term</u>	<u>Year</u>
Tuition	\$6,228	\$12,456	\$9,504	\$19,008	\$7,464	\$14,928
♦NECI Room	2,944	5,888	2,944	5,888	2,944	5,888
Student Activity Fee*	102	204	102	204	102	204
Facilities Fee*	260	520	260	520	260	520
Matriculation Fee**	104	208	104	208	104	208
Health Insurance***	<u>931</u>	<u>1,431</u>	<u>931</u>	<u>1,431</u>	<u>931</u>	<u>1,431</u>
Total	\$10,569	\$20,707	\$13,845	\$27,259	\$11,805	\$23,179

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

* Applies to all matriculated students

** New students only; fall semester rate is \$200, spring incoming rate is \$100

*** 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 \$931 applies to spring semester incoming students only. \$1,431 is the annual rate for all fall semester students.

Other Estimated Expenses

Books, transportation, personal needs	\$1,325 (term) \$2,650 (year)
Clinic attire, uniforms, shoes, laundry, etc	\$1,000
Dental instruments & lab material	\$1,300
Second Year Examinations & Licensure	\$975

Optional Room & Board Rates per Semester

Double Room	\$2,325
Single Room.....	\$2,944
Triple Room	\$2,088
Gold Meal Plan is unlimited with \$50 points at snack bar	\$1,579
12-Meal Plan with \$75 points at snack bar	\$1,520
8-Meal Plan with \$110 points at snack bar	\$1,461
Overnight rooms for emergencies.....	\$15 per night

Other Fees: All Programs

Allied Health Programs Liability Insurance Fee	\$25
Application fee (due when applying for admission)	\$38
Course Change	\$17
Challenge Exam Fee	\$50
Deferred Payment Fee	\$50
Graduation Fee	\$73
Late Class Registration	\$48
Late Financial Clearance Fee	\$100
Non-degree Student Registration Fee (per semester)	\$50
Returned Check Fee	\$25
Parking Sticker	\$50 fall / \$25 spring
Portfolio Assessment	\$50
Transcript Evaluation (Incoming transfer courses)	\$25
Transcript Fee	\$5 per copy

Per Credit Tuition and 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 Three 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)	\$415
Vermont Resident (Dental Hygiene)	\$519
Non-Vermont Resident (All students)	\$792
RSP/NEBHE Student Program (All students)	\$622

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

Fees

Degree Student Activity Fee (per credit hour - max. 12 credits)	\$9
Non-degree Student Registration Fee (per semester)	\$50
Facilities Fee (Per credit hour - max. 12 credits)*	\$22
Summer Student Activity Fee	No Charge

**All Matriculated Students*

Summer Costs 2010

Vermont Resident (Non-Dental Hygiene).....	\$415
Vermont Resident (Dental Hygiene).....	\$519
Non-Vermont Resident (All students).....	\$622
RSP/NEBHE/GN Student Program (All students)	\$622

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 costs.

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. For details, contact Admissions.

	CT	MA	ME	NH	RI
Agribusiness	x	x			x
Architectural/Building (2 yr)		x			x
Architectural Eng Tech. (4 yr)	x	x	x	x	x
Automotive Technology	x	x	x		x
Business Technology & Mgt (2 yr)	x	x	x	x	
Business Technology & Mgt (4 yr)			x	x	
Civil/Environmental Eng Tech					x
Computer Eng Tech (2 yr)			x		
Computer Eng Tech (4 yr)	x		x		x
Construction Management (2 yr.)	x	x			x
Construction Management (4 yr.)		x			x
Dairy Farm Management		x	x		x
Dental (4 yr)	x	x		x	x
Diversified Agriculture (4 yr.)		x	x		x
Electrical Eng Technology (2 yr)	x		x		x
Electromechanical (4 yr)	x	x	x	x	x
Equine Studies	x	x	x	x	x
Fire Science	x				
Information Technology			x	x	x
Landscape Dev/Horticulture		x			x
Licensed Practical Nursing (CT)	x	x	x	x	x
Software Engineering		x	x	x	x
Sustainable Design & Technology		x	x	x	x
Veterinary Technology					x

New York Residents' Good Neighbor Policy

Reduced tuition rates are available for residents of the state of New York. Please contact Admissions to see if you are eligible.

Explanation of Fees

Application Fee: \$38

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 in debit points.

Challenge Exam Fee: \$50

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: \$17 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.

Facilities Fee: up to \$260 per semester

This fee is charged per semester to all matriculated students. Full-time equivalent students (12 credits or more) are charged \$260 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: \$73

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: \$1,431 per year or \$931 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 he or she is covered to be exempted from the college insurance fee. A Student Waiver Card for the VSC Student Health Insurance Plan must be completed by all full-time students. This card will be enclosed with the semester billing. Students failing to return the card by the published deadline will automatically be enrolled in and billed for the VSC Health Plan.

Late Financial Clearance Fee: \$100

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: \$48

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

Matriculation Fee: \$208 per year or \$104 for spring semester

This fee is to cover expenses incurred during orientation, including meals and room.

Portfolio Assessment Fee: \$50

This fee is for each portfolio submitted for review.

Registration Fee: \$50

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

Returned Check Fee

There is a \$25 service charge on checks returned to the business office for insufficient funds and no future checks will be cashed.

Student Activity Fee: up to \$102 per semester

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

Transcript Evaluation Fee: \$25

This fee covers the cost of evaluating and processing transfer credit and advanced standing (waived for transcripts from VSC institutions).

Transcript Fee: \$5 per copy

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

Textbooks and 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 \$500 per semester. The bookstore accepts credit cards, cash, and checks. Bookstore charge forms are available, upon approval, from the Business Office.

Automotive Technology and Construction Practice & 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.

Payment Policy

Billing and Payment Policy

Paperless billing begins June 1, 2009 for the fall 2009 semester. Student Account statements, Student Insurance Waiver/Selection forms, and other relevant information will be available online. Students will receive a postcard when the first billing statement is available for viewing at <https://blackboard.vsc.edu>

Who really pays the bill?

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://blackboard.vsc.edu> beginning July 1st. We offer three convenient in-house plans:

- Five payments from July through November
- Four payments from August through November
- Three plans 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.

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 1st.

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. Please contact the business office for details.

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, and 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 pro-rata basis. The date of withdrawal or dismissal is determined by the registrar. The pro-rata 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.

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 Admissions office 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 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.

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.ed.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.

In an effort to be as consistent as possible with all students in awarding aid from the college, Vermont Tech's Office of Financial Aid requests an official signed copy of a student's and/or family's latest federal income tax return. Please send only copies. The financial aid office uses imaging to maintain and track documentation sent to the office and all originals are shredded accordingly.

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.

Expected Family Contribution

The needs analysis system evaluates all of the information requested and determines a reasonable contribution to be expected from the parent and 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. Vermont Tech requires all students desiring financial aid to apply for the Pell Grant.

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 \$2000 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.

In accordance with the laws and regulations of the Higher Education Act, borrowers have the right to choose and select the lender of their choice to process loans. On Vermont Tech's website there is a list of suggested lenders and a lender comparison chart for families to evaluate benefits and customer service options. Families are not limited to selecting from the suggested lender list and can choose the lender of their choice.

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.

Campus-Based

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 loans range from \$600 to \$1600 per year. Students eligible for Pell Grants have first consideration for this fund.

The *Academic Competitiveness Grant* is funded by the Federal government and awarded to undergraduates enrolled full-time in their first or second academic year. Students must have completed a rigorous secondary school program of study and be enrolled in at least a two-year academic program acceptable for full credit toward a bachelor's degree. Students must be U.S. citizens and be Pell eligible. First year students must have a high school graduation date after January 1, 2006 and have not been previously enrolled in an undergraduate program. Second year students must have a high school graduation date after January 1, 2005 and have at least a 3.0 cumulative GPA after their first year as an undergraduate. The award is up to \$750 for first year students and up to \$1300 for second year students.

The *National Science and Mathematics Access to Retain Talent Grant (National SMART Grant)* is funded by the Federal government and awarded to undergraduates enrolled full-time in their third or fourth academic year. Students must be U.S. citizens, Pell recipients, and enrolled in an eligible degree program. Eligible programs are physical, life, or computer sciences; engineering; technology; mathematics; or a critical need foreign language. The student must also have at least a 3.0 cumulative GPA meet grade level criteria. The award is up to \$4000 for each of the third and fourth academic years.

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 hours of work per week. Students may also use FWS funds for off-campus 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.

A "Financial Aid Packet for Vermont Students" is available at all Vermont high school guidance offices and at Vermont Tech's Office of Financial Aid. Students are required to file supplemental information to the Vermont Student Assistance Corporation (VSAC) to be considered for a Vermont State Grant. On-line access is available at www.vsac.org

Grants from other states include Maine, New Hampshire, 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

Vermont Tech programs are approved by the Vermont State Approving Agency, Office of Veterans' Affairs. These benefits are generally available to veterans who are separated from

active duty within the past ten years; veterans with service-connected disabilities; and the sons, daughters, spouses, and widows or widowers of deceased or totally disabled veterans.

Veterans' Benefits GI Bill: Educational benefits are available to any honorably discharged veteran who enlisted for active duty and was on active duty for at least 181 consecutive days. Students must make application to the Veterans Administration. The Department of Veterans Affairs GI bill web site, www.gbill.va.gov is the comprehensive resource for those interested in learning about and applying for these benefits.

The Vermont Tech registrar is the college's certifying official for Veterans Administration benefits. Additional information and assistance with applying for benefits is available from the Office of the Registrar.

First payment from the Veterans Administration normally takes 4-8 weeks from the beginning of the first term. After that, checks are normally received monthly.

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.

Statement of Satisfactory Progress for Financial Aid

The Federal Office of Education has stated that a student must be "maintaining satisfactory progress in the course of study s/he is pursuing, according to the standards and practices of the institution at which the student is in attendance."

In order to be eligible for financial aid at Vermont Tech, a student must satisfy the criteria below. Both measurements are reviewed in determining a student's eligibility for continued aid.

Satisfactory Academic Standing

Satisfactory academic standing is determined in accordance with the policies set forth under "Academic Standing" in the "Academic Affairs" chapter of this catalog. The financial aid office is notified by the registrar's office of students who fall below the minimum standards. These students are notified that they have been placed on financial aid probation for one term.

If a student fails to raise his or her GPA to that required for satisfactory academic standing by the end of their probationary period, financial aid eligibility will be suspended. Students who are academically dismissed automatically lose their aid eligibility.

Satisfactory Academic Progress

Satisfactory academic progress is determined by earning an accumulation of credits that apply to a student's current degree program at a rate that will allow the completion of a degree program within a specified time period.

For financial aid considerations, the maximum time frame allowed for a student pursuing an associate's degree or a "plus two" baccalaureate degree is three years (six terms) of full-time enrollment (12 or more credits per term) or the equivalent part-time enrollment.

For a student enrolled in a three-year program, the maximum time frame allowed is 4.5 years (nine terms) of full-time enrollment or the equivalent part-time enrollment.

The financial aid office will review for satisfactory academic progress on a semester basis.

Appeal

If a student loses eligibility for aid, he or she may appeal to have the aid reinstated by writing to the Director of Financial Aid. All appeals for reinstatement of financial aid should identify any mitigating circumstances causing the loss of eligibility and the measures adopted as corrective action.

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.

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) portion of the financial aid package.

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 he or she has notified us to the contrary. If a student changes his or her status from full- to part-time enrollment, an aid adjustment may result.

Academic Programs

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 farm. In addition to the important basics in plant and animal agriculture, the program emphasizes business and communication skills.

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

- Understand the income and expense sources of varied agricultural business
- 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 minimum number of credits required for a degree is 67.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ACC 2121 - Financial Accounting	4	ACC 1010 - Computerized Accounting	3
AGR 1011 - Ag Techniques I	2	ACC 2122 - Managerial Accounting	4
AGR 1050 - Livestock Production	3	ENG 2080 - Technical Communication	3
ENG 10XX – English*	3-4	LAH 1050 - Introduction to Soils	4
LAH 1020 - Intro to Horticulture	3	ELE XXXX – elective***	<u>2-4</u>
MAT 1210 - Principles of Math	<u>3</u>		16-18
	18-19		

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
BUS 2210 - Small Business Mgmnt	3	BUS 2230 - Principles of Marketing	3
CHE 1020 - Intro to Chemistry	4	BUS 2410 - HR Management	3
CIS 1080 - Intro to S/D Mgmt	2	ENG 1070 - Effective Speaking	3
ELE XXXX - AH/SS elective**	3	ELE XXXX - AH/SS elective**	3
Select two:		ELE XXXX - elective***	<u>2-4</u>
AGR 2020 - Farm Buildings	3		14-16
AGR 2040 - Forage Production	3		
BUS 2020 - Principles of Mgmnt	3		
BUS 2260 - Principles Fin Mgmnt	3		
BUS 2270 - Organizational Comm	4		
ELE XXXX - elective***	<u>3-4</u>		
	18-19		

*Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.

**Students must complete a minimum of one Arts and Humanities (AH) and once Social Science (SS) elective.

***Electives approved by the department

Architectural and Building Engineering Technology

Graduates of this program are prepared for a wide range of construction industry careers at the technical and design support level. Graduates typically fill 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 degree programs in architecture or engineering.

Graduation from the program at the associate's level (2 or 3 year) allows students an ideal opportunity to make an informed decision relative to their career paths. This "decision platform" offered to students completing their associate's degree is one of the program's greatest strengths. Students may continue on into a Bachelor of Science degree program in Architectural Engineering Technology, Sustainable Design & Technology, 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 that are exercised during their workforce careers include:

- **Graphic communication skills:** Graduates are able to use freehand sketches, board drafting, presentation graphics, and CADD 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 will 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.

The program is accredited by the Technology Commission of the Accreditation Board for Engineering and Technology.

The minimum number of credits required for a degree is 70.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ARC 1000 - Freshmen Orientation	1	ARC 1210 - Const Mtrls/ Methods	6
ARC 1010 - Arch Woodfrm Constr	3	ARC 1220 - Architectural History	3
ARC 1021 - Architectural CAD I	2	MAT 1520 - Calculus for Engineering	4
CIS 1050 - Intro to Spreadsheets	1	Select one	
ENG 10XX – English*	3-4	PHY 1041 – Physics I	4
MAT 1420 - Technical Math	5	PHY 2041 – Physics I w/ Calculus	<u>4</u>
ELE XXXX - AH/SS elective**	<u>3</u>		17
	18-19		

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
ARC 2031 - Environmental Sys I	3	ARC 2032 - Environmental Sys II	3
ARC 2040 - Construction Practices	3	ARC 2052 - Architectural Design II	3
ARC 2051 - Architectural Design I	3	ARC 2720 - Architecture Seminar	0
CET 2040 – Statics/Strength Mtrls	4	CET 2120 - Structural Design	4
ENG 2080 - Tech Comm	3	ELE XXXX - AH/SS elective**	3
PHY 1043 - Physics II for Arch	<u>3</u>	ELE XXXX - technical elective***	<u>3-4</u>
	19		16-17

Three Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ARC 1000 - Freshmen Seminar	1	ARC 1220 - Architectural History	3
ARC 1010 - Arch Woodfrm Constr	3	ENG 1042 - Expository Writing*	4
CIS 1050 - Intro to Spreadsheets	1	MAT 1112 - Intro to Tech Math II	5
ENG 1041 - Basic College Writing	4	ELE XXXX - AH/SS elective**	<u>3</u>
MAT 1111 - Intro to Tech Math I	<u>5</u>		15
	14		

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
ARC 1021 - Architectural CAD I	2	ARC 1210 - Const Mtrls/Methods	6
ENG 1043 - Research Writing	4	ENG 2080 - Technical Communication	3
MAT 1420 - Technical Math	5	MAT 1520 - Calc for Engineering	4
PHY 1021 - Intro to Newtonian Mech	4	PHY 1022 - Energy Cons/Equil	<u>4</u>
ELE XXXX - AH/SS elective**	<u>3</u>		<u>17</u>
	18		

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
ARC 2031 - Environmental Sys I	3	ARC 2032 - Environmental Sys II	3
ARC 2040 - Construction Practices	3	ARC 2052 - Architectural Design II	3
ARC 2051 - Architectural Design I	3	ARC 2720 - Architecture Seminar	0
CET 2040 – Statics/Strength Mtrls	4	CET 2120 - Structural Design	4
PHY 1043 - Physics II for Arch	<u>3</u>	ELE XXXX - technical elective***	<u>3</u>
	16		13

*Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.

** Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective.

*** Choose from MAT 2532 - Calculus II, CET 2110 - Mechanics of Soils, LAH 2011 - Introduction to Landscape Design, ARC 2022 - Architectural CAD II, or ARC 3010 - Design Systems Integration. Elective availability depends on scheduling.

Bachelor of Science in Architectural Engineering Technology

Graduates of this bachelor's program receive broad-based preparation for numerous career opportunities in the building design and construction industries. Education in this area provides the opportunity for excellent salaries and the satisfaction of seeing creative 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's 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's program in structures, HVAC, plumbing, electrical, and integrated 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.

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

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's 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 and plumbing systems):** Graduates use principles and procedures to analyze and design building mechanical systems, including the use of energy conservation and sustainability concepts.
- **Electrical and 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.

The program is accredited by the Technology Commission of the Accreditation Board for Engineering and Technology.

The minimum credits required for graduation is 130.

Four Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ARC 1000 - Freshmen Orientation	1	ARC 1210 - Construction Materials & Meth	6
ARC 1010 - Arch Woodframe Constr	3	ARC 1220 - Architectural History	3
ARC 1021 - Architectural CAD I	2	MAT 1520 - Calc for Engineering	4
CIS 1050 - Intro to Spreadsheets	1	Select one:	
ENG 10XX – English*	3-4	PHY 1041 - Physics I	4
MAT 1420 - Technical Mathematics	5	PHY 2041 – Physics I w. Calculus	<u>4</u>
ELE XXXX - AH/SS elective**	<u>3</u>		<u>17</u>
	18-19		

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
ARC 2031 - Environmental Systems I	3	ARC 2032 - Environmental Systems II	3
ARC 2040 - Construction Practices	3	ARC 2052 - Architectural Design II	3
ARC 2051 - Architectural Design I	3	ARC 2720 - Architecture Seminar	0
CET 2040 – Statics/Strength of Mtrls	4	CET 2120 - Structural Design	4
ENG 2080 - Technical Communication	3	MAT 2532 - Calculus II	4
PHY 1043 - Physics II for Architectural	<u>3</u>	ELE XXXX - AH/SS elective**	<u>3</u>
	19		17

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
ARC 2022 - Architectural CAD II	3	ARC 3010 - Design Systems Integration	3
ARC 3020 - Structural Analysis	3	ARC 3030 - Steel Structures Design	3
ARC 3110 - Codes and Loads	3	ARC 3040 - Electrical/Lighting Systems	3
ELT 3020 - Electrical Circuits/Controls	4	ARC 3050 - Fndmntls Fluids/Thermodyn	4
ENG 1070 - Effective Speaking	3	CHE 1031 - General Chemistry I	4
	16		17

Fourth Year

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
ARC 4010 - Concrete Struct Dsgn	3	ARC 4040 - Plumbing Systems	3
ARC 4020 - ArchEngineering Mgmt	3	ARC 4050 - FE Exam Survey	1
ARC 4030 - HVAC Systems	4	ARC 4720 - Senior Project	4
Select One:		Select Two:	
ELE 3XXX - AH/SS elective**	3	ELEXXX – AH/SS elective**	3
ELE XXXX - technical elective ***	<u>3-4</u>	ELEXXX – technical elective***	<u>3-4</u>
	13-14		14-15

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99. This may require summer courses or additional terms to complete the degree.*

***Students must complete a minimum of four Arts and Humanities (AH) and Social Science (SS) electives, with at least one at the 3XXX level.*

****Choose from CET 2020 - Hydraulics & Drainage, MAT 2021 – Statistics, CET 2110 - Mechanics of Soils (spring), or others with permission of department. Availability depends on scheduling. Students must complete a minimum of one technical elective. Electives approved by the department.*

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 Vermont Tech Automotive Technology 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.

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.
- In the fall of 2007, a new course on hybrid and advanced technology was introduced, as was a mini-seminar on high-performance preparation.
- This program has been developed with the support and encouragement of the Vermont Automobile Dealers Association.

The minimum number of credits required for a degree is 66.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ATT 1000 - Freshman Orientation	1	ATT 1040 - AutoElectrical Systems	4
ATT 1010 - Suspension and Steering	3	ATT 1050 - Brakes & Wheel Alignment	4
ATT 1020 - Engine Diagnostics/Repair	4	CIS 1050 - Intro to Spreadsheets	1
ATT 1120 - General Electronics	4	PHY 1030 - General Physics	4
ENG 10XX - English*	3-4	ELE XXXX - AH/SS Elective**	<u>3</u>
MAT 1100 - Intro to Technical Math	<u>3</u>		
			16
	18-19		

Summer Course

ATT 2801 - Summer Internship 0

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
ATT 2010 - Engine Performance	4	ATT 2030 - Advanced Engine Perf	4
ATT 2020 - Body Electronic Systems	4	ATT 2040 - Automotive Drivelines	4
ATT 2802 - Internship Review	1	ATT 2060 - AdvTechnology Vehicle	4
ELE XXXX - AH/SS elective**	3	MEC 1020 – Manufactrng Processes	2
BUS 2210 - Small Business Mngmnt	<u>3</u>	ENG 2080 - Technical Comm	<u>3</u>
	15		17

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.*

***Students must complete a minimum of one Arts and Humanities (AH) and once Social Science (SS) elective (PSY 1010 - Intro to Psychology, strongly recommended).*

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, associate's degree graduates may choose to enroll in the Bachelor of Science in Business Technology and Management at Vermont Tech, or they may transfer to a bachelor's degree program elsewhere with majors such as marketing or accounting.

Highlights of the degree program include a formal business dinner where students dress in professional attire and learn the rules of formal dining. Students also learn resume 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 and Management will be able to:

- Demonstrate technical skills in accounting, computer applications, and office support
- Demonstrate communication skills in writing, speaking, and listening
- Demonstrate management skills in human resources, marketing, and business law
- Demonstrate interpersonal "soft" skills in image awareness, business behavior, teamwork, and job search techniques

The minimum number of credits required for a degree is 67.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ACC 2121 - Financial Accounting	4	ACC 1010 - Computerized Accounting	3
BUS 1010 - Introduction to Business	3	BUS 1052 - Information Processing II	3
BUS 1051 - Information Processing I	3	CIS 1080 - Intro Spreadsheet/Database	2
ENG 10XX - English*	3	ENG 1070 - Effective Speaking	3
MAT 1210 - Principles of Mathematics	3	ELE XXXX - AH/SS elective **	3
	16	Select One:	
		ACC 2122 - Managerial Accounting	4
		BUS 2150 - Office Information Systems	3

17-18

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
BUS 2020 - Principles of Management	3	BUS 2132 - Management Applications	3
BUS 2131 - Bus Com Technology	3	BUS 2230 - Principles of Marketing	3
BUS 2270 - Organizational Com	4	BUS 2410 - HR Management	3
ELE XXXX - AH/SS elective**	3	BUS 2720 - Business Seminar	3
Select One:		ENG 2080 - Technical Communication	3
BUS 2210 - Small Business Mgmt	3	Select One:	
BUS 2260 - Principles of Fin Mgmt	3	BUS 2210 - Small Business Management	3
BUS 2440 - Intro to Business Law	3	CIS 1152 - Advanced Website Dev	4
CIS 1151 - Website Design	3	ELE XXXX - elective*	3-4
ELE XXXX - elective*	3-4	SCI XXXX science elective*	<u>4</u>
SCI XXXX - science elective*	4		18-19
	16-17		

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.*

***Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective.*

****Electives approved by the department*

Bachelor of Science in Business Technology and Management

Graduates of this bachelor's 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 with a Bachelor of Science in Business Technology and Management will be able to:

- Demonstrate technical skills in accounting, computer applications, and office support
- Demonstrate communication skills in writing, speaking, and listening
- Demonstrate management skills in human resources, marketing, and business law
- Demonstrate interpersonal “soft” skills in image awareness, business behavior, teamwork, and job search techniques
- Assume leadership roles in an increasingly technology-focused workforce
- Provide increased contributions to their current employer
- Exhibit personal and professional growth in the breadth and depth of their technical and business knowledge

Students must complete all of the required courses in the list that follows. All course work from an accredited institution not used to meet core requirements may be used toward the credit minimum.

The minimum number of credits for a degree is 120.

Core Courses

Core Courses*	Credits
ACC-2121 - Financial Accounting	4
* ACC-1010- Computerized Accounting	3
BUS-2020 - Principles of Management	3
* BUS-2270 - Organizational Communication	4
* BUS-2131 - Business Communication Technology	3
* BUS-2132 - Management Applications	3
* CIS-1080 - Spreadsheets and Databases	2
BUS-2410 - Human Resources Management	3

BUS-2440 - Introduction to Business Law	3
BUS-2260 - Principles of Financial Management	3
BUS-2230 - Principles of Marketing	3
* BUS-2720 - Business Seminar	3
BUS-3150 - Production & Operations Management	3
BUS-3250 - Organizational Behavior & Management	3
BUS-3410 - Business Ethics	3
BUS-4310 - Business Information Architecture	3
BUS-4530 - Technical Project Management	3
BUS-4730 - Senior Project	3
ENG-1061XX - English Composition	3-4
ENG-1070 - Effective Speaking	3
* ENG-2080 - Technical Communication	3
ELE-XXXX - Arts/Humanities Elective	3
ELE-XXXX - Social Science Elective	3
ELE-3XXX - Arts/Humanities or Social Science Elective	3
ELE-XXXX - Art/Humanities or Social Science Elective	3
MAT-1221 - Finite Math	3
MAT-2021 - Statistics	3
SCI-XXXX - Lab Science	4
Select One:	
ECO-2020 - Macroeconomic	3
ECO-2030 - Microeconomics	3

Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.

Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective.

All core courses or equivalent coursework must be completed. The above courses marked with an asterisk will be waived for students who have an associate's or bachelor's 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 baccalaureate 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) will be admitted into the Clarkson program.

Civil and Environmental Engineering Technology

No discipline offers a greater diversity of career opportunities than does civil and environmental engineering. Civil and environmental engineering technicians work on every phase of design and construction of buildings, roadways, bridges, public water systems, dams, landfills, and recreation facilities.

Graduates of this program have the opportunity to work outdoors on construction and surveying projects or indoors in design or estimating offices. Students are well prepared to continue in Vermont Tech's Bachelor of Science programs in Architectural Engineering Technology, Sustainable Design and Technology, or Business Technology and Management.

The Civil and Environmental Engineering Technology program provides training in design, surveying, materials testing, the construction process, structural design of buildings, water/wastewater engineering, and solid waste management. Students learn to prepare construction drawings using computer-aided drafting and design (CADD) equipment at the state-of-the-art computer workstations. Graduates find work with engineering design firms, government agencies, construction firms, and testing laboratories. Some graduates go on to become licensed land surveyors or registered professional engineers.

Students with an Associates of Engineering in Civil and Environmental Engineering Technology will be able to:

- Perform in the workforce with confidence in the use of CADD 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.

The program is accredited by the Technology Commission of the Accreditation Board for Engineering and Technology.

The minimum number of credits required for a degree is 70.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CET 1000 - Freshman Orientation	1	CET 1020 - Engineering Materials	4
CET 1011 - Surveying I	3	CET 1032 - Computer Applications II	3
CET 1031 - Computer Applications I	3	ENG 2080 - Technical Communication	3
CHE 1031 - General Chemistry I	4	MAT 1520 - Calculus for Engineering	4
ENG 10XX – English*	3-4	Select one:	
MAT 1420 - Technical Mathematics	<u>5</u>	PHY 1041 - Physics I	4
	19-20	PHY 2041 - Physics I w/calculus	<u>4</u>
			18

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
CET 2012 - Surveying II	4	CET 2050 - Civil and Env Design	4
CET 2020 - Hydraulics and Drainage	3	CET 2060 - Const Estimates/Records	3
CET 2030 - Env Eng & Science	3	CET 2110 - Mechanics of Soils	3
CET 2040 – Statics/Strength of Mtrls	4	CET 2120 - Structural Design	4
ELE XXXX - AH/SS elective**	<u>3</u>	ELE XXXX - AH/SS elective**	<u>3</u>
	17		17

Three Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CET 1000 - Freshman Orientation	1	CET 1020 - Engineering Materials	4
CET 1031 – Eng/Surv Computer Apps I	3	ENG 1042 - Expository Writing	4
ENG 1041 - Basic College Writing	4	MAT 1112 - Intro to Tech Math II	5
MAT 1111 - Intro to Tech Math I	<u>5</u>	PHY 1021 - Intro to Newtonian Mech	<u>4</u>
	13		17

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
CET 1011 - Surveying I	3	CET 1032 - Computer Applications II	3
ENG 1043 - Research Writing	4	CHE 1031 - General Chemistry I	4
MAT 1420 - Technical Mathematics	5	ENG 2080 - Technical Communication	3
PHY 1022 - Energy Cons/Equil	4	MAT 1520 - Calculus for Engineering	4
	16		14

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
CET 2012 - Surveying II	4	CET 2050 - Civil and Env Design	4
CET 2020 - Hydraulics and Drainage	3	CET 2060 – Const Estimates/Records	3
CET 2030 - Env Eng/Science	3	CET 2110 - Mechanics of Soils	3
CET 2040 – Statics/Strength of Mtrls	4	CET 2120 - Structural Design	4
ELE XXXX - AH/SS elective**	3	ELE XXXX - AH/SS elective**	3
	17		17

*Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.

**Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective.

Note: Students taking MAT 1520 (or equivalent) may take PHY 2041/2042 instead of PHY 1041/1042.

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 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 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's degree with Electrical Engineering Technology.

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

- Design and implement combinational and sequential digital circuits using simple tools and techniques
- Interface simple analog or digital hardware to a microcontroller and manipulate that hardware using programs in both assembly language and a high level language
- Understand port access, interrupt service routines, and hardware timing issues
- Develop small programs written in assembly language
- Develop small programs written in a high level language
- Understand the basic concepts of object-oriented programming
- Install and configure a significant operating system
- Administer a computer system by managing its resource usage, interpreting the output of monitoring tools, and troubleshooting system problems
- Apply knowledge of network protocols from the physical layer through the transport layer to analyze and troubleshoot TCP/IP network problems
- Clearly communicate technical information in both oral and written form to peers and supervisors
- Understand the computer engineering technology profession, its diversity, and its related ethical and social issues.
- Function effectively in teams

- Demonstrate a commitment to quality, timeliness, continuous improvement, and lifelong learning

The minimum number of credits required for a degree is 71.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CIS 2025 - C Programming	4	CIS 2280 - Perl Programming	2
ELT 1031 - Electrical Circuits I	4	ELT 1080 - Electronics for CPE	4
ELT 1051 - Presentation Graphics I	1	ELT 1110 - Introduction to Digital Circuits	4
ENG 10XX – English*	3-4	MAT 1520 - Calculus for Engineering	4
INT 1000 – Elec/Computer Orientation	1	Select one:	
MAT 1420 - Technical Mathematics	5	PHY 1041 - Physics I	4
	18-19	PHY 2041 - Physics I w/Calculus	4
			18

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
CIS 2151 - Computer Networks I	4	CIS 2230 - System Administration	4
CIS 2260 - Object-Oriented Prog	3	CIS 2720 – Current Topics in Comp Eng	3
ELT 2050 - Microprocessor Technique	4	ELT 2040 - Computer System & Interface	4
ELE XXXX - AH/SS elective**	3	ENG 2080 - Technical Communication	3
Select one:		ELE XXXX - AH/SS elective**	3
PHY 1042 - Physics II	4		17
PHY 2042 - Physics II w/Calculus	4		
	18		

Three Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ELT 1011 - Fundamentals of Circuits I	3	CIS 1160 - Fndmntls of Programming in C	1
ELT 1021 - Fndmntls of Digi Circuits I	3	ELT 1012 - Fundamentals of Circuits II	3
INT 1000 - Freshman Orientation	1	ELT 1022 - Fndmntls of Digital Circuits II	3
ENG 1041 - Basic College Writing	4	ENG 1042 - Expository Writing	4
MAT 1111 - Intro to Tech Math I	5	MAT 1112 - Intro to Tech Math II	5
	16		16

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
CIS 2025 - C Programming	4	CIS 2280 - Perl Programming	2
ELT 1051 - Presentation Graphics I	1	ELT 1080 - Electronics for CPE	4
ENG 1043 - Research Writing	4	MAT 1520 - Calculus for Engineering	4
MAT 1420 - Technical Mathematics	5	PHY 1022 - Energy Cons/Equil	4
PHY 1021 - Intro to Newtonian Mech	4	ELE XXXX - AH/SS elective**	<u>3</u>
	18		17

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
CIS 2151 - Computer Networks I	4	CIS 2230 - System Administration	4
CIS 2260 - Object-Oriented Prog	3	CIS 2720 – Current Topics in Comp Eng	3
ELT 2050 - Microcomp Techniques	4	ELT 2040 - Computer System/Interfaces	4
PHY 1042 - Physics II	4	ENG 2080 - Technical Communication	3
	15	ELE XXXX - AH/SS elective**	<u>3</u>
			17

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This will require summer courses or additional terms to complete the degree.*

***Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective*

Bachelor of Science in Computer Engineering Technology

Graduates of this program will experience a balanced treatment of hardware, software, and administrative (or “systems”) topics. As with the two-year degree, upon which this bachelor’s program builds, this program explores what goes on “under the hood” of a computer system. Digital electronics and computer architecture are explored, as well as topics in programming, networks, and system administration. This broad-based approach is intended to give graduates a diverse range of career options.

Vermont Tech’s approach is to give students a good foundation in all aspects of computer technology so that they can adapt to changes in the field. Also, because hardware, software, and systems topics often overlap in the real world, Vermont Tech’s preparation will equip graduates to properly evaluate the entire computer system they are working with and understand how all of its aspects interact.

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

- Design and implement digital and embedded microcontroller systems in both the hardware and software areas using industry standard tools and techniques
- Evaluate new computer hardware technologies and make recommendations about such technologies based on features, performance, and cost
- Design and implement simple digital signal processing systems
- Implement standard algorithms and data structures, and develop network, multithreaded, and graphical applications
- Understand the purpose of various programming language features and how those features are implemented
- Use standard software engineering tools
- Understand and evaluate system performance and security
- Understand basic database design and administration
- Build, test, and document operating system software, such as a device driver, that interacts directly with hardware
- Clearly communicate technical information in both oral and written form to peers and supervisors
- Understand the Computer Engineering Technology profession, its diversity, and its related ethical and social issues
- Function effectively in teams
- Demonstrate a commitment to quality, timeliness, and continuous improvement and lifelong learning

The minimum number of credits required for the degree is 140.

Four Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CIS 2025 - "C" Programming	4	CIS 2280 - Perl Programming	2
ELT 1031 - Electrical Circuits I	4	ELT 1080 - Electronics for CPE	4
ELT 1051 - Presentation Graphics I	1	ELT 1110 - Introduction to Digital Circuits	4
ENG 10XX – English*	3-4	MAT 1520 - Calculus for Engineering	4
INT 1000 - Freshman Orientation	1	Select one:	
MAT 1420 - Technical Mathematics	5	PHY 1041 - Physics I	4
	18-19	PHY 2041 - Physics I w/Calculus	4
			18

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
CIS 2151 - Computer Networks I	4	CIS 2230 - System Administration	4
CIS 2260 - Object-Oriented Prog	3	CIS 2720 – Current Topics in Comp Eng	3
ELT 2050 - Microcomp Techniques	4	ELT 2040 - Computer System/Interfaces	4
ELE XXXX – AH/SS elective**	3	ENG 2080 - Technical Communication	3
Select one:		ELE XXXX - AH/SS elective**	3
PHY 1042 - Physics II	4		17
PHY 2042 - Physics II w/Calculus	4		
	18		

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
CIS 3030 - Programming Languages	3	BUS 2440 - Introduction to Business Law	3
CIS 3050 – Algorithms/Data Structures	3	CIS 3010 - Database Systems	4
ELT 3010 - Digital II	4	CIS 3152 - Networks II	4
MAT 2532 - Calculus II	4	ELT 3050 - Microprocessor Techniques II	4
ELE 3XXX – AH/SS elective**	3	MAT 3170 - Applied Math for Engineering	3
	17		18

Fourth Year

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
CIS 4020 - Advanced OS	4	CIS 3/4XXX – CIS elective***	3
CIS 3/4XXX – CIS elective***	3	CIS 3/4XXX – CIS elective***	3
CIS 4150 - Software Engineering	3	CIS 4712 - Project II	3
CIS 4711 - Project I	2	ELT 4020 - Digital Signal Processing	4
ELT 4010 - Computer Architecture	3	ELE XXXX - AH/SS elective**	<u>3</u>
MAT 3720 - Topics in Discrete Math	<u>3</u>		16
	18		

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (See English Requirements page 99). This may require summer courses or additional terms to complete the degree.*

***Students must complete a minimum of four Arts and Humanities (AH) and Social Science (SS) electives, including at least one from each discipline (AH and SS) and one at the 3XXX level.*

****Students must take a minimum of 12 credits from: CIS 3010, 4030, 4040, 4050, 3XXX, 2 4XXX, and 4140*

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 languages, including one object-oriented language and one scripting language
- Understand the fundamentals of computer hardware
- Be able to develop and manage complete web sites
- 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
- Demonstrate a solid background in business processes
- Understand the historical and social context of information technology

The student, in conjunction with the department chair, may develop a sequence of courses to best meet his or her background and needs that still satisfies the degree requirements. The typical curriculum taken by students is given below. Due to the dynamic nature of the information technology field, the recommended sequence of courses is subject to change.

The minimum, number of credits required for the degree is 67.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CIS 1120 - Intro to Inform Sys Tech	3	ACC 1020 - Survey of Accounting	3
CIS 1151 - Website Design	3	CIS 1152 - Adv. Website Design	3
CIS 2271 - JAVA Programming	3	CIS 2010- Computer Organization	4
ENG 10XX – English*	3-4	CIS 2280 - Perl Programing	2
INT 1000 - Freshman Orientation	1	MAT 2120 - Discrete Structures	3
MAT 1221 – Finite Math	3	ELE XXXX - AH/SS elective**	3
	16-17		18

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
BUS 2020 - Principles of Management	3	BUS 2230 – Principles of Marketing	3
CIS 2151 - Computer Networks 1	4	CIS 2230 - System Administration	4
CIS 2320 - Software QA & Testing	3	ELE XXXX - AH/SS elective**	3
ELE XXXX - elective	3	ENG 2080 - Technical Communications	3
ENG 1070 - Effective Speaking	3	SCI XXXX - science elective	4
	16		17

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.*

***Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective*

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's degree program, as well as:

- 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 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.

The student, in conjunction with the department chair, may develop a sequence of courses to best meet his or her background and needs that still satisfies the degree requirements. The typical curriculum taken by students is given below. Due to the dynamic nature of the information technology field, the recommended sequence of courses is subject to change.

The minimum number of credits required for the degree is 129.

Four Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CIS 1120 - Intro to IST	3	ACC 1020 - Survey of Accounting	3
CIS 1151 - Website Design	3	CIS 1152 - Adv Website Design	3
CIS 2271 - JAVA Programming	3	CIS 2010- Computer Organization	4
ENG 10XX – English*	3	CIS 2280 - Perl Programming	2
INT 1000 – Freshman Orientation	1	MAT 2120 - Discrete Structures	3
MAT 1221 - Finite Math	<u>3</u>	ELE XXXX - AH/SS Elective**	<u>3</u>
	16-17		18

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
BUS 2020 - Principles of Management	3	BUS 2230 – Principles of Marketing	3
CIS 2151 - Computer Networks 1	4	CIS 2230 - System Administration	4
CIS 2260 - Object Oriented Program	3	ELE XXXX - AH/SS Elective**	3
CIS 2320 - Software QA & Testing	3	ENG 2080 – Technical Communication	3
ENG 1070 - Effective Speaking	<u>3</u>	SCI XXXX - Science Elective	4
	16		17

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
BUS 2440 - Business Law	3	ACC 1010 – Computerized Accounting	3
CIS 4150 - Software Engineering	3	CIS 3010 - Database Systems	4
HUM 2060 - Cyberethics	3	CIS 4120 - Systems Analysis & Dsn	3
ELE 3XXX - AH/SS elective**	3	MAT 2021 - Statistics	3
ELE XXXX - elective	<u>3</u>	Select one:	
	15	BUS 3250 - Organizational Behav/Mgmt	3
		CIS 2XXX – CIS elective	<u>3</u>
			16

Fourth Year

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
CIS 3170 – Hist/Theory of Computing	3	BUS 4530 - Technical Project Mgt	3
CIS 4721 - Senior Projects I	2	CIS 3XXX – CIS elective	3
SCI XXXX - science elective	3	ELE XXXX – AH/SS elective**	3
Select two:		CIS 4040 - Computer Security	4
BUS 4310 - Business Info Arch	3	CIS 4722 - Senior Projects II	<u>3</u>
CIS 3XXX – CIS elective	3		16-17
CIS 4030 – GUI Programming	3		
CIS 4140 – Human Comp Interaction	<u>3</u>		
	15-16		

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms.*

***Students must complete a minimum of four AH and/or SS electives, including at least one from each discipline and one 3XXX level.*

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 Degree 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 web sites
- 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.

The student, in conjunction with the department chair, may develop a sequence of courses to best meet his or her background and needs that still satisfies the degree requirements. The typical curriculum taken by students is given below. Due to the dynamic nature of the software engineering field, the recommended sequence of courses is subject to change.

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

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CIS 1120 - Intro to Info Sys Tech	3	CIS 1152 - Adv Website Design	3
CIS 1151 - Website Design	3	CIS 2010 - Computer Organization	4
CIS 2271 – JAVA Programming	3	CIS 2280 - Perl Programming	2
ENG 10XX – English*	3-4	ELE XXXX - AH/SS elective**	3
MAT 1221 - Finite Math	3	MAT 2021 - Statistics	5
INT 1000 - Freshman Orientation	<u>1</u>	MAT 2120 – Discrete Structures	<u>4</u>
	16-17		18

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
CIS 2151 - Computer Networks I	4	CIS 2230 - Systems Administration	4
CIS 2260 – Obj Oriented Programming	3	CIS 2730 - CSE Projects	4
CIS 2320 - Software QA & Testing	3	ENG 2080 - Technical Communications	3
ELE XXXX - AH/SS elective**	3	SCI XXXX - science elective	4
Select One:		Select as Required:	
BUS 2020 – Principles of Management	3	MAT 1520 – Calculus for Eng	<u>4</u>
MAT 1420 – Technical Mathematics	5		13-17
PHI 1030 - Intro to Logic	<u>3</u>		
	16-18		

*Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms.

**Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective.

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 might include test engineer, release engineer, or customer support engineer. Students may continue on to a Bachelor of Science Degree in Software Engineering, which adds an understanding of software development and significantly more technical depth.

Students with a Bachelor of Science in Computer Software Engineering should be able to meet all the outcomes of the associates 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.

The student, in conjunction with the department chair, may develop a sequence of courses to best meet his or her background and needs that still satisfies the degree requirements. The typical curriculum taken by students is given below. Due to the dynamic nature of the software engineering field, the recommended sequence of courses may change.

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

Four Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CIS 1120 - Intro to Info Sys Tech	3	CIS 1152 - Adv Website Design	3
CIS 1151 - Website Design	3	CIS 2010 - Computer Organization	4
CIS 2271 - JAVA Programming	3	CIS 2280 - Perl Programming	2
ENG 10XX – English*	3-4	ELE XXXX - AH/SS elective**	3
INT 1000 – Freshman Orientation	1	MAT 2021 - Statistics	3
MAT 1221 - Finite Math	<u>3</u>	MAT 2120 – Discrete Structures	<u>3</u>
	16-17		18

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
CIS 2151 - Computer Networks I	4	CIS 2230 - Systems Administration	4
CIS 2260 – Obj Oriented Programming	3	CIS 2730 - CSE Projects	2
CIS 2320 - Software QA & Test	3	ENG 2080 - Technical Communication	3
ELE XXXX - AH/SS elective**	3	SCI XXXX – science elective	4
Select One:		Select as Required:	
BUS 2020 – Principles of Mgmt	3	MAT 1520 – Calculus for Engineering	<u>4</u>
MAT 1420 – Technical Mathematics	5		13-17
PHI 1030 - Intro to Logic	<u>3</u>		
	16-18		

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
CIS 3030 - Programming Lang	3	CIS 2XXX – CIS elective	3-4
CIS 3050 - Algorithm & Data Struct	3	CIS 3XXX – CIS elective	3-4
CIS 4150 - Software Engineering	3	CIS 4120 - Sys Analysis & Design	3
SCI XXXX - science elective	4	ELE 3XXX - AH/SS elective**	3
Select One:		Select One:	
BUS 4310 - Business Info Arch	3	BUS 2230 - Principals of Marketing	3
CIS 3XXX – CIS elective	3-4	BUS 2440 - Business Law	<u>3</u>
MAT 2532 - Calculus II	<u>4</u>		15-17
	16-17		

Fourth Year

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
CIS 4020 - Advanced OS	4	BUS 4530 - Tech Project Mgmnt	3
CIS 4721 - Senior Projects I	2	CIS 4XXX – CIS elective	3-4
HUM 2060 - Cyberethics	3	CIS 4XXX – CIS elective	3-4
Select one:		CIS 4722 - Senior Projects II	3
CIS 4030 – GUI Programming	3	ELE XXXX - AH/SS elective**	<u>3</u>
CIS 4140 – Human Comp Interaction	3		15-17
CIS 4210 – Computer Graphics	<u>3</u>		
	12		

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms.*

***Students must complete a minimum of four Arts and Humanities (AH) or Social Science (SS) electives, including at least one from each discipline and one 3XXX level.*

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 in Business Technology.

Students with an Associate of Applied Science in Construction Practice and 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 take-offs in residential and commercial construction

The minimum number of credits required for the associate's degree is 68.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CPM 1000 - Freshmen Orientation	1	CPM 1010 - Electrical/Mechanical Sys	3
CET 1031 – Eng/Surv Comp Apps I	3	CPM 1022 - Construction Graphics II	1
CPM 1021 - Construction Graphics I	1	CPM 1111 - Commercial Const Systems	4
CPM 1031 - Residential Const Sys	3	MAT 1210 - Principles of Mathematics*	3
CPM 1032 - Construction Lab	2	PHY 1030 - General Physics	4
ENG 10XX – English*	3-4	ELE XXXX – AH/SS elective**	<u>3</u>
Select One:			18
MAT 1100 – Math for Technology	3		
MAT 1420 - Technical Mathematics	<u>5</u>		
	16-19		

First Year Summer Course	Credits
CPM 2801 - Summer Internship	0

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
ACC 1020 - Survey of Accounting	3	BUS 2210 - Small Business Management	3
BUS 2440 - Intro to Business Law	3	CPM 2030 – Elem Theory of Structures	4
CPM 2010 - Construction Estimates	3	CPM 2730 - Const Seminar and Project	4
CPM 2020 - Const Project Mngmnt	3	ENG 2080 - Technical Communication	3
CPM 2050 - Const Mngmnt Software	1	ELE XXXX – AH/SS elective**	<u>3</u>
CPM 2060 - Field Engineering	3		17
CPM 2802 - Internship Review	1		
Optional	:		
CPM 2720 - Construction Supervision	<u>1</u>		
	17-18		

*Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (See English Requirements, page 99). This may require summer courses or additional terms to complete the degree.

**Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective.

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

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

Bachelor of Science in Construction Management

We offer a 2+2 construction management baccalaureate program for graduates from the Vermont Tech Architectural and Building Engineering, Civil and Environmental Engineering, and Construction Practice and 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, have 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:

Program Goals:

- To prepare students with strong technical and problem-solving backgrounds for management level positions
- To enable students to control or contribute to a profitable construction-related business
- To equip future employees with the skills necessary to adapt to technological and process changes in a rapidly developing field
- To instill resiliency, lifelong learning, and a “no excuses” mentality

Learning Outcomes (Upon graduation from the Construction Management program, students will be able to):

- Create and implement a company safety plan
- Create, estimate, condense, and graphically communicate Gantt, Network Diagram, and Activity on Node project management charts
- Estimate and submit competitive construction bids
- Manage a construction project, including materials and resources, from design phase to close-out

- Interpret construction drawings, specifications, and permits for implementation of Best Management Practices
- Properly lay out and site buildings, bridges, and roads from designs
- Manage documentation for payments, inspections, as-built drawings, and progress submittals
- Provide immediate first aid and live saving care (CPR) to other employees
- Evaluate multiple choices in the means and methods of construction for fiscal decision-making and planning

The minimum number of credits required for a degree is 120.

Third Year

CPM

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
CET 1032 - Eng Surv Comp Apps II	3	AHS 2035 – Advanced First Aid	2
CET 3130 – Environmental Soils	3	BUS 2410 – HR Management	3
PHY 1041 – Physics I	4	CPM 3010 – Construction Estimates II	3
MAT 1420 – Technical Mathematics	<u>5</u>	CPM 3020 – Construction Documents	3
	14	CPM 3030 – Concrete/Steel Const Lab	2
		PHY 1041 – Physics I	<u>4</u>
			17

CET, ARC

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
ACC 2121 – Financial Accounting	3	AHS 2035 – Advanced First Aid	2
BUS 2210 – Small Business Mngmnt	3	BUS 2410 – HR Management	3
BUS 2440 – Business Law	3	CPM 3010 – Construction Estimates II	3
CPM 2010 – Construction Estimates	3	CPM 3020 – Construction Documents	3
CPM 2020 – Project Management	<u>3</u>	CPM 3030 – Concrete/Steel Const Lab	2
	15	ELE XXXX – AH/SS Elective	<u>3</u>
			16

Third Year Summer (optional) Credits

CPM 4801 - Summer Internship	0
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Fourth Year

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
BUS 2260 – Financial Management	3	BUS 2230 – Small Business Marketing	3
CPM 4010 – Contract Negotiations	3	CPM 4110 – Construction Permits	3
CPM 4020 – Adv Field Engineering	3	CPM 4120 – Proj Planning & Finance	3
CPM 4030 – Const Safety/Risk Mgmt	3	CPM 4130 – Const Superintendency	<u>3</u>
CPM 4802 – Internship Review	1		12
ELE 3XXX – AH/SS elective	<u>3</u>		
	16		

**Students must complete a minimum of four Arts and Humanities (AH) and Social Science (SS) electives, including at least one from each discipline (AH and SS) and one at the 3XXX level.*

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

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 and Life Sciences at the University of Vermont. Full-tuition scholarships are available to Vermont students in the FARMS Program.

Students with an Associate of Applied Science in Dairy Farm Management 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 minimum number of credits required for the degree is 66.

Two Year Curriculum

First Year

First Year Fall Semester	Credits	First Year Spring Semester	Credits
ACC 1020 - Survey of Accounting	3	AGR 1012 - Ag Techniques II	1
AGR 1011 - Ag Techniques I	2	AGR 1030 - Animal Reprod/Genetics	3
AGR 1050 - Livestock Production	3	AGR 2030 - Animal Nutrition	4
CIS 1080 - Intro to Spreadsheet & Db	2	ENG 2080 - Technical Communications	3
ENG 10XX – English*	3-4	LAH 1050 - Introduction to Soils	4
Select One:		ELE XXXX - AH/SS elective**	<u>3</u>
MAT 1210 - Principles of Math	3		18
MAT 1420 - Technical Math	<u>5</u>		
	16-18		

Second Year

Second Year Fall Semester	Credits	Second Year Spring Semester	Credits
AGR 2011 - Dairy Herd Mgmnt I	3	AGR 2012 - Dairy Herd Mgmnt II	3
AGR 2020 - Farm Buildings	2	AGR 2050 - Large Animal Diseases	3
AGR 2040 - Forage Production	3	BUS 2210 - Sm Business Mgmnt	3
AGR 2720 – Issues/ Trends in Ag	2	BUS 2230 - Principles of Marketing	3
BUS 2260 - Principles Fin Mgmnt	3	ELE XXXX - AH/SS elective**	<u>3</u>
Select One:			15
CHE 1020 - Intro to Chemistry	4		
CHE 1031 - General Chemistry	<u>4</u>		
	17		

*Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.

**Students must complete a minimum of one Arts and Humanities (AH) and once Social Science (SS) elective.

Dental Hygiene

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 health care 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 four 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.

All students completing the program will be eligible to apply to participate in licensing examinations.

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

- 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 health care team
- Have a basic knowledge of legal responsibilities and ethical considerations of patient care
- Develop a commitment to continuous and lifelong learning

The minimum number of credits for the associate's degree is 72.

Two-Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
BIO 1030 - Nutrition	3	BIO 2012 - Hum Anat/Physio II	4
BIO 2011 - Hum Anat/Physio I	4	DHY 1012 - Clinical Dental Hygiene I	5
DHY 1011 - Pre-clinical DH	4	DHY 1022 - Oral Tiss II/ Med Emerg	3
DHY 1021 - Oral Tissues I	3	DHY 1030 - Dental Radiography	3
ENG 10XX - English	<u>3-4</u>	PSY 1010 - Intro to Psychology	<u>3</u>
	17-18		18

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
BIO 2120 - Elements of Microbio	4	DHY 2210 - Community Oral Health	3
DHY 2010 - Dental Materials	3	DHY 2220 - Oral Pathology	2
DHY 2020 – Pathology/Pharmo	3	DHY 2722 - Clinical DH III	6
DHY 2030 - Periodontics	3	ENG 2080 - Tech Comm	3
DHY 2721 - Clinical DH II	<u>5</u>	MAT 1040 - Math for Allied Health	2
	18	ELE XXXX - AH elective	<u>3</u>
			19

All DHY/BIO courses 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's program have access to more educational and career opportunities than students who have only completed an associate's degree in Dental Hygiene. Career areas where the advanced degree would be advantageous include jobs in dental hygiene research, sales, public health, and education.

Current Vermont Tech students may continue into the bachelor's degree program with departmental approval and do not have to make the decision until the spring of the sophomore year. Students will complete the bachelor level curriculum through a combination of on-line and transfer courses. Students have six years to complete the required courses for the bachelor's degree.

Intended outcomes for the Dental Hygiene degree completion program are:

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

The minimum number of credits for the degree is 120.

Four Year Curriculum

First Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
BIO 1030 - Nutrition	3	BIO 2012 - Human Anat/Physiology II	4
BIO 2011 - Human Anat/Physio I	4	DHY 1012 - Clinical Dental Hygiene I	5
DHY 1011 - Pre-clinical Dental Hyg	4	DHY 1022 - Oral Tiss II /Med Emrgncies	3
DHY 1021 - Oral Tissues I	3	DHY 1030 - Dental Radiography	3
ENG 10XX - English	<u>3-4</u>	PSY 1010 - Intro to Psychology (SS)	<u>3</u>
	17-18		18

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
BIO 2120 - Elements of Microbiology	4	DHY 2210 - Community Oral Health	3
DHY 2010 - Dental Materials	3	DHY 2220 - Oral Pathology	2
DHY 2020 - Pathology/Pharmacology	3	DHY 2722 - Clinical Dental Hygiene III	6
DHY 2030 - Periodontics	3	ENG 2080 - Technical Communication	3
DHY 2721 - Clinical Dental Hygiene II	5	MAT 1040 - Mathematics for Allied Health	2
	18	ELE XXXX - AH elective*	3
			19

Third Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
DHY 3010 - Ev Based Dec Making	3	CHE 1020 - Intro to Chemistry	4
ENG 1070 - Effective Speaking	3	CIS XXXX - IT elective	2-4
ELE 3XXX - AH/SS elective*	3	DHY 3020 - Advanced Periodontics	3
PSY 1050 - Human Growth/Dev	3	DHY 3030 - Educational Method/LeadrsHP	3
	12		12-14

Fourth Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
DHY 4010 - Adv Comm Oral Health	3	DHY 4810 - Practicum	6
ELE XXXX AH/SS elective*	3	ELE 3XXX - AH/SS elective*	3
Select One:		POS XXXX - political science elective	3
HUM 2020 - Bioethics (AH)	3		12
PHI 1040 - Intro to Ethics (AH)	3		
Select One:			
XXX XXXX - critical thinking elective	3		
MAT XXXX - math elective	3		
	12		

**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 3XXX level.*

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

The Vermont Tech Bachelor of Science degree program holds articulation agreements with Quinsigamond Community College, Community College of Rhode Island, Tunxis 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.

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 earthmoving 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.

The program covers all significant skill areas of the repair industry and includes modules on parts, 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 the agricultural equipment, earthmoving 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, earthmoving equipment, and heavy-duty trucks. All mechanical systems are covered in the curriculum including steering, suspension and brakes, and drive train systems. 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 Admissions Department.

The curriculum uses the NATEF (National Technician's Education Foundation) and AED (Associated Equipment Distributors) diesel task mastery specifications to assess successful learning outcomes. Outcomes include but are not limited to: the ability to use the principles of critical thinking in the diagnostic process, the ability to understand, maintain and repair advanced electronic systems on trucks, agricultural and earthmoving equipment, the ability to understand, maintain and repair all major mechanical systems on trucks, agricultural and earthmoving equipment and the ability to perform successfully as an entry to B-level heavy duty service technician. Coursework in English and technical communication, computer software skills, technical math, physics, and general education are also included. Courses are offered in Williston and Middlebury. Students must provide their own transportation.

The minimum number of credits required for degree is 64.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
DSL 1010 – Steer, Susp, & Align	4	CIS 1080 - Intro to Spreadsheets & Db	2
DSL 1040 - Bsc Diesel E/E Sys	4	DSL 1020 – Diesel Power Systems	3
ENG 10XX – English*	3-4	DSL 1050 - Preventive Maintenance	3
MAT 1100 – Intro to Tech Math	<u>3</u>	DSL1110 - Hvy Duty Brkng Sys	3
	14-15	PHY 1030 - General Physics	<u>4</u>

16

First Year Summer Course

DSL 2801 – Summer Internship	0
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Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
BUS 2210 – Small Business Mngmnt	3	DSL 2010 – Fuel Systems	4
DSL 2020 - Chassis E/E Sys	4	DSL 2040 - Power Transmission	4
DSL 2030 - Hydraulics	3	DSL 2060 - Fabrication	3
DSL 2802 – Internship Review	1	ELE XXXX - AH/SS elective	3
ENG 2080 - Technical Communication	3	ELE XXXX – elective	<u>3</u>
ELE XXXX – AH/SS elective**	<u>3</u>		17
	17		

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms.*

***Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective.*

Bachelor of Science in 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 number of credits required for a degree is 120.

Four Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ACC 1020 - Survey of Accounting	3	AGR 1012 – Agricultural Tech II	1
AGR 1011 - Agricultural Tech I	3	AGR 2030 – Animal Nutrition	4
AGR 1050 - Livestock Production	3	BIO 1220 - Botany	4
CIS 1080 - Intro to Sprdsht/Database	2	LAH 1050 – Intro to Soils	4
ENG 10XX – English*	3-4	Select one:	
LAH 1020 – Intro to Horticulture	3	MAT 1221 – Finite Math	3
	17-18	MAT 1210 – Principles of Math	3
			16

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
AGR 2020 – Farm Buildings	2	AGR 1030 – Reproduction and Genetics	3
AGR 2040 – Forage Production	3	BIO 2030 – Plant Pathology	3
AGR 2720 – Issues & Trends in Ag	2	CHE 2060 – Organic Chemistry	4
BIO 2040 - Entomology	3	ENG 2080 – Technical Communications	3
BUS 2210 – Small Business Mngmnt	3	ELE 2XXX – AH/SS elective**	3
CHE 1031 – General Chemistry	4		16
	17		

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
AGR 3050 – Nutrient & Pest Mngmnt	3	AGR 2050 – Large Animal Disease	3
BIO 1020 – Environmental Biology	4	AGR 3111 – Veg & Fruit Production I	3
BUS 2260 – Financial Management	3	BUS 2230 – Principles of Marketing	3
LAH 2020 – Plant Propagation	3	LAH 1040 – Greenhouse Management	4
ELE 3XXX – AH/SS elective**	3	ELE 2XXX – AH/SS elective**	3
	16		16

Summer Course

AGR 4801 – Summer Internship	0
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Fourth Year

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
AGR 4040 – Agricultural Products	3	AGR 4720 – Diversified Ag Project	3
AGR 4802 – Internship Review	1	AGR XXXX – AGR elective	6
SDT 3010 – Mediation & Comm	3	ELE XXXX - elective	3
SDT 4112 – Green Sites Tech Surv	3	Select One:	
ELE XXXX – AH/SS elective**	3	MAT 2021 – Statistics	3
Select One:		MAT XXXX – math elective	<u>3-5</u>
AGR 1061 – Burls to Boards	3		15
AGR XXXX - AGR elective	<u>3-4</u>		
	15-16		

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.*

***Students must complete a minimum of four Arts and Humanities (AH) and Social Science (SS) electives, with at least one at the 3XXX level.*

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.

With a minimum of an extra year's work, students may pursue a dual major with Computer Engineering Technology or Mechanical Engineering Technology. Upon completion of a two year Associate's Degree in Electrical Engineering Technology, students may pursue a bachelor's degree in Electromechanical Engineering, Sustainable Technology, or Business Technology & Management.

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

- Understand the concepts of AC/DC circuit analysis and demonstrate the ability to apply concepts learned in class experimentally
- Understand the concepts of digital electronics and demonstrate the ability to apply concepts learned in class experimentally
- Understand the fundamental operation of semiconductor devices and their application in modern electronic circuits
- Be able to write programs in assembly language and in an appropriate high level language
- Be able to utilize current hardware and software tools and devices such as laboratory instruments, MultiSim, embedded controllers, and PLCs
- Execute a simple manufacturing type project including design, layout prototype, documentation, and presentation
- Be able to communicate technical information clearly in oral and written forms
- Understand the professional requirements of today's employers regarding quality, timeliness, and the ability to work in teams towards a common goal
- Understand professional, ethical, and social responsibilities and recognize the need for continuous improvement and lifelong learning
- Demonstrate a respect for diversity and knowledge of contemporary professional, societal, and global issues

The minimum number of credits required for the degree is 71.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ELT 1031 - Electrical Circuits I	4	CIS 2025 - C Programming	4
ELT 1051 - Present Graphics I	1	ELT 1032 - Electrical Circuits II	4
ELT 1110 - Intro to Digital Circuits	4	ELT 1052 - Presentation Graphics II	1
ENG 10XX – English*	3-4	MAT 1520 - Calc for Engineering	4
INT 1000 - Freshman Orientation	1	Select one:	
MAT 1420 - Technical Math	<u>5</u>	PHY 1041 - Physics I	4
	18-19	PHY 2041 - Physics I w/Calculus	<u>4</u>
			17

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
ELT 2050 - Microcomp Techniques	4	ELT 2052 - Electronics II	4
ELT 2051 - Electronics I	4	ELT 2130 - Industrial Electronics	4
ELT 2060 - Electronic Applications	4	ELT 2720 - Electrical Project	3
ELE XXXX – AH/SS elective**	3	ENG 2080 – Technical Communication	3
Select one:		ELE XXXX - AH/SS elective**	<u>3</u>
PHY 1042 – Physics II	4		17
PHY 2042 – Physics II w/ Calculus	4		
	19		

Three Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ELT 1011 - Fundmntls of Circuits I	3	CIS 1160 - Fundmntls of Prog in C	1
ELT 1021 - Fundmntls of Dig Circ I	3	ELT 1012 - Fundmntls of Circuits II	3
ENG 1041 - Basic College Writing	4	ELT 1022 - Fundmntls of Dig Circ II	3
INT 1000 - Freshman Orientation	1	ENG 1042 - Expository Writing	4
MAT 1111 - Intro to Tech Math I	<u>5</u>	MAT 1112 - Intro to Tech Math II	<u>5</u>
	16		16

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
CIS 2025 - C Programming	4	ELT 1032 - Electrical Circuits II	4
ELT 1051 - Presentation Graphics I	1	ELT 1052 - Presentation Graphics II	1
ENG 1043 - Research Writing	4	MAT 1520 - Calculus for Engineering	4
MAT 1420 - Technical Math	5	PHY 1022 - Energy Cons and Equil	4
PHY 1021 - Intro to Nwtnian Mech	4	ELE XXXX - AH/SS elective**	<u>3</u>
	18		17

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
ELT 2050 - Microcomp Techniques	4	ELT 2052 - Electronics II	4
ELT 2051 - Electronics I	4	ELT 2130 - Industrial Electronics	4
ELT 2060 - Electronic Apps	4	ELT 2720 - Electrical Project	3
PHY 1042 - Physics II	4	ENG 2080 – Technical Communication	3
	16	ELE XXXX - AH/SS elective**	<u>3</u>
			17

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (See English Requirements page 99). This may require summer courses or additional terms to complete the degree.*

***Students must complete a minimum of one Arts and Humanities (AH) and once Social Science (SS) elective.*

Bachelor of Science in 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 “two-plus-two” 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.

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

- Use standard software engineering tools in the mechanical, electrical, and software areas.
- Exhibit a basic knowledge in the mechanical, electrical, and software areas and be able to apply this knowledge to adapt to emerging applications of mathematics, science, engineering, and technology.
- Conduct, analyze, and interpret experiments and apply experimental results to improve processes.
- Program in several languages including those related to microcontrollers and PLCs.
- Demonstrate a working knowledge of control theory and control systems design, both analog and digital, employing differential and integral calculus.
- Understand professional, ethical, and social responsibilities.
- Research and evaluate new technologies (electrical, mechanical, or software); make recommendations about such technologies based on features, performance, and cost; and manage the implementation of those new technologies in a design or technical solution with a commitment to quality, timeliness, and continuous improvement.
- Research, read, and understand relevant documents, recognizing that lifelong learning is a necessary part of the discipline.
- Communicate clearly (in writing and orally) with his or her peers as well as with personnel and authority.
- Apply engineering principles and creativity to design, develop, and troubleshoot electromechanical products.
- Function effectively on teams.

- Demonstrate a respect for diversity and knowledge of contemporary professional, societal, and global issues.

The minimum number of credits required in the junior and senior years is 66.

Third Year, *EET*

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
ELM 3015 – Sensors/Instrumentation	3	ELT 2061 - ELT 2061 - Electromec Sys I	4
MAT 2532 - Calculus II	4	MAT 3170 - Applied Math for Engr	3
MEC 1011 - Design Communications I	2	PHY 3120 - Intro to Modern Physics	4
MEC 2010 - Fluid Mechanics/Systems	4	MEC 3020 - Manufctrng Proc /Mach Des	3
MEC 2020 - Applied Mechanics	<u>3</u>	MEC 3030 – Prop/Mech of Materials	<u>3</u>
	16		17

Fourth Year, *EET*

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
ELM 4015 - ElectroMec Power Sys	4	ELM 4232 - Control Systems II	4
ELM 4231 - Control Systems I	4	ELM 4702 - ELM Project II	3
ELM 4701 - ELM Project I	2	ELT 3040 – Electronic/Data Comm	4
ELE XXXX - technical elective***	3-4	ELE XXXX - AH/SS elective*	3-4
ELE 3XXX - AH/SS elective*	<u>3</u>	ELE XXXX - Technical elective***	<u>3</u>
	16-17		17-18

Third Year, *MEC*

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
ELM 3015 – Sensors/Instrumentation	3	ELT 2061 - ELT 2061 - Electromec Sys I	4
MAT 2532 - Calculus II	4	MAT 3170 - Applied Math for Engr	3
CIS 2025 - C Programming	4	PHY 3120 - Intro to Modern Physics	4
ELT 3060 - Electrical Circuit Analyses	<u>3</u>	ELT 2050 - Microcomputer Techniques	4
	14	ELT 3030 - Solid State Electronics	<u>4</u>
			19

Fourth Year, MEC

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
ELM 4015 - ElectroMec Power Sys	4	ELM 4232 - Control Systems II	4
ELM 4231 - Control Systems I	4	ELM 4702 - ELM Project II	3
ELM 4701 - ELM Project I	2	ELT 3040 – Electronic/Data Comm	4
ELE XXXX - technical elective***	3-4	ELE XXXX - AH/SS elective*	3-4
ELE 3XXX - AH/SS elective*	3	ELE XXXX - Technical elective***	3-4
	16-17		17-19

* General Education requirement for the BS.ELM program include a cumulative 24 credits, 9 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 ELM 4702), and three credits must be at a 3XXX level.

** EET > ELM courses required of students with two-year electrical/electronic degrees; MEC > ELM courses required of students with two-year mechanical degrees

*** 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.

Bachelor of Science in Equine Studies

Graduates from this program can explore a variety of career opportunities, depending on their areas of interest. The Equine Studies bachelor's degree 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 larger equine industry. In addition to the traditional careers (barn manager, assistant trainer, or riding instructor), the many opportunities for employment are limited only by graduates' imaginations and interests. Providing a solid foundation of business skills and equine knowledge, this program prepares students for success in whatever path they choose.

The core Equine Studies program is a combination of theory and hands-on experience working with horses and clients. Specific equine topics include equine anatomy and disorders; nutrition; genetics and reproduction; training (both beginning and advanced); riding instruction techniques, equine massage, tack selection and fit; therapeutic riding, farrier practices, and equitation. Independent study and internships are encouraged.

Students with a Bachelor of 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
- Recognize, examine, and implement fundamental business theories and practices, including bookkeeping and accounting systems, legal guidelines, and marketing objectives and strategies
- 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

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

Four Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
BIO 2320 - Zoology	4	CHE 1020 - Introduction to Chemistry	4
EQS 1011 - Intro to Equine Studies I	2	EQS 1012 - Intro to Equine Studies II	2
EQS 1021 - Equitation I	1	EQS 1022 - Equitation II	1
EQS 1031 – Stable Management I	2	EQS 1032 – Stable Management II	2
ENG 10XX – English*	3-4	LAH 1050 - Intro to Soils	4
Select one:		VET 1020 - Animal Anat & Physio	<u>4</u>
MAT 1210 - Principles of Math	3		17
MAT 1221 – Finite Math	<u>3</u>		
	15-16		

Summer (optional)

EQS 2801 – Summer Internship	0
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Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
ACC 1020 - Survey of Accounting	3	AGR 1030 - Animal Repro & Gene	3
AGR 2040 - Forage Production	3	AGR 2030 - Animal Nutrition	4
BUS 2210 - Small Business Mgmt	3	ENG 2080 - Tech Com	3
EQS 2011 - Equine Training I	3	EQS 2023 - Equitation III	1
EQS 2020 - Farrier Care & Lameness	2	ELE XXXX - AH/SS elective**	3
EQS 2802 – Internship Review (if req)	1	Select one:	
Select one:		CIS 1050 - Intro to Spreadsheets	1
EQS 2710 – Equine Massage I	3	CIS 1080 - Intro to Sprdshts & Database	<u>2</u>
AGR 1050 – Livestock Production	<u>3</u>		15-16
	17-18		

Third Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
BUS 2260 - Principles of Fin Mgmnt	3	ACC 1010 - Computerized Accounting	3
EQS 3024 - Equitation IV	1	BUS 2410 - HR Management	3
EQS 3031 - Riding Instruction I	3	ENG 1070 - Effective Speaking	3
ELE XXXX - AH/SS elective**	3	EQS 3012 - Equine Training II	3
PSY 1010 – Intro to Psychology	3	Select one:	
Optional:		MAT 1221 – Finite Math	3
EQS 1221 – Horse Judging	1	MAT 2021 – Statistics	<u>3</u>
EQS 3042 – Equine Massage II	3		15
ELE XXX – elective (if req)	<u>3</u>		
	13-16		

Fourth Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
CIS 1151 - Website Design	3	BUS 2230 - Principles of Marketing	3
EQS 4010 – Law: Equine Profession	3	EQS 4110 – Equine Health/Disease	3
EQS 4032 – Riding Instruction II	2	EQS 4120 – Therapeutic Ride/Drive	2
XXX XXXX – elective	3	EQS 4610 – Senior Project	3
ELE XXXX - AH/SS elective**	3	ELE XXXX – AH/SS elective**	3
Optional:		Optional:	
EQS 4025 – Equitation V	<u>1</u>	EQS 4026 – Equitation VI	<u>1</u>
	15-16		14-15

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.*

***Students must complete a minimum of four Arts and Humanities (AH) and Social Science (SS) electives, including at least one from each discipline (AH and SS) and one at the 3XXX level.*

Fire Science

Graduates of the program are prepared to pursue careers in firefighting, fire protection services, and affiliated professions. Some typical career choices for graduates of the Fire Science program include firefighters; emergency medical technicians; fire, police, and ambulance dispatchers; fire suppression and alarm system installers and technicians; and fire inspectors and investigators.

The curriculum includes coursework in behavior, emergency medicine, hazardous materials chemistry, incident strategy and tactics, administration of emergency services, fire prevention, and occupational safety and health. The program will also prepare students for certification in both firefighting (NFPA Firefighter I) and emergency medicine (EMT-B). 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.

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 leadership in their community, fire department, and personal lives
- Deliver professional presentations concerning fire safety in the public and private 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 extinguishments
- 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

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

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CIS 1050 - Intro to Spreadsheets	1	CHE 1020 - Introduction to Chemistry	4
FSC 1000 - Freshman Orientation	1	FSC 1022 - Firefighting Services II	4
FSC 1010 - Bldg Const/Fire Protection	3	FSC 1210 - Fire Inspector I	3
FSC 1021 - Firefighting Services I	3	FSC 1220 - Fire Service Leadership	3
FSC 1030 - Hist/Imp Fire in America	3	ELE XXXX - AH/SS elective**	3
MAT 1210 - Principles of Mathematics	3	Optional:	
ENG 10XX - English*	<u>3-4</u>	FSC 1122 - Svc Learning/Ind Study	<u>3</u>
	17-18		17-20

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
AHS 2011 - Emergency Medical Svcs	6	FSC 2210 - Fire Administration	3
ENG 2080 - Technical Communication	3	FSC 2220 - Firefighting Strategy/Tactics	3
FSC 2020 - Hydraulics/Water Supply	3	FSC 2230 - Haz Mat Chem/ Ops	3
FSC 2250 - Fire & Life Safety Educator	3	FSC 2240 - Fire Protection Systems	3
Electives (fall or spring by permission):		ELE XXXX - AH/SS elective**	<u>3</u>
FSC 2030 - Firefighting OSH	3		15
FSC 2820 - Residential Internship	<u>3</u>		
	15		

*Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.

**Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective

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 Technology Extension Division, 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.

Initial Courses

	Credits		Credits
ENG 10XX - English	3	PHY 1041 - Physics I	4
ENG 2080 – Technical Communication	3	ELE XXXX - SS elective	3
MAT 1420 - Technical Math	5	ELE XXXX - AH elective	3

Foundation Courses

Course sequences depend on the industry emphasis. Example:

Electronic-Aerospace	Credits	Semiconductor	Credits
ELT 1070 - Electronic Circuits	4	CHE 1031 - General Chemistry I	4
CIS 1030 - Intro to Computer	3	CIS 2025 - C Programming	4
CIS 2025 - C Programming	4	ELT 1101 - General Electronics I	4
MAT 1520 - Calc for Engineering	4	MAT 1520 - Calc for Engineering	4
PHY 1042 - Physics II	4	PHY 1042 - Physics II	4

Landscape Development and Ornamental Horticulture

Graduates of this program are eminently qualified for positions as landscape designers; contractors and maintenance personnel; greenhouse growers; plant propagators; perennial growers; nursery and garden center operators; salespeople for horticultural products; and technicians for state and federal regulatory agencies. Projected job growth is excellent and there is a steady trend toward higher salaries in this field.

The curriculum features courses such as Woody Ornamentals, Herbaceous Plant Materials, Entomology, Greenhouse Management, and Plant Pathology. In addition, we offer Landscape Graphics, Landscape Construction and Maintenance, AutoCAD, and two semesters of Landscape Design.

The program combines these horticulture and landscape classes with offerings in math, English, general education, and business. Graduates from this program are well-prepared to enter today's dynamic horticultural industry or to continue their education here at Vermont Tech or at another four-year college or university.

Students with an Associate of Applied Science in Landscape and Ornamental Horticulture will be able to:

- **Graphic Communication Skills** – students develop an appropriate mastery of freehand sketching, board drafting, presentation graphics, and CADD as effective tools for the formulation, exploration, communication, and presentation of design ideas.
- **Communication Skills** –students develop the ability to communicate technical and theoretical information effectively to clients, customers and co-workers through both the written and spoken word; excellent listening and interpersonal skills; and the ability to understand the principles of professional conduct in all aspects of client/customer and employee/employer relations.
- **Technical Skills** –students demonstrate a high level of comprehension in and the ability to analyze, solve, and apply materials and methods of construction (including the respective roles of specifications and drawings, the development of design intentions at the site and detail level and their resolution according to sound principles of construction, surveying techniques in preparation of a base map, construction of stone walls and patios, statics and mechanics of basic landscape construction materials, and estimating and bidding); site engineering issues such as grading and drainage; the creation and maintenance of healthy plant environments, both indoors and outdoors; legal issues and regulations as they apply to land use, landscape construction and/or installation; the installation, operation, advantages and disadvantages of greenhouse and nursery environmental systems; pesticide/herbicide application; and the utilization of appropriate computer applications
- **Design Skills** – students learn to 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. Coursework includes working drawings, presentation drawings, client/jury presentation, and write-up. This course of study will culminate in a proposed master plan project that will integrate all aspects of design study.

- Horticultural Skills – students demonstrate a high level of comprehension in and the ability to analyze, solve, and apply 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 control; soil properties; and landscape applications such as plant selection, planting and pruning practices, cultural requirements, cultural practices, and maintenance.
- Business Skills – students examine and analyze the practical aspects of organizing and managing a small business; marketing (product, place, pricing, and promotion); and management skills. Students will also demonstrate a working knowledge of generally accepted accounting practices as they apply to the horticultural/design industry.

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

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
CIS 1080 - Intro to S/D Mgmt	2	ACC 1020 - Survey of Accounting	3
ENG 10XX - English *	3-4	BIO 1220 - Botany	4
LAH 1000 - Freshman Orientation	1	LAH 1050 - Introduction to Soils	4
LAH 1020 - Intro to Horticulture	3	LAH 2011 - Intro to Lndscp Design	3
LAH 1021 - Landscape Graphics	3	ELE XXXX - AH/SS elective**	<u>3</u>
LAH 1030 - Woody Ornamentals	3		17
MAT 1210 - Principles of Math	<u>3</u>		
	18-19	First Year Summer Course	
		LAH 2801 – Lndscp/Hort Internship	0

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
BIO 2040 - Entomology	3	BIO 2030 - Plant Pathology	3
BUS 2210 - Sm Business Mgmt	3	BUS 2230 - Principles of Marketing	3
LAH 2030 - Herbaceous Plnt Mtrls	3	ENG 2080 - Tech Comm	3
LAH 2802- Internship Review	1	LAH 2720 - Lnd Dsn/Orn Hort Seminar	2
ELE XXXX - AH/SS elective**	3	ELEXXXX–technical elective***	3-4
Select One:		Select:	
LAH 2010 - Lndscp Const/Mgmt	4	LAH 1031 - CAD for Landscape Design	1
LAH 2020 - Plant Propagation	<u>3</u>	<i>and</i>	
	16-17	LAH 2012 - Adv Landscape Design	3
		<i>or</i>	
		LAH 1040 - Greenhouse Mgmt	4
			18-19

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.*

***Students must complete a minimum of one Arts and Humanities (AH) and once Social Science (SS) elective.*

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 Electromechanical Engineering Technology program or the Sustainable Design and Technology program.

Program Educational Objectives

Students with an Associate of Engineering in Mechanical Engineering Technology will:

- Gain the knowledge, problem-solving abilities, and hands-on skills to succeed in a career in the manufacturing, design, specification, installation, testing, operation, maintenance, sales, or documentation of mechanical systems.
- Employ communication and teamwork skills to effectively form a link between professional engineers and skilled production workers and to assist engineers to design, develop, and manufacture industrial machinery and consumer products.
- Apply knowledge and an aptitude for learning to continuously develop new skills and learn about new topics needed for long-term career development, including science, engineering, and technology knowledge and communication and teamwork skills.

Program Outcomes

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

- Exhibit mastery of the knowledge, techniques, skills, and modern tools of mechanical engineering technology.
- Apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology.
- Conduct, analyze and interpret experiments and apply experimental results to improve processes
- Apply creativity in the design of systems, components, or processes appropriate to program objectives.
- Function effectively on teams
- Identify, analyze, and solve technical problems
- Communicate effectively
- Recognize the need for and possess an ability to engage in lifelong learning
- Understand professional, ethical, and social responsibilities
- Respect diversity and have a thorough knowledge of contemporary professional, societal, and global issues

- Exhibit a clear commitment to quality, timeliness, and continuous improvement

The minimum number of credits required for a degree is 70.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ENG 10XX – English*	3-4	ENG 2080 - Technical Communications	3
MAT 1420 - Technical Math	5	MAT 1520 - Calculus for Engineering	4
MEC 1000 - Freshman Orientation	1	MEC 1012 - Design Communication II	2
MEC 1011 - Design Communication I	2	MEC 1040 - Intro to Materials Sci/Engr	3
MEC 1020 - Manufacturing Processes	2	PHY 1042 - Physics II *	4
MEC 1050 – Comp Apps Mec Eng	1		16
PHY 1041 - Physics I***	4		
	18-19		

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
ELT 2071 - Basic Electricity	3	ELT 2072 - Electronics	4
MEC 2010 - Fluid Mech/Fluid Sys	4	MEC 2030 - Strength of Materials	4
MEC 2020 - Applied Mechanics	3	MEC 2050 – Thermodynamics Heat Trans	4
MEC 2040 - Comp-Aided Tech	2	MEC 2720 - Mechanical Projects	3
MEC 2060 - Mechanisms	3	ELE XXXX - AH/SS elective**	3
ELE XXXX - AH/SS elective**	3		18
	18		

Three Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
ENG 1041 - Basic College Writing	4	ENG 1042 - Expository Writing	4
MAT 1111 - Intro to Tech Math I	5	MAT 1112 - Intro to Tech Math II	5
MEC 1000 - Freshman Orientation	1	MEC 1012 - Design Communication II	2
MEC 1011 - Design Communication I	2	PHY 1021 - Intro to Newtonian Mec	4
MEC 1050 - Comp Apps Mech Eng	1		15
	13		

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
ENG 1043 - Research Writing	4	ENG 2080 - Technical Communications	3
MAT 1420 - Technical Math	5	MAT 1520 - Calc for Engineering	4
MEC 1020 - Manufacturing Processes	2	MEC 1040 - Intro to Materials Sci/Engr	3
PHY 1022 - Energy Cons/Equil	4	PHY 1042 - Physics II	<u>4</u>
ELE XXXX - AH/SS elective**	<u>3</u>		14
	18		

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
ELT 2071 - Basic Electricity	3	ELT 2072 - Electronics	4
MEC 2010 - Fluid Mech/Fluid Sys	4	MEC 2030 - Strength of Materials	4
MEC 2020 - Applied Mechanics	3	MEC 2050 - Thermodynamics Heat Trans	4
MEC 2040 - Comp-Aided Tech	2	MEC 2720 - Mechanical Projects	3
MEC 2060 - Mechanisms	<u>3</u>	ELE XXXX - AH/SS elective**	<u>3</u>
	15		18

*Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms to complete the degree.

**Students must complete a minimum of one Arts and Humanities (AH) and one Social Science (SS) elective.

***Students desiring PHY2041/2042 instead of PHY 1041/1042 must make specific arrangements with the department chair.

Nursing

Vermont Tech offers a Practical Nursing (PN) certificate program and an Associate's Degree in Nursing (ADN) program. These programs are offered at four locations across the state with campuses in Bennington, Brattleboro, Williston, and Randolph Center. Both programs are also offered in a distance learning format at several locations around Vermont.

The PN program extends over two semesters and one summer session. Students learn PN skills through independent study, lectures, demonstrations, and practice in a nursing arts lab. Under instructor supervision, students also provide patient care in a variety of health care settings in neighboring health care agencies.

Upon completion of the program, PN graduates are eligible to apply to take the National Council Licensure Examination for Practical Nurses. The ADN program graduates are awarded an Associate of Science in Nursing and are eligible to apply to take the National Council Licensure Examination for Registered Nurses. The Vermont State Board of Nursing (VSBN) application requests information regarding past history of substance abuse, prior felony convictions, and failure to pay child support and/or taxes concerning 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 the VSBN website: <http://vtprofessionals.org/opr1/nurses>

After licensure, PN graduates typically find employment in hospitals, nursing homes, and other health care agencies and work under the supervision of a registered nurse, physician, or dentist. With experience, they can assume increasing responsibilities in the nursing field.

The ADN program articulates with the PN program and requires two further semesters of full-time study. The program is selective and rigorous and there is no assurance of admission from the PN program. Additionally, the twelve clinical credits earned in the PN program do not transfer to the ADN program.

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

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

- Employ the nursing process for selected 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 clinical setting
- 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 health care 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

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

- Evaluate the plan of care to assist clients with complex health care 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 health care needs
- Demonstrate accountability for growth as individuals, as members of society, and as professional nurses

The minimum number of credits required for the certificate 47 and for the associate's degree is 35.

Certificate in Practical Nursing

First Year

Fall Courses	Credits	Winter Courses	Credits
BIO 1030 - Nutrition	3	BIO 2012 - Human Anat/Physio II	4
BIO 2011 - Human Anat/Physio I	4	NUR 0121 – Princ/Pract Nursing II	4
NUR 0111 – Princ/Prac Nursing I	4	NUR 1010 - Pharm for Nursing	3
NUR 1020 - Nurse/Client Rltnshp	3	NUR 1121 – Princ/Prac Nursing II	5
NUR 1111 – Princ/Prac Nursing I	<u>5</u>	PSY 1050 - Human Growth/Dev	<u>3</u>
	19		19

Spring 2 Courses	Credits
NUR 0131 – Princ/Prac Nursing III	4
NUR 1131 – Princ/Prac Nursing III	<u>5</u>
	9

Associate's Degree in Nursing

Second Year

Fall Courses	Credits	Spring Courses	Credits
BIO 2120 - Elements of Microbio	4	ENG 2080 - Tech Comm	3
ENG 10XX - English*	3-4	MAT 1040 - Math for Allied Health	2
NUR 2010 - Trends in Nursing	2	NUR 2011 - Adv Pharmacology	1
NUR 2030 –Princ/Prac Nursing IV	3	NUR 2130 – Princ/Prac Nursing V	5
NUR 2040 –Princ/Prac Nursing IV	2	NUR 2140 – Princ/Prac Nursing V	4
ELE XXXX – AH elective	<u>3</u>	PSY 1010 - Intro to Psychology	<u>3</u>
	17-18		18

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (see English Requirements, page 99). This may require summer courses or additional terms.*

All BIO and NUR courses and PSY-1050 must be completed with a grade of "C" or better to continue in the program.

The certificate program includes 495 hours of theory and 630 hours of clinical/lab; the degree program includes 420 hours of theory and 315 hours of clinical/lab.

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, skilled nursing facilities

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

Graduates are eligible to apply to take the entry-level certified respiratory therapist and advanced-level registered respiratory therapist credentialing examinations offered by the National Board for Respiratory Care. The program is accredited by the Commission on Accreditation for Respiratory Care Programs.

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

- Meet the respiratory care needs in the health care community and 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 in fact effective
- Develop critical thinking skills, use strong communication skills, and demonstrate the leadership required of today's respiratory therapists

The minimum number of credits required for a degree is 69.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
BIO 2011 - Human Anat/Physio I	4	BIO 2012 - Human Anat/Physio II	4
ENG 10XX – English*	3-4	RSP 1012 - Respiratory Care II	4
RSP 1000 – Freshman Orientation	1	RSP 1210 – Resp Anat/Physio	3
RSP 1010 – Intro to Resp Therapy	3	RSP 1601 – Resp Clinical Field Exp I	2
RSP 1011 - Respiratory Care I	4	Select One:	
ELE XXXX – AH/SS elective**	<u>3</u>	MAT 1210 – Principles of Math	3
	18-19	MAT 1221 – Finite Math	3
		MAT 2021 – Statistics	<u>3</u>
			16
		Summer Course	
		RSP 2801 - Respiratory Internship	0

Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
BIO 2120 - Elements of Microbiology	4	ENG 2080 - Technical Communication	3
RSP 2011 - Cardiopulm Disease I	5	RSP 2012 - Cardiopulmonary Disease II	5
RSP 2013 - Respiratory Care III	4	RSP 2603 - Resp Clinical Field Exp III	6
RSP 2602 - Resp Clinical Field Exp II	4	RSP 2802 – Internship Review	1
RSP 2802 – Internship Review	<u>1</u>	ELE XXXX – AH/SS elective**	<u>3</u>
	17		18

*Students must place into ENG 1060 or 1061 in order to be accepted into the program.

**Students must complete a minimum of on Arts and Humanities (AH) and one Social Science (SS) elective.

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

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

Bachelor of Science in Sustainable Design and Technology

Graduates of this program will be prepared to work in technical fields related to their associate's degree and to work with newer sustainable technologies as applications engineers, project managers, or technical staff. SDT graduates will also be prepared to pursue post-baccalaureate education in business, environmental law, or related technical fields. Graduates will provide businesses with highly valued employees with a blend of technical, project management, and communication skills.

This is a cross-disciplinary program grounded in the belief that students who understand the fundamentals of technology, business, and the regulations that govern both can be effective agents for sustainable change. The program creates graduates committed to using technology to grow a sustainable economy, act as stewards of our environment and resources, and educate others about the benefits of a more sustainable college and community.

The 2+2 SDT curriculum emphasizes application of technology in service of sustainable goals and an understanding of the fundamentals of business, regulation, and permitting as well as sustainable application of technologies. The curriculum is organized into four areas: sustainability core, green technical track, business electives, and general education. Students select one of three technical tracks: Green Buildings, Green Sites, or Renewable Energy.

The ***Green Buildings*** track focuses on conserving energy in new and renovated residential and commercial buildings without sacrificing function and design. This track includes all aspects of sustainable design, from green materials and construction to efficient selection and operation of complex mechanical systems. Students learn to evaluate building designs on the basis of natural energy efficiency standards and how to integrate renewable energy systems into buildings. Students enter this track from the Architectural & Building Engineering Technology (ABT) and Construction Management (CPM) programs.

The ***Green Sites*** track focuses upon the art of responsible, inspired design and engineering for residential, agricultural, and commercial sites in order to enhance the quality, sustainability, and integrity of our built environment. Within this track, special emphasis is placed upon the design of the landscape, including structures, plantings, roads, and water systems, in order to minimize environmental impact; meet and create legislative standards; and promote an ethic of stewardship of the land and our natural resources. Students enter this track from the Civil & Environmental Engineering Technology (CET), Dairy Farm Management Technology (DFM), and Landscape Development & Ornamental Horticulture (LAH) programs.

The ***Renewable Energy*** track focuses on renewable energy technology and systems for efficient energy conversion and use. The technical curriculum includes courses in mechanical and electrical engineering that cover topics such as materials and structures; circuits and electronics; sensors and instrumentation; and electromechanical power systems. Energy systems courses address the use of solar, wind, alternative fuels, and other renewable technologies for electricity, heating, and other power uses. Students enter this track from Electrical Engineering Technology (EET) or Mechanical Engineering Technology (MEC) programs.

Students with associate's degrees from other majors may have individualized programs set up based on previous coursework and track requirements.

Students with a Bachelor of Science in Sustainable Design and Technology will be able to:

- Demonstrate a robust understanding of the environmental, climate, and energy challenges facing our state and society and the economic opportunities provided by meeting these challenges
- Apply critical and analytical thinking skills to determine where and when sustainable designs, technologies, and practices are appropriate and effective
- Demonstrate effective communication and be advocates for sustainability and environmental stewardship
- Develop a basic understanding of business and management practices.
- Demonstrate an understanding of the costs and benefits of a more sustainable approach to environmental, technological, economic, and societal issues
- Apply a high level of competence and technical mastery in their chosen green technical track.

Students may take SDT courses prior to completion of their associate’s degree if their schedule and prerequisites permit.

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

Green Buildings Track

for Architecture and Construction students

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
Core Classes:		Core Classes:	
SDT 3000 - SDT Seminar	1	SDT 3010 – Conflict/Comm	3
SDT 3111 - Energy Sys/Sust	3	SDT 3121 - SDT Design Studio I	3
SDT 4112 – Green Sites Survey	3		
ABT		ABT	
BIO 1020 - Intro Env Science	4	ARC 3010 - Dsn Systems Integration	3
BUS XXXX – business elective	3	ARC 3050 – Fndmntls Fluids/Therm	4
SDT 3110 – Codes/Loads/LEED	3	SDT 4113 – Green Bldg Tech Survey	3
CPM*		CPM	
ARC 2051 – Architectural Design I	3	ARC 2032 – Env Systems II	3
MAT 1520 – Calculus for Engineers	4	ARC 3010 – Design Sys Integration	3
PHY 1043 – Physics II for Arch	<u>3</u>	ARC 3050 – Fnd Fluids/Thermo	<u>4</u>
	17		16

Summer Course

SDT 4801 – Summer Internship 0

Fourth Year

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
Core Classes:		Core Classes:	
SDT 4110 – Controls/Commissioning	3	SDT 4122 - SDT Studio II	3
SDT 4802 - Internship Review	1		
ABT		ABT	
ARC 4020 - Arch Engrng Mgmt	3	ARC 3040 – Elec/Lighting Systems	3
ARC 4030 – HVAC Systems	4	BUS XXXX – business elective	3
CHE 1031 – General Chemistry	4	ELE XXXX - AH/SS elective**	3
ELE 3XXX – AH/SS elective**	3	MAT 2021 - Statistics	3
CPM		CPM	
ARC 4030 - HVAC Systems	4	ARC 3040 – Elec/Light Sys	3
BIO 1020 - Intro Env Science	4	CHE 1031 – General Chemistry I	4
ELE XXXX - AH/SS elective**	3	ELE XXXX – AH/SS elective**	3
SDT 3110 – Codes/Loads/LEED	3	MAT 2021 – Statistics	3
	18	SDT 4113 – Green Bldg Tech Survey	3
			19

* CPM students must complete MAT 1420 - Technical Mathematics I before entering the SDT program.

**Students must complete a minimum of two Arts and Humanities (AH) or Social Science (SS) electives, including at least one at the 3XXX level.

Two business courses, BUS 2020 - Principles of Management and BUS 4530 - Technical Project Management, are strongly suggested.

Green Sites Track*for Civil, Dairy, and Landscape students***Third Year**

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
Core Classes:		Core Classes:	
SDT 3000 - SDT Seminar	1	SDT 3010 – Conflict/ Comm	3
SDT 3111 - Energy Sys/Sust	3	SDT 3020 - Environmental Permitting	2
SDT 3130 – Environmental Soils	3	SDT 3121 - SDT Design Studio I	3
SDT 4112 – Green Sites Survey	3	SDT 4113 – Green Bldg Tech Survey	3
CET		CET	
AGR 2720 – Issues/Trends in Ag	2	AGR 3050 – Adv Nutrition Mgt	3
LAH 1020 - Intro to Horticulture	3	BUS XXXX – business elective	3
LAH 1021 – Landscape Graphics	3		
DFM		DFM	
CET 1031 - Computer Apps I	3	CET 1032 - Computer Apps II	3
LAH 1021 – Landscape Graphics	3		
LAH		LAH	
BIO 1020 – Intro Env Science	4	AGR 3050 – Adv Nutrient Mgt	3
CET 1031 – Computer Apps I	<u>3</u>	CET 1032 – Computer Apps II	<u>3</u>
	16-18		14-17
		Summer Course	
		SDT 4801 - Summer Internship	0

Fourth Year

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
Core Classes:		Core Classes:	
SDT 4010 – Water/Wastewater	3	MAT 2021 - Statistics	3
SDT 4802 - Internship Review	1	SDT 4020 – Ground/Storm Water	3
		SDT 4122 - SDT Studio II	3
CET		CET	
AGR 2040 – Forage Production	3	BUS XXXX – business elective	3
BIO 1020 - Intro Env Science	4	ELE XXXX - AH/SS elective**	3
BUS XXXX – business elective	3		
ELE 3XXX – AH/SS elective**	3		
DFM		DFM	
BIO 1020 - Intro Env Science	4	ELE XXXX – AH/SS elective**	3
BUS XXXX – business elective	3	PHY 1030 – General Physics	4
ELE 3XXX – AH/SS elective**	3		
LAH		LAH	
AGR 2720 – Issues/Trends in Ag	2	PHY 1030 – General Physics	4
CHE 1020 – Intro to Chemistry	4	ELE XXXX - AH/SS elective**	<u>3</u>
BUS XXXX – business elective	3		15-16
ELE 3XXX – AH/SS elective**	<u>3</u>		
	14-17		

***Students must complete a minimum of two Arts and Humanities (AH) or Social Science (SS) electives, including one at the 3XXX level.*

Two business courses, BUS 2020 - Principles of Management and BUS 4530 - Technical Project Management, are strongly suggested.

Renewable Energy Track

for Electrical and Mechanical students

Third Year

Third Year Fall Courses	Credits	Third Year Spring Courses	Credits
Core Classes:		Core Classes:	
BIO 1020 - Intro Env Science	4	SDT 3010 – Conflict/Comm	3
BUS XXXX – business elective	3	SDT 3121 - SDT Design Studio I	3
ELM 3015 – Sensors/Instruments	4	SDT 4030 – Renewable Energy Systems	3
SDT 3000 – Sustainable Dsgn Smnr	1	SDT 4113 – Green Bldg Tech Survey	3
SDT 3111 – Energy Sys & Sustain	3	EET	
SDT 4112 – Green Sites Survey	3	ARC 3050 – Fund Fluids/Therm	4
	18	BUS XXXX – Business Elective	3
		MEC	
		BUS XXXX – Business Elective	3
			15-19
		Summer Course	
		SDT 4801 - Summer Intrnshp	0

Fourth Year

Fourth Year Fall Courses	Credits	Fourth Year Spring Courses	Credits
Core Classes:		Core Classes:	
BUS XXXX – business elective	3	CHE 1031 – General Chemistry	4
ELE 3XXX – AH/SS elective**	3	MAT 2021 – Statistics	3
ELM 4015 – ELM Power Systems	4	SDT 4122 – SDT Studio II	3
SDT 4802 – Internship Review	1		
EET		EET	
Select One:		BUS XXXX – business elective	3
ARC 2031 - Env Systems	3	ELE XXXX – AH/SS elective**	3
ATT 2010 - Engine Performance	4		
ATT 2060 – Adv Tech Vehicle	4		
MEC 1020 - Manufacturing Processing	2		
MEC		MEC	
Select One:		BUS XXXX - business elective	3
ARC 2031 - Environmental Systems	3	ELE XXXX – AH/SS elective**	<u>3</u>
ATT 2010 - Engine Performance	4		16
ATT 2060 – Adv Technology Vehicle	4		
	13-15		

***Students must complete a minimum of two Arts and Humanities (AH) or Social Science (SS) electives, including at least one at the 3XXX level.*

Two business courses, BUS-2020 Principles of Management and BUS-4530 Technical Project Management, are strongly suggested.

Technical Education Program

The Vermont Mentor Program is an alternative process of teacher certification for people with professional experience in trades and industry and technical professional areas who need to complete the technical education courses required to teach in Vermont's Career and Technical Education Centers. Once employed as a Trades and Industry instructor or technical professional in a technical center, the student then takes: Methods and Materials in Technical Education I & II; Current Issues and Trends in Technical Education; Special Needs Students in Technical Education; Reading in Secondary Content Areas; and Adolescent Development.

Courses	Credits
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)	3
PSY 2310 – Adolescent Development	3
TEC 1110 – Issues and Trends in Technical Education	3
TEC 1120 – Reading in Technical Education Content Areas	3
TEC 1130 – Vocational Instruction for Students w/ Special Needs	3
	24

Note: Enrollment in the Technical Education Mentor Program or permission of the instructor is the prerequisite for all of the above courses.

Telecommunications Technology

The Associate of Applied Science degree in Telecommunications Technology program is part of a cooperative effort among Vermont Tech, the telecommunications industry, and other New England colleges. Presently, enrollment in the program is open only to employees of sponsoring organizations.

The program provides a thorough examination of state-of-the-art telecommunications technology, as well as a solid foundation in mathematics, electronics, physics, and general education subjects. The instructional approach is applications-oriented with a science and technology emphasis. Graduates of the program are proficient in the broad range of technical competencies required of highly-skilled telecommunications technicians.

The general education foundation in mathematics, computer applications, social science, and written and oral communications provides essential support for the specialized coursework in electronics and technical subjects specific to the telecommunications industry.

The minimum number of credits for the degree is 61.

FALL

First Semester	Credits
CIS 1030 - Introduction to Computer	3
MAT 1421 - Tech Math I	4
TCT 1000 - Telecommunications Orientation	1

Third Semester	Credits
ELT 2030 - Digital II	4
MAT 1422 - Tech Math II	4

Fifth Semester	Credits
ELT 1101 - General Electronics	4
TCT 1001 - Telecommunications I	4

Seventh Semester	Credits
ENG 2080 - Technical Communication	3
TCT 2003 - Telecomm II-LANS and WANS	4

SPRING

Second Semester Credits

ELT 1110 - Digital I	4
ENG 10XX - English*	3-4

Fourth Semester Credits

ELT 1070 - Electrical Circuits	4
PHY 1041 - Physics I	4

Sixth Semester Credits

TCT 1002 - Telecom II-Intro to Voice and Data	4
ELT 1102 - General Electronics II	4

Eighth Semester Credits

SSC XXXX - Social Science Elective	3
TCT 2004 - Telecom IV-Advanced Topics	4

**Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (See English Requirements page 157). This may require summer courses or additional terms.*

TCT 0001 – Asset Test Preparation may be a prerequisite to the first semester for some students.

Undeclared Associate Program

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 the associate degree undeclared program. Enrollment in this program may begin in either the fall or spring semester.

Students who might be interested in this program are uncertain about a major, want to begin college in mid-year, would like a lighter credit load each semester, would like a slower pace, or have other plans for the fall semester.

Students who enroll in the undeclared program will be expected to select a degree program as soon as possible. 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 departmental approval. Once in the program, students are expected to meet all the requirements of that program for graduation.

Enrollment in the undeclared program will either be in engineering or non-engineering and by be determined by placement test. It will also necessarily increase the time it takes to complete a degree. Students are not eligible to graduate as undeclared and will not have scheduling priority over matriculated students.

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

Sample Semesters:

Fall Entry	Credits	Spring Entry	Credits
XXX 1000 - Freshman Orientation	1	CIS XXXX - computer operations	2
CIS XXXX - computer operations	2	ENG XXXX – English*	3
ENG XXXX – English*	3	MAT XXXX – mathematics*	2-5
MAT XXXX - mathematics	2-5	SCI XXXX - science	3-4
SCI XXXX - science	3-4	ELE XXXX - elective	3
ELE XXXX - elective	3		15-18
	15-18		

**English and math courses based on placement test results*

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, and the newly-remodeled 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 Science in Veterinary Technology will be able to:

- Participate in facility management, utilize appropriate medical terminology, and communicate in a professional manner; as well as follow and uphold the applicable laws and the veterinary technology ethical code.
- Demonstrate safe and effective administration and dispensing of medications and explain prescribed drugs to clients
- Demonstrate and perform patient assessment, husbandry, nutrition, therapeutic, and dentistry techniques to various animal species
- Safely and effectively manage patients, anesthetic, and monitoring equipment in all phases of anesthetic procedures
- Understand and integrate all aspects of patient and equipment management for common surgical procedures in a variety of species
- Demonstrate the ability to handle, store, and properly analyze laboratory specimens
- Demonstrate the ability to safely and effectively produce diagnostic radiographic and non-radiographic images
- Demonstrate the ability to safely and effectively handle and provide care for common laboratory, avian and exotic animals

Students demonstrate competence by:

- Completing AVMA required psychomotor and didactic skills in each category in accordance with criteria of evaluation established by program faculty
- Taking quizzes, hourly and final examinations, and other written assessments as determined by the instructor

Students must satisfactorily complete all AVMA required tasks for each course to receive a grade in the course.

The minimum number of credits required for a degree is 70.

Two Year Curriculum

First Year

First Year Fall Courses	Credits	First Year Spring Courses	Credits
BIO 2320 - Zoology	4	CHE 1020 - Intro to Chemistry	4
MAT 1210 - Principles of Math	3	VET 1020 - Animal Anat/Physio	4
ENG 10XX – English*	3-4	VET 1040 - Animal Diseases	4
VET 1000 - Freshman Orientation	1	VET 1052 - Animal Care II	1
VET 1030 - Animal Care/Restraint	3	VET 1060 - Lab Techniques	5
VET 1051 - Animal Care I*	1		18
	15-16		

First Year Summer Course

VET 2801 - Vet Externship	0
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Second Year

Second Year Fall Courses	Credits	Second Year Spring Courses	Credits
CIS 1080 - Intro to S/D Mgmt	2	ENG 2080 - Tech Comm	3
VET 2011 - Clinical Techniques I	3	VET 2012 - Clinical Techniques II	3
VET 2030 - Animal Nutrition	2	VET 2040 – Reprod/Genetics	3
VET 2050 - Applied Lab Methods	4	VET 2060 - Office Procedures	3
VET 2070 – Pharm/Toxicology	3	VET 2080 - Animal Behavior	2
VET 2720 - Veterinary Supervisor*	1	VET 2090 - Vet Tech National Exam	1
VET 2802 - Externship Review	1	ELE 2XXX - AH/SS elective**	3
ELE XXXX - AH/SS elective**	3		
	19	Optional:	
		VET 2720 - Veterinary Supervisor*	1
			18-19

*Students who do not place into ENG 1060 or 1061 may take up to three terms to complete English Composition (See English Requirement page 99). This may require summer courses or additional terms to complete the degree.

**Students must complete a minimum of one Arts and Humanities (AH) and once Social Science (SS) elective.

*** Must be taken at least once, but 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.

General Education Requirements

The goals of Vermont Tech's general education component, within both the prescribed and the elective areas of the curriculum, are to foster within each student an appreciation for the major domains of human achievement; to provide a common educational experience; to refine critical thinking, writing, information literacy, and communication skills; to nurture civic responsibility; to celebrate diversity and common values; to foster life-long learning; and to produce a well-rounded graduate.

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.

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.

Depending on specific program requirements, each associate's degree student will complete a minimum of the following list:

- 3 credits of English (composition, writing, and research)
- 3 credits of Technical Communication
- 4 credits of natural sciences
- 1 credit of information technology
- 3 credits of arts and humanities
- 3 credits of social science
- 3 credits of mathematics/critical thinking

In addition to the basic associate's degree requirements, and depending on specific program requirements, each bachelor's degree student will complete a selection from the following list:

- 6 credits of arts/humanities or social sciences (3 credits minimum at the 3XXX level)
- 2 credits of information technology
- 4 credits of natural sciences
- 2-3 credits of mathematics/critical thinking

All courses that are at a higher level or are a continuation of the listed initial courses will meet the general education requirements of the initial offerings. For example, if PHY 1041 is listed as meeting the science requirement, PHY 1042 also will satisfy the science requirement.

Students need to work with their advisors to develop a plan to meet the general education elective requirements.

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 1041 or ESL 1041 (with a “B” or better); ENG 1042 and ENG 1043
- ENG 1042 and ENG 1043
- ENG 1060 or ENG 1061

For most programs, students who do not place into ENG 1060 or 1061 might take up to three terms to complete English Composition. 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.

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. The following courses meet minimum IT requirements:

ACC 1010 Computerized Accounting	3	CIS 1160 Fndmntls of Prgrmmng in C	1
ARC 1021 Architectural CAD I	2	CIS 2025 “C” Programming	4
BUS 1051 Information Processing I	3	CPM 1021 Construction Graphics I	1
BUS 2131 Office Administration I	3	CPM 2050 Const Mgmnt Software	1
CET 1031 Eng/Survey Comp Apps I	3	LAH 1031 CAD for Landscape Design	1
CIS 1030 Introduction to Computer	3	MEC 1011 Design Communication I	2
CIS 1050 Intro to Spreadsheets	1	MEC 1050 Comp Apps for Mech	1
CIS 1080 Intro to S/D Mgmt	2	NUR 1020 Nurse/Client Relationship	3
CIS 1151 Website Design	3	RSP 1011 Respiratory Care I Lab	4

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.

ARC 2040 Construction Practices	3	MAT 1112 Intro to Tech Math II	5
CIS 1420 Computational Foundations	4	MAT 1210 Principles of Mathematics	5
CPM 2010 Construction Estimates	3	MAT 1221 Finite Mathematics	3
MAT 1040 Math for Allied Health	2	MAT 1340 Algebra and Trig	5
MAT 1100 Math for Technology	3	MAT 2021 Statistics	5
MAT 1420 Technical Mathematics	5	MAT 2120 Discrete Structures	3
MAT 1111 Intro to Tech Math I	5	PHI 1030 Intro to Logic	3

Natural Sciences Requirements

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

BIO 1020 Environmental Biology	3	CHE 1020 Introduction to Chemistry	4
BIO 1030 Nutrition	3	CHE 1031 General Chemistry I	4
BIO 1220 Botany	4	PHY 1021 Intro to Newtonian Mech	4
BIO 2011 Human Anat/Physio I	4	PHY 1022 Energy Cons/Equilibrium	4
BIO 2012 Human Anat/Physio II	4	PHY 1041 Physics I	4
BIO 2040 Entomology	3	PHY 1042 Physics II	4
BIO 2120 Elements of Microbiology	4	PHY 2041 Funds of Physics I w/Calc	4
BIO 2320 Zoology	4	PHY 2042 Funds of Physics II w/Calc	4

Arts and Humanities Electives (AH)

Each associate degree student will be exposed to the methods of inquiry and major concepts in the arts and humanities. Courses at the associate's level will be offered in survey 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 meet program and curriculum expectations for more in-depth student learning and understanding.

ARH 1010 Intro to Art History	3	HUM 2080 Lit/Cult of Witchcraft*	3
ARH 2660 European Classroom	3	HUM 2110 Vietnam in Lit/Film	3
BUS 3410 Business Ethics	3	HUM 2330 Peace Studies*	3
ENG 1070 Effective Speaking*	3	HUM 2350 Mindfulness/Meditation*	3
ENG 1310 Intro to Literature	3	HUM 2710 Special Topics in Hum*	3
ENG 2070 Grant Writing	3	HUM 3050 Theories of Sci/Tech*	3
ENG 2101 Intro to Creative Writing*	3	HUM 3070 Vampire in Lit/Cult/Film*	3
ENG 2320 Themes in American Lit*	3	HUM 3330 Peace Stud/Peacemaking*	3
ENG 2485 Lit of Peace/Pacifism*	3	HUM 3490 Crime & Punishment*	3
ENG 2550 Science Fiction Lit	3	ITA 1011 Italian I*	3
ENG 2590 Stephen King in Lit/Film*	3	MUS 1010 Music Appreciation*	3
ENG 3485 Tradition of Anti-war Lit*	3	MUS 1028 History of Rock and Roll*	3
ENG 3590 Film/Nov of Stephen King*	3	PHI 1010 Intro to Philosophy*	3
FRE 1111 French I	3	PHI 1030 Intro to Logic*	3
HUM 2010 Educational Inquiry	3	PHI 1040 Intro to Ethics*	3
HUM 2020 Bioethics*	3	PHI 2010 Comparative Religion*	3
HUM 2030 Folklore*	3	PHI 2060 Business Ethics	3
HUM 2040 The Holocaust	3	SLS 1011 Sign Language*	3
HUM 2050 Women's Spirituality	3	SPA 1011 Spanish I*	3
HUM 2060 Cyberethics	3	THA 2060 Women in Film*	3
HUM 2070 Vampire in Lit/Cult/Film	3	THA 2070 Comedy in Film*	3

*Courses marked with an asterisk may be offered regularly at Vermont Tech.

CCV course HUM 1000 does not meet the Vermont Tech AH elective requirement.

Social Sciences Electives (SS)

Each student will be exposed to an understanding of human behavior, personality, politics, and economics, as well as the social context of human interaction, in survey and special topics courses designed to enhance reading, writing, and communication skills within the context of the social sciences.

The following courses may be used to satisfy the AH/SS elective requirements and are offered at Vermont Tech or other VSC schools, but might not be offered every semester.

ANT 1010 Cultural Anthropology*	3	HIS 1112 World History II*	3
BUS 2140 Personal Finance*	3	HIS 1120 Modern World History	3
BUS 2440 Intro to Business Law*	3	HIS 1211 American History I*	3
BUS 2450 Business Law	3	HIS 1212 American History II*	3
CRJ 1010 Intro to Criminal Justice	3	HIS 1220 Native American Hist/Cult	3
ECO 1010 Economics & Society	3	HIS 1230 History of America to 1763	3
ECO 2020 Macroeconomics*	3	HIS 1240 Colonial America/Revolution	3
ECO 2030 Microeconomics*	3	HIS 1260 IT Past/Present/ Future*	3
ENV 1110 Intro to Env Problems	3	HIS 2070 Vermont History*	3
ENV 2070 Environmental Law*	3	HIS 2110 U.S. History 1945-Present	3
ENV 3050 Issues in Env Studies*	3	HIS 2120 Social Reform in America*	3
GEO 1010 World Geography*	3	HIS 2130 African American History	3
GEO 1020 Physical Geography	4	HIS 2140 The Civil War	3
GEO 1030 Intro to Plan & Zone	3	HIS 2150 History of U.S. in the 60s*	3
GEO 1040 Maps & Map Reading	3	HIS 2210 Women in US History	3
GEO 1050 Geography/ Econ Dev	3	HIS 2220 The Wild, Wild West	3
GEO 1060 Geography Modern Ovrw	3	HIS 2230 Modern Russian History	3
GEO 2010 Connecticut River Valley	3	HIS 2240 Survey of Eurasia	3
GEO 2030 Rural Land Planning	3	HIS 2250 Modern Middle East Hist	3
GEO 2060 Env Problems in Geog	3	HIS 2270 Soc/Env in History	3
GEO 2070 North America	3	HIS 2330 Traditional Asia	3
GEO 2090 Africa	3	HIS 2340 Modern Chinese History	3
GEO 2150 Cultural Geography	3	HIS 2350 Modern Pacif Asian History	3
GEO 2160 Travel and Tourism	3	HIS 2410 Latin American Hist/Cult	3
GEO 2910 Independent Study	1	HIS 2420 Modern Latin American Hist	3
HIS 1011 Western Civilization I	3	HIS 2430 Survey of Africa	3
HIS 1012 Western Civilization II	3	HIS 2440 African Civilization	3
HIS 1020 Comparative Civilizations	3	HIS 2450 Modern African History	3
HIS 1111 World History*	3	HIS 2510 Historian at Work	3

Social Sciences Electives (SS) *Continued*

HIS 2520	Intro to Genealogy	3	POS 2120	Consumer Law	3
HIS 2530	Women in History	3	POS 2701	Environmental Politics	3
HIS 2660	European Classroom*	3	POS 2310	Environmental Politics	3
HIS 2710	Special Topics in History*	3	PSY 1010	Intro to Psychology*	3
HIS 2720	Special Topics VT History	3	PSY 1020	Child Abuse & Neglect	3
HIS 2730	PC/Truth/20th Century	3	PSY 1030	Psych of Consciousness	3
HIS 3165	VT History & Government	3	PSY 1040	Human Interaction	3
POS 1010	Intro to Political Science	3	PSY 1050	Human Growth/Dev*	3
POS 1020	Intro to Amer Politics/Gov*	3	PSY 1110	Observe, Record, Report	3
POS 1030	Comparative Government	3	PSY 1121	Intro Behavior Analysis	3
POS 1040	African-American Hist/Poli	3	SSC 2020	Experience Russia	1
POS 1050	The Constitution	3	SSC 2040	Experience Brazil	1
POS 1060	Law & the Individual	3	SSC 2050	Experience China	1
POS 2010	Observ Legal Process	0	PSY 2310	Adolescent Development*	3
POS 2020	Family Law	3	SSC 2010	Sci, Tech, and Society	3
POS 2030	UN & World Politics	3	SSC 2030	Energy and Society	3
POS 2040	International Relations	3	SSC 3010	Revolution: Call to Serve*	3
POS 2050	International Econ/Politics	3	SSC 3045	News & Newspapers*	3
POS 2110	State/Local Government*	3			

* Courses marked with an asterisk (*) may be offered regularly at Vermont Tech.

Learning outcomes for students taking courses in English, humanities, and social sciences include:

- Gains experience with the unique content and methods of inquiry in social sciences and in arts/humanities
- Demonstrates competence with written communication by achieving the required standard on the written communication assessment
- Focuses written work around an explicit or implicit central thesis
- Develops the central thesis as appropriate to the audience, using specific details and supporting evidence
- Organizes written work clearly and logically
- Uses correct grammar, syntax, punctuation, and spelling
- Follows standard practices in quotation, summary, paraphrase, and citation of textual material

Course Descriptions

Key to Course Subject Abbreviations

ACC Accounting	FSC Fire Science
AGR Agricultural and Animal Science	GEO Geography
AHS Allied Health Science	HIS History
ARC Architecture	HUM Humanities
ARH Art History	INT Interdisciplinary
ATT Automotive	ITA Italian
BIO Biological Sciences	LAH Landscape
BUS Business	MAT Mathematics
CET Civil & Environmental Engineering	MEC Mechanical Engineering
CHE Chemistry	MUS Music
CIS Computer Science	NUR Nursing
CPE Computer Engineering	PHI Philosophy
CPM Construction	PHY Physics
DHY Dental Hygiene	POS Political Science
DSL Diesel	PSY Psychology
ECO Economics	RSP Respiratory Therapy
EDU Education	SDT Sustainable Design
ELT Electrical Engineering	SSC Social Science
ELM Electromechanical Engineering	TCT Telecommunications
ENG English	TEC Technical Education
ENV Environmental Studies	THA Theatre Arts
EQS Equine Studies	VET Veterinary
ESL English for Speakers of Other Languages	XXX Individual Research, Independent Study and Interim Special Topics

NOTE: Students without the prerequisites for any course must obtain the permission of the instructor.

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 2121 or 1020

ACC 1020 Survey of Accounting (3) **fall/spring**

Students acquire basic familiarity with processing accounting transactions for service and merchandise businesses, including cash receipts and accounts payable; cash payments and accounts payable; and payroll. Students prepare and analyze financial statements and develop an understanding of inventory valuation, depreciation of plant assets, and generally accepted accounting principles; 3 hours of lecture per week. Prerequisite: None

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. Prerequisite: None

ACC 2122 Managerial Accounting (4) **spring**

This course is a continuation of Financial Accounting and covers accounting concepts of partnerships and corporations. Topics also include bonds, investments, financial statement analysis, and cash-flow analysis. Students will gain entry-level skills which permit employment in keeping accurate financial records for a small business; 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

Agriculture and 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. Prerequisite: None

AGR 1012 Agricultural Techniques II (1)

spring

This is a continuation of AG 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. Prerequisite: None

AGR 1030 Animal Reproduction and 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 selection systems; 3 hours of lecture per week. Prerequisite: None

AGR 1050 Livestock Production (3)

fall

This course focuses on the study and discussion of livestock applicable to the New England agricultural industry. 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. Prerequisite: None

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 (3)

fall

This course concentrates on the profitable care and management of a dairy herd. Detailed practices that are essential to operating a modern, efficient dairy herd are presented in lecture. These principles are reinforced in laboratory experiences that utilize the college herd. Various field trips are planned to complement what is taught in lecture and laboratory. Active student participation is expected. Dairy Herd Management I deals with record keeping and the development and implementation of breeding and feeding programs that will accomplish a desired set of goals. Students also learn how to manage the reproductive performance of the herd as well as how to raise quality herd replacements. Further covered is the production of quality milk and the ability to identify weaknesses in a dairy operation; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: AGR 1030, 2030 or instructor permission

AGR 2012 Dairy Herd Management II (3)

spring

A continuation of Dairy Herd Management I with emphasis on execution of the objectives identified in AGR 2011 and BUS 2260 as it pertains to business on a dairy farm; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: AGR 2012 *or* instructor permission

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. Prerequisite: None

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. Prerequisite: None

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. Prerequisite: None

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. Prerequisite: None

AGR 2060 Beef Production (3)

spring

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 health issues will also be discussed; 1 hour of lecture, 2 hours of laboratory per week. Prerequisite: None

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. Prerequisite: None

AGR 2720 Issues and Trends in Agriculture (2)

fall

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 3110 Apples, Berries, and 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, *or* instructor permission

Allied Health Science (AHS)**AHS 2011 Emergency Medical Service (6)****fall**

This course combines classroom and laboratory instruction in all phases of pre-hospital emergency care at the emergency medical technician level. Clinical practice includes patient assessments, required participation in ambulance/rescue emergency service response, and hospital experience. This course prepares students for EMT-B and CPR/AED certification through a written exam, hospital care, and proficiency skill testing. In addition, after successful completion of this course, students will be eligible to take the NREMT EMT-B certifying exam; 4 hours of lecture, 2 hours of laboratory per week. Prerequisite: None [Course fee: \$200]

AHS 2035 First Aid and 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 lecture per week. Prerequisite: None

Architecture (ARC)**ARC 1000 Freshmen Orientation (1)****fall**

This course provides a forum for first-year students to learn about the program and about the architecture profession, the building construction industry, and related engineering disciplines. Skills that will assist the student in having a successful experience at the college are also discussed. The course makes use of guest speakers from within the college community and from the building industry; 1 hour of seminar per week; graded Pass/No Pass. Prerequisite: None

ARC 1010 Architectural Woodframe Construction (3)**fall**

This course covers basic instruction in architectural construction graphics and the use of hand drawing equipment, as well as an introduction to the materials of light woodframe construction. A set of drawings for a small residence is developed, in keeping with contemporary office practices; 6 hours of studio per week. Prerequisite: None

ARC 1021 Architectural CAD I (2)**fall**

This course covers basic instruction in computer-aided drafting and design as related to architectural and building engineering technology. The students will receive instruction using AutoCAD; 3 hours of studio per week. Prerequisite: ARC 1010 and CIS 1050 *or* instructor permission

ARC 1210 Construction Materials and Methods (6)

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 and drafting of construction assemblies. Hand drafting and CAD are both used in the latter; 4 hours of lecture, 3 hours of materials testing laboratory, and 3 hours of detailing studio per week. Prerequisite: ARC 1010 and 1021

ARC 1220 Architectural History (3)

spring

Through photo slide lectures, 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 through the present day. A major concentration is development since the 18th century, particularly in America, and its significance to today's society. Lecture discussions develop visual perception and knowledge of aesthetic principles from a view of architectural history; 3 hours of lecture per week. Prerequisite: None

ARC 2022 Architectural CAD II (3) spring

This course covers advanced instruction in computer-aided drafting and design for architecture. There will be combined lecture and studio sessions in the use of productivity modules to improve two dimensional plan/detail construction drawings, three-dimensional building models, and presentation rendering; 6 hours of studio per week. Prerequisite: ARC 1021 and 2051

ARC 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 laboratory 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. Prerequisite: concurrent enrollment in PHY 1043

ARC 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. Prerequisite: ARC 2031 or CPM 1010 and MAT 1420

ARC 2040 Construction Practices (3)

fall

This course is a combination of several distinct areas in the building construction industry. One half 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, take-offs, 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: ARC 1210

ARC 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: ARC1010, 1210, and 1220 and concurrent enrollment in ARC 2031 *or* CPM 1021, 1022, 1031, 1032, 111 and CET 1031

ARC 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 things such as zoning, building codes, and users of the building. Throughout the course, oral and graphic communication and presentation skills 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: ARC 2051

ARC 2720 Architecture Seminar (0)**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

ARC 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 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: ARC 2032 (may be concurrent with permission), 2051, and CET-2120 *or* CPM 2030 *or* AE.CET degree

ARC 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, reactions, member forces and moments in beams, frames, and trusses (2-D and 3-D) through both determinate and indeterminate methods, as well as approximate methods. Deflection analysis is also covered. Computer applications for analysis are used and matrix methods of analysis are introduced, as well as dynamics structural analysis; 3 hours of lecture per week. Prerequisite: MAT 1520 and CET 2040

ARC 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 constructability are also addressed; 3 hours of lecture per week. Prerequisite: ARC 3020, 3110, and CET 2120

ARC 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: ARC 2032, 3110, and SDT 3110 and ELT 3020 or SDT 4110

ARC 3050 Fundamentals of Fluids and 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; psychrometrics; basic thermodynamic processes; and HVAC; 3 hours of lecture, 3 hours of studio per week. Prerequisite: MAT 1520 and PHY 1043

ARC 3110 Codes and Loads (3) fall

This course provides students with an understanding of which codes and specifications govern the determination of design structural, 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. 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, HVAC, plumbing, electrical/lighting, and Senior Project. Lectures introduce topics and methods of application; the studio emphasizes the application of codes and methods on varying structure types; 1 hour of lecture, 3 hours of studio per week. Prerequisite: ARC 2032, CET 2120, and MAT 1520 *or* instructor permission

ARC 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 (beam and columns), one- and two-way slabs, and foundation footings and walls; 3 hours of lecture per week. Prerequisite: CET 2120, ARC 3110, and 3020

ARC 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 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 and tools, especially in a team setting on team projects; 3 hours of lecture per week. Prerequisite: ARC 2040

ARC 4030 HVAC Systems (4) fall

This course addresses the engineering aspects of heating, ventilating, and air conditioning systems design. There is a focus on mechanical systems for commercial buildings that includes psychrometrics, 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: ARC 2032, 3050, and 3110 *or* SDT 3110

ARC 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: ARC 2032 and 3050

ARC 4050 FE Exam Survey (1)**spring**

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 administered by most states as a first step toward professional licensure as a Professional Engineer (PE). 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 ARC 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. Applications are primarily in SI units to match the FE examination; 3 hours of lecture/ laboratory per week for 8 weeks. Prerequisite: Senior standing in AET or an ABET-accredited program *or* instructor permission

ARC 4720 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: ARC 2022, 3030, 3040, 3110, 4010, 4020, and 4030

Automotive (ATT)**ATT 1000 Freshman Orientation (1)****fall**

This course helps students to gain basic skills for success in the automotive technology program through library workshops, laboratory report writing workshops, and an introduction to Vermont Tech support services. The course also serves to introduce students to the automotive field and includes wide-ranging discussion on topics such as career opportunities, graduate stories, Vermont auto history, repair order writing, and flat rate vs. straight time pay scales; 1 hour of orientation per week; graded Pass/No Pass. Prerequisite: None

ATT 1010 Suspension and 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; the physics of hydraulics; vehicle suspension requirements; vehicle handling and dynamics; and the diagnosis of suspension problems; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

ATT 1020 Engine Diagnostics & Repair (4)**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, 3 hours of laboratory per week. Prerequisite: None

ATT 1040 Automotive Electrical Systems (4)

spring

This course is intended to give the student a thorough understanding of automotive 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, 3 hours of laboratory per week. Prerequisite: ATT 1120

ATT 1050 Alignment and 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; and the diagnosis of brake problems; 3 hours of lecture, 3 hours of laboratory, 1.5 hours of practical per week. Prerequisite: None

ATT 1120 General Electronics for Automotive (4)

fall

This course will introduce the student to general 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, and battery starting and charging systems; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

ATT 2010 Engine Performance (4)

fall

This course gives the student an understanding of fuel delivery systems as they relate to the internal combustion engine. Topics include engine air/fuel requirements, gasoline fuel injection systems, diesel fuel injection systems, and vehicle emissions and emission controls. 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: PHY 1030

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; 3 hour of lecture, 3 hours of laboratory per week. Prerequisite: ATT 1010, 1040, and PHY 1030

ATT 2030 Advanced Engine Performance (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; and causes of premature component failure are studied in detail; 4 hours of lecture, 3 hours of laboratory per week. Prerequisite: ATT 1120

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: None

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; and a basic introduction to fuel cell vehicles; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ATT 1020

ATT 2801/2802 Summer Internship/Internship Review (0/1) summer/fall

This course is a ten-week summer cooperative education experience followed by a one credit fall internship review; graded Pass/No Pass. Prerequisite: Departmental permission [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; critical observation; and interpretation of landscapes. The course will stress communication skills, as well as critical thinking and teamwork; 3 hours of lecture and 2 hours of laboratory per week. Prerequisite: None

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. Prerequisite: None

BIO 1220 Botany (4)**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. Prerequisite: None

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. Prerequisite: None

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. All methods of control are covered, but more emphasis is placed on bio-rational techniques; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: BIO 2040 *or* instructor permission

BIO 2040 Entomology (3)

fall

Entomology examines the biology and control 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 control strategies as part of an integrated approach to pest management. The most effective, least toxic, and sustainable methods of insect control are highlighted; 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; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: BIO 2012 recommended

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. Prerequisite: None

Business (BUS)

BUS 1010 Introduction to Business (3)

fall

The focus of this course is to survey the interconnected disciplines of management, marketing, finance, and information technology and to facilitate college success strategies such as note-taking, time management, test-taking, and study skills. Students will begin to develop effective oral and written communication, critical thinking, problem solving, and interpersonal skills necessary to succeed in a business environment; 3 hours of lecture per week. Prerequisite: None

BUS 1051 Information Processing I (3) fall

Students will develop skills in a variety of business competencies, including “touch” keyboarding at 45 words per minute, file management, basic functions of word processing using Microsoft Word, and preparation of business correspondence; 1 hour of lecture, 4 hours of laboratory per week. Prerequisite: None

BUS 1052 Information Processing II (3) spring

Students will develop advanced skills in a variety of business competencies, including “touch” keyboarding at 60 words per minute and advanced functions of word processing and desktop publishing using Microsoft Word and Microsoft Publisher; 1 hour of lecture, 4 hours of laboratory per week. Prerequisite: BUS 1051 or equivalent skills

BUS 2020 Principles of Management (3) fall

Students will understand styles and roles of effective management in today’s workplace. Both classic and modern topics will be included. Emphasis will be placed on the anatomy of organizations and the evolution of management theories through today’s LEAN concepts. Traditional topics include motivation, group dynamics, and organizational culture. Emerging topics include self-managed teams, coping with stress, and diversity in the workplace; 3 hours of lecture per week. Prerequisite: None

BUS 2131 Business Communication Technology (3) fall

This course will focus on computer software proficiency and professional business writing. Students will write business letters, memos, email messages, instant messages, blog postings, podcasts, and newsletters. Students will write, design, and create PowerPoint slides and will conduct computer training seminars; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: Basic skills in Microsoft Office

BUS 2132 Management Applications (3) spring

This course will focus on management theories and techniques applied with emphasis on the action skills that managers need for success. Course topics include accounting; conference and travel planning; 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. Prerequisite: ACC 2121 or 1020

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) Prerequisite: None

BUS 2150 Office Information Systems (3) spring

This course will examine the impact of technology and information systems on the evolution of today’s office. Topics include the history of information technology; hardware components and uses; software applications; networks and data communications; systems concepts; and applications. Emphasis is placed on the integration of people, equipment, procedures, and environments; 3 hours of lecture per week. Prerequisite: None

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. Prerequisite: None

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, pricing, and promotion. Students will learn marketing strategies well suited to small business operation; 3 hours of lecture per week. Prerequisite: None

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 (4)

fall

This course offers a clear, hands-on approach to learning the role, the process, and the skills of interpersonal, group, and public communications in professional and organizational settings. The distinctive feature and objective of the course is to understand the role of people in the organizational communication process, both individually and in work groups. Specific topics include the psychology of face-to-face communications; the role of non-verbal communication; teamwork and group dynamics; professional behavior; effective listening; and oral presentations; 4 hours of lecture per week. Prerequisite: None [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. Prerequisite: None

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 the Uniform Commercial Code, such topics as contracts, negotiable instruments, agency bailment, real property, and insurance are covered; 3 hours of lecture per week. (General Education: SS) Prerequisite: None

BUS 2720 Business Seminar (3)

spring

This course is designed to assist students in developing the attitudes and skills essential for career success. The focus is in two areas: *Job Search*, which includes researching the job market, writing a resume/cover letter, and preparing for job interviews; and *Senior Project*, which includes a two-part demonstration of essential skills and knowledge learned in the Business degree program. The project consists of individual written assignments and a team oral presentation; 3 hours of lecture per week. Prerequisite: Sophomore standing

BUS 3150 Production & Operations Management (3)

fall

This course develops the administrative skills needed to efficiently manage the elements of production: materials, facilities, and staffing. Quantitative models (Management Science) are used to optimize the efficient use of resources; 3 hours of lecture per week. Prerequisite: MAT 2021 and junior standing *or* instructor permission

BUS 3250 Organizational Behavior and Management (3)

spring

Students will explore the foundations of individual and group behavior and discuss how attitudes and values contribute to or detract from individual success, as well as the success or failure of organizations. Students will classify various personality characteristics and discuss how these characteristics influence the ways people and groups feel and behave as they do in organizations; 3 hours of lecture per week. Prerequisite: BUS 2020

BUS 3260 Investments and 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: BUS 2260 and ACC 1020 or 2121

BUS 3410 Business Ethics (3) fall

This course is designed to develop an awareness of ethical issues in organizations and encourage students to reflect upon the values underlying policy-making and operational decisions. In this process, students will need to reflect upon their personal values and the sources of ethical standards in today's culture. The ultimate goal of the course is to underscore ethical concerns as a basic and articulated part of organizational culture. Students will be required to write a formal research paper on a topic related to business ethics; 3 hours of lecture per week. Prerequisite: ENG 1061 *or* equivalent

BUS 4310 Business Information Architecture (3) fall

Students will learn and apply theory, process, design, and development to create effective, user-centered oral, written, printed, and electronic information. Components of the course include human interactions in the workplace; the convergence of communication and computing systems; and the unintended consequences of the Information Age, such as information glut, trash, and hype. Students will write and design copy for business applications including letters, memos, email messages, instant messages, blog postings, podcasts, oral presentations, and PowerPoint slides; 3 hours of lecture per week. Prerequisite: BUS 2020

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

Designed for the project manager who interacts with all levels of management while satisfying the customers' needs, this course covers planning, scheduling, and controlling projects. Emphasis will be placed on issues like leadership, motivation, team-building, and conflict resolution. CPM and PERT will be covered in detail. Real case studies will be used extensively to illustrate theories and concepts covered in the lectures; 3 hours of lecture per week. Prerequisite: BUS 2020

BUS 4730 Senior Project (3) spring

This is a capstone course that integrates knowledge and skills developed through other coursework and life experience. The course will focus on special topics in business and a specific business issue or problem. Students will work in cross-functional teams to select a project which involves solving a common business problem. Students will research the topic extensively and prepare a team oral presentation of their solution. Presentations will be judged by business and industry professionals. Students will also prepare written documentation as part of their project; 3 hours of lecture per week. Prerequisite: Senior standing

Civil & Environmental Engineering (CET)

CET 1000 Freshman Orientation (1)

fall

This course will focus on the skills required by students for success in the CET program. The course may have guest speakers and field trips to construction projects and public facilities that will give the student a picture of the variety of work done by civil engineers and the job opportunities in the field; 1 hour of seminar per week. Prerequisite: None

CET 1011 Surveying I (3)

fall

The course introduces fundamental surveying principles and methods, including the measuring of distances, angles, difference in elevation, and instruction and practice in the care and use of equipment. Areas covered are bearings; cross sections and profiles; note keeping; computations and field practice relating to traverses; an introduction to geodetic surveying; the basics of construction surveying; and the adjustment of surveying instruments. 2D and 3D coordinate transformation is introduced; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: Concurrent enrollment in MAT 1420

CET 1020 Engineering Materials (4)

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. Prerequisite: None

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 Carlson 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 (3)

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 (AutoCAD). 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. Prerequisite: None

CET 1032 Engineering & Surveying Computer Applications II (3)

spring

This course is a continuation of CET 1031 intended to provide proficiency in the creation and understanding of working drawings related to Civil and Environmental Engineering Technology. Covered AutoCAD topics include advanced AutoCAD entity manipulation, customization, and programming. The student is introduced to a civil and environmental/survey software package used for site mapping, terrain modeling, and road and utilities design. In addition, related technologies such as Geographic Information Systems (GIS), their application, and data sources are discussed; 1 hour of lecture, 6 hours 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, 6 hours of laboratory per week. Prerequisite: CET 1011 and 1032 and MAT 1420

CET 2020 Hydraulics and Drainage (3)**fall**

The course includes an introduction to the fundamental concepts of fluids, fluids at rest, measuring devices, pressure diagrams, buoyancy, and steady flow. Calculations with computer applications are made for head losses, open channel flow, hydrology, and runoff. Pump characteristics and water distribution systems are also studied; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1520 and PHY 1041 or 1022

CET 2030 Environmental Engineering & Science (3)**fall**

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 fieldtrips to environmental facilities; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: CHE 1031, MAT 1420, and PHY 1041 or 1022

CET 2040 Statics and 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 and PHY 1041 or 1022

CET 2050 Civil and 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, and 2040; concurrent enrollment in CET 2060, 2110, 2120

CET 2060 Construction Estimates and Records (3)**spring**

A study of construction planning, equipment, and methods is incorporated with the study of construction contracts, specifications, and working drawings. Various types of plans and specifications are used as a basis for determining the construction methods and materials to be used on a project. These plans are also used for preparing cost estimates and CPM schedules. Earned value analysis and project accounting is introduced. Computers are used throughout the course for problem solving, estimating, and record keeping; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: CET 1011 and 1032

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; and soil strength. 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 (4)

spring

This course is a study of the design of structural systems using wood, reinforced concrete, masonry, and steel. The design of various structural members and systems, such as tension members, beams, columns, connections, walls, and foundations is presented in accordance with relevant design codes. Laboratory work consists of the application of building and design codes to the design of structural systems and generation of detail drawings; 3 hours of lecture, 3 hours laboratory per week. Prerequisite: CET 2040

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. Prerequisite: None

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. Prerequisite: None

CHE 1031 General Chemistry I (4)

fall/spring

This course is intended for engineering students and consists of the fundamentals of general and physical chemistry. Laboratory work is designed to amplify the lectures, provide an introduction to laboratory techniques, and introduce some methods of analysis currently used in industry; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: None; recommend math placement level 3

CHE 2060 Principles of Organic Chemistry (4)

as required

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. Prerequisite: None

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. Prerequisite: None

CIS 1080 Introduction to Spreadsheets and Database Management (2) fall/spring

This course introduces students to the use of email, MAPLE 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. Prerequisite: None

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. Prerequisite: None

CIS 1151 Website Development (3) fall

This course includes the introduction of web pages for commercial web sites including use of and design with Hypertext Markup Language, 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. Prerequisite: None

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 JAVA Scripts; 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; use of basic SQL programming; use of Cold Fusion to reformat text and databases and dynamic web pages; and use of style sheets; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 1151

CIS 1160 Fundamentals of Programming in C (1) spring

Fundamentals of programming in C is a course intended to be a gentle introduction to writing programs in a Windows environment. It is taught using the C programming language, but focuses primarily on concepts such as variable declarations, *if* statements, and loops that are common to most popular programming languages. Students also learn how to manage files and directories, run programs, edit text files, and use a computer. This course is open to all majors who would like to take an introductory programming course; 3 hours of laboratory per week. Prerequisite: None

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: CIS 2271

CIS 2025 C Programming (4)

fall/spring/on-line

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 on-line versions. Sufficient internet skills and the permission of the instructor are required to take the course on-line; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

CIS 2151 Computer Networks I (4)

fall/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. IPX/SPX is also discussed. Topics include Ethernet and token ring networks, connectionless protocols, connection-oriented protocols, and application protocols such as SMTP, NNTP, and HTTP. Students learn about both hardware and software troubleshooting tools, security issues, and current topics such as IPv6. The way network software is written, both on the server side and the client side, is also covered; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: CIS 2025 or 2271

CIS 2230 System Administration (4)

spring

In this course the student explores the basics of system management. 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. Some topics in computer security are also discussed. Unix and Windows NT/2000 are the specific systems studied; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: CIS 2025, 2271, or 2280

CIS 2235 Advanced System Administration (4)

spring

This course provides an investigation into the issues involved in managing information technology systems at the enterprise level. Topics covered may include global authentication mechanisms, shared file systems, mail servers, backup/restore, license servers, application servers, and firewalls; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 2151 and 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 C++ 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: CIS 2010, 2025, or 2271

CIS 2271 JAVA Programming (4)

fall

This course will introduce the student to basic concepts of JAVA and Object Oriented Programming (OOP). The course begins with basic concepts of OOP. These include classes, objects, inheritance, polymorphism, and object oriented design. The course will then cover the language features of JAVA. The topics in this section are: program structure; statement and field types; operators; expressions; and control structures. The course then returns to OOP features of JAVA, focusing on object data types, strings, methods, classes, and constructors. The final section addresses graphical user interface (GUI). The topics are: applets, GUI components (e.g. buttons), event processing, and frames; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: None

CIS 2280 Perl Programming (2)**spring**

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 2010, 2025, or 2271

CIS 2320 Software Quality Assurance and 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 2010, 2271, or 2025

CIS 2610 Topics in Information Technology (3)**fall**

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 and 2230

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, 3 hours laboratory per week. Prerequisite: ELT 1080 and 2050, CIS 2151 and 2260, concurrent enrollment in CIS 2230 [Course Fee: \$50]

CIS 2730 Software Engineering Projects (3)**fall/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 and 2271

CIS 3010 Database Systems (4)**spring**

In this course, students study a method for designing relational databases, the use of SQL to access data stored in a relational database, and the use of a commercial database management system to implement a relational database system. Students are required to implement a real-world example relational database as a project. Additional topics that may be discussed as time and class interest permit include: VBA, DAO and ActiveX, ODBC, and JDBC; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: CIS 2230 or equivalent

CIS 3030 Programming Languages (3)**fall**

This course introduces the student to a variety of important or current languages. The idea is to give the student more exposure and experience with programming by showing the student how various languages can be used to solve various problems. The intent is to cover languages of practical and theoretical importance. Some software engineering techniques are also introduced; 3 hours of lecture per week. Prerequisite: Concurrent enrollment in CIS 3050

CIS 3050 Algorithms and 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. The language used is C++ with an emphasis on the C++ Standard Template Library; 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 *or* instructor permission

CIS 3152 Networks II (4) spring

This is a second course in networks with an emphasis on the upper layers of the OSI model and network programming. Topics include TCP/IP protocol behavior (including coverage of IPv6), client/server programming, and an application level protocol such as HTTP or SMTP/MIME. An introduction to character sets and XML is also presented. In addition, RPC and a distributed object system such as CORBA are covered; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: CIS 2151

CIS 3170 History of the Theory of Computation (3) spring

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, Turing machines, implications of Shannon's Limit, and Moore's Law will be studied. The course is also offered on-line; 3 hours of lecture per week. For non-computer students (General Education: SS) Prerequisite: Junior standing

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. Prerequisites: CIS 2260 and MAT 2120

CIS 3311 Budgeting and Planning IT Infrastructure (3) fall

This course is an introduction to the budgeting and planning for a major information technology infrastructure change or upgrade. Topics covered include capacity planning, technology requirements, RFP/RFQ processes, technology appropriateness, and lifecycle considerations. Students will develop a complete information technology proposal; 3 hours of lecture per week. Prerequisite: ACC 1020 or 2121, CIS 2235

CIS 3312 Deploying and Monitoring IT Infrastructure (3) spring

This course is an introduction to deploying and monitoring substantial information technology infrastructure systems and considers issues such as rolling versus big bang deployments, transition periods, heterogeneous versus homogeneous environments, optimizing deployments, and monitoring tools for all forms of software and hardware information technologies; 3 hours of lecture per week. Prerequisite: CIS 2151 and 3311

CIS 4020 Advanced Operating Systems (4)**fall**

In this course, students study the internal workings of modern operating systems. Topics include file systems, multiprocessing, memory management, and device drivers. Distributed operating systems and real time operating systems are also discussed. As part of this course students write a significant Linux kernel module and a device driver for some commercially important operating system; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: CIS 2230, 3050, and 3152

CIS 4030 GUI Programming (3)**fall/on-line**

Modern Graphical User Interface (GUI) design and implementation methods are studied. The course uses JAVA as the base language. Industry standard libraries, such as Swing and Open GL, are used for programming coursework; 3 hours of lecture per week. Prerequisite: CIS 2271 or 3030

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 systems, digital signatures, secure hashes, cryptographic random number generation, and message authentication codes. Network security topics are also covered including secure protocols (SSH, SSL, IPSec), network attack methods, network authentication protocols (for example, 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 3040 or 3152

CIS 4050 Compiler Design (3)**spring**

This course investigates how languages are implemented and gives the student enough knowledge to build specialized “mini languages” for niche applications. Students will use compiler generation tools, such as Lex and Yacc, and will create some hand-built components. Although some theory is presented, the emphasis is on implementation (programming) rather than theorem-proving. Most programming is done in C, but other languages (C++, JAVA) are also used; 3 hours of lecture per week. Prerequisite: CIS 3030 and 3050

CIS 4120 Systems Analysis and 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 CIS or CPE and CIS 2260

CIS 4130 Introduction to Software Engineering (3)**as required**

This course continues beyond good programming techniques to design modeling techniques for process, event, object, and data modeling and utilizes an underlying framework call UML (Unified Modeling Language); 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: CIS 3070 or 3090

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: CIS 2260 and 1152

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 3030 and 3050

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 and MAT 1520

CIS 4220 Physical Simulations (3)

as required

This course is an introduction to simulating Newtonian physics in a computer program; 3 hours of lecture per week. Prerequisite: CIS 3050, MAT 2520, and PHY 1041

CIS 4230 Parallel Programming (3)

as required

This course examines the algorithms, programming, configuration, and performance of parallel programs. Parallelism at both the local thread level and distributed across machines is considered; 3 hours of lecture per week. Prerequisite: CIS 2151 and 3050

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 in a computer program [Course fee: \$50.00]

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, departmental faculty, and invited guests (including potential employers); 1 hour of lecture, 6 hours of laboratory per week. Prerequisite: CIS 4711 *or* instructor permission [Course fee: \$50.00]

CIS 4721 Information Systems Technology Senior 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; 4 hours of laboratory per week. Prerequisite: Senior standing in the CSE or CIT programs

CIS 4722 Information Systems Technology Senior Project II (3)

spring

This course is the 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, departmental 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 Projects (3)**spring**

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 Freshman Orientation (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. Prerequisite: None

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 1031 and 1021 *or* instructor permission

CPM 1021 Construction Graphics I (1)**fall**

This course prepares students to interpret working drawings for residential and light commercial construction projects by teaching them to make their own basic architectural drawings on a drafting board. 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 and others in the program; 3 hours of laboratory per week. Prerequisite: None

CPM 1022 Construction Graphics II (1)**spring**

This course applies the lessons of CPM-1021 to the study and interpretation of construction specifications and drawings for residential and light commercial projects; 3 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. Prerequisite: Concurrent enrollment in CPM 1032 *or* instructor permission

CPM 1032 Construction Lab (2)

fall

Students are introduced to the basic materials and methods of commercial construction; 6 hours of laboratory per week. Prerequisite: Concurrent enrollment in CPM 1031.

CPM 1111 Commercial Construction Systems (4)

spring

This course introduces students to the construction materials and installation methods used in commercial I 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 BOCA building code. CPM 1111 is the same as ARC 1210 for the lecture portion; 4 hours of lecture per week. Prerequisite: CPM 1031 *or* instructor permission

CPM 2010 Construction Estimates (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 1031, 1111, 1022 and MAT 1100 or 1420 *or* instructor permission.

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. Prerequisite: None

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: MAT 1100 or 1420, PHY 1030, CPM 1031 and 1111

CPM 2050 Construction Management Software (1)

fall

This course exposes students to several commonly-used computer applications for construction management including advanced spreadsheets (Excel), estimating (Winest), and scheduling (Primavera Suretrak). Students will learn the software by working through tutorial-type exercises in a weekly computer laboratory run by an instructor; 3 hours of studio per week. Prerequisite: CET 1031 and CIS 1050 or 1080

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

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 and Project (4)**spring**

This course ties together all the previous courses for the CPM program. The lecture portion utilizes professionals from all phases of the construction process as guest speakers. In the laboratory, students read and interpret the contract and specifications for a commercial project of significant scope. Through individual and group work on this project, they develop a complete estimate of cost, construction time, a project schedule, a schedule of values, a safety plan, an environmental plan, and a quality control plan; 2 hours of lecture, 6 hours of laboratory per week. Prerequisite: Sophomore standing *or* instructor permission

CPM 2801/2802 Construction Internship/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: Departmental permission [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 take-offs 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 and Steel Lab (3)**spring**

This course covers current methods and equipment used in concrete, masonry, and steel construction. Laboratory exercises emphasize means and methods of commercial, engineering, and industrial construction. Reinforcement techniques; concrete form design and construction; and testing based on American Concrete Institute standards are covered; 3 hours of studio per week. Prerequisite: CPM major

CPM 4010 Contract Negotiations (3)**fall**

This course focuses on collective representation, including the history of collective bargaining and employment laws. Emphasis is placed on the unique aspects of the construction industry and practical approaches to construction labor issues are addressed. Local, state and federal labor laws and their effect on contract negotiations are also taught. The oral communication graduation standard will be evaluated in this course; 3 hours of lecture per week. Prerequisite: CPM 2020 or instructor permission

CPM 4020 Advanced Field Engineering (3)**fall**

This course focuses on advanced building construction layout, computer applications (including Land Desktop and SurveyPro), and an introduction to geographic information systems, global positioning systems, and laser imaging; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: CPM 2060 or CET 2012

CPM 4030 Construction Safety and 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. Prerequisite: None

CPM 4110 Construction Permits (3)

spring

This is an in-depth study of zoning, building, and life safety permits. Special emphasis is placed on contract implementation within the context of permit requirements. Analysis of the International Building Code, life safety, and development control laws are considered; 3 hours of lecture per week. Prerequisite: CPM 3020 or instructor permission

CPM 4120 Project Planning and 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 Superintendancy (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 4801 Summer Internship (0)

summer

This internship is an 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 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 (4)

fall

This course explores the principles of dental hygiene and provides an orientation to clinical practice and preclinical experience; 3 hours of lecture, 6 hours of laboratory per week. Prerequisite: None

DHY 1012 Clinical Dental Hygiene I (5)

spring

This course is a continuation of DHY 1011 with an early clinical experience; 3 hours of lecture, 8 hours of laboratory per week. Prerequisite: DHY 1011 and 1021

DHY 1021 Oral Tissues I (3)**fall**

This course is an introduction to dental terminology and the morphology and histology of the oral tissues; 2 hours of lecture, 3 hours laboratory per week. Prerequisite: None

DHY 1022 Oral Tissues II and 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 and 1021 and BIO 2011

DHY 1030 Dental Radiography (3)**spring**

This is the study, demonstration, and practice of fundamentals of intraoral radiographic technique. The student will learn to recognize radiographic appearance of common oral disorders; 2 hours of lecture per week, 2 hours of laboratory per week. Prerequisite: DHY 1011 and 1021 and BIO 2011

DHY 2010 Dental Materials (3)**fall**

This course is designed to emphasize the clinical and theoretical concepts of dental materials and their clinical application. This course blends 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 1012, 1022, 1030, and BIO 2012

DHY 2020 General Pathology and Clinical Dental Pharmacology (3)**fall**

This course is an introduction to clinical pathology and the pharmacological management of the treatment of dental patients. The student will learn to integrate diseases commonly found in dental hygiene practice with the pharmacologic agents used in management of those diseases; 3 hours of lecture per week. Prerequisite: DHY 2030, 2020, 2721 *or* instructor permission

DHY 2030 Periodontics (3)**fall**

This is the study of the morphologic and functional aspects of the supporting structures. The student will learn to recognize diseases of the periodontium and will learn therapeutic measures for the treatment of these diseases; 3 hours of lecture per week. Prerequisite: DHY 1012, 1022, 1030, and BIO 2012

DHY 2210 Community Oral Health (3)**spring**

This 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. Additionally, there is an introduction to sociological study with an emphasis on core models and concepts associated with major sociological perspectives; 3 hours of lecture per week. Prerequisite: DHY 2010, 2020, 2030, and 2721

DHY 2220 Oral Pathology (2)**spring**

This course is the study of the functional and organic diseases of the oral cavity and their clinical management; 2 hours of lecture per week. Prerequisite: DHY 2020, 2030, and 2721

DHY 2721 Clinical Dental Hygiene II (5)**fall**

This is the experience of clinical practice with patients from Class 0 to Class 5 periodontal conditions. Children, adults, and special populations are treated; 1 hour of lecture, 14 hours of clinic per week. Prerequisite: DHY 1012, 1022, 1030, and BIO-2012

DHY 2722 Clinical Dental Hygiene III (6)

spring

This is the continuation of DHY 2721 and involves clinical practice with patients from Class 0 to Class 5 periodontal conditions. Children, adults, and special populations are treated. The administration of local anesthetics will also be covered; 2 hours of lecture, 16 hours of clinic per week. Prerequisite: DHY 2010, 2020, and 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; offered on-line. Prerequisite: DHY 2722 *or* equivalent

DHY 3020 Advanced Periodontics (3)

fall

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; 3 hours of lecture per week; offered on-line. Prerequisite: DHY 3010

DHY 3030 Dental Hygiene Methodology and Leadership (3)

fall

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; laboratory and clinical instruction using educational media and software; and leadership skills; 3 hours of lecture per week; offered on-line. Prerequisite: DHY 3010

DHY 4010 Advanced Community Oral Health (3)

fall

This course is an in-depth study of the current issues surrounding today's public health care delivery system. Issues addressed include: access to health care, quality assurance, health care financing, and regulatory approaches to health care delivery in the public sector. Oral health care issues will be incorporated throughout the course with special emphasis on public health policy and practice; 3 hours of lecture per week; offered on-line. Prerequisite: DHY 3010

DHY 4610 Dental Hygiene Practicum (6)

fall

This course is designed to provide the student an opportunity to apply their knowledge of a chosen professional role through teaching, internship, observation, or work experience. This course will use student selected sites, on or off campus, to develop the expanding role of the dental hygienist in the health care system; 8 hours of practicum per week. Prerequisite: DHY 3020, 3030, and 4010

Diesel (DSL)

DSL 1010 Heavy Duty Suspension & Steering (4) fall

This course is designed to give the student a thorough understanding of the theory, design, and construction of heavy duty suspension and steering systems as used on highway trucks. The student will also become familiar with wheel alignments. Emphasis is placed on the geometry of links and levers; the physics of hydraulics and pneumatics; vehicle suspension and steering requirements; vehicle handling and dynamics; the diagnosis of suspension and steering problems; and the performance of wheel alignments; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

DSL 1020 Diesel Power Systems (4) spring

This course provides a comprehensive study of the theory, design, construction, and repair of the diesel power-plant. Topics include fixed and mobile diesel power systems; engine design (types and components); definition of power and calculations; engine disassembly/reconditioning and reassembly; cooling and lubrication systems; breathing and retarding systems; and run-in, performance, maintenance, and failure analysis; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

DSL 1040 Basic Diesel Electrical/Electronics Systems (4) fall

This course is intended to give students a thorough understanding of diesel electrical and electronic systems and to teach diagnostic and troubleshooting skills. Topics include Ohm's Law, basic circuit devices, circuit faults, basic computers, networks, feedback circuits, batteries, and charging and starting systems. The student will become familiar with various types of test equipment, diagnostic charts, and wiring diagrams; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

DSL 1050 Preventive Maintenance (3) spring

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. Prerequisite: None

DSL 1110 Heavy Duty Braking Systems (3) spring

This course is designed to give the student a thorough understanding of the theory, design, and construction of those mechanical devices utilized in hydraulic, pneumatic, and combination braking systems. Emphasis is placed on the geometry of links and levers; the physics of friction and hydraulics; pneumatic systems; vehicle braking requirements; and the diagnosis of braking problems. Parking brake systems, power boost systems, anti-lock braking systems, and dynamic stability control systems are also presented; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

DSL 2010 Fuel Systems (4) spring

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. Prerequisite: None

DSL 2020 Chassis Electrical and Electronic Systems (4)

fall

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

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 (4)

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 1060 and 2020

DSL 2050 Emissions and Engine Performance (4)

spring

This course is intended to give students a thorough understanding of advanced diesel engine performance and emissions systems and to teach diagnostic and troubleshooting skills. Topics include engine performance; emissions theory; exhaust emissions treatment; diagnosis and correction of engine performance; and emission complaints; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: DSL 1020 and 1040

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. Prerequisite: None

DS 2801/2802 Summer Internship/Internship Review (0/1) summer/fall

A ten week summer cooperative education experience followed by a one credit internship review conducted during the fall term; graded Pass/No Pass. Prerequisite: Departmental permission [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 higher *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 higher *or* instructor permission

Education (EDU)**EDU 2051 Teaching Methods I (3)****fall/spring**

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)**fall/spring**

This class continues curriculum from EDU 2051. Prerequisite: EDU 2051

EDU 2061 Teaching Methods II (3)**fall/spring**

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) (3)**fall/spring**

This class continues curriculum from EDU 2061. Prerequisite: EDU 2061

Electromechanical Engineering (ELM)

ELM 3015 Sensors and Instrumentation (3)

fall

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, and PHY 1042 [Course fee: \$160.00]

ELM 4015 Electro-Mechanical Power Systems (4)

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 *OR* instructor permission

ELM 4231 Control Systems I (4)

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 the design of discrete-time controllers using z-transform methods; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 2061, MAT 3170, senior standing in the BS.ELM program, *OR* instructor permission [Course fee: \$50.00]

ELM 4232 Control Systems II (4)

spring

This course is a continuation of Control Systems I. Students are introduced to complex second-order and higher-order systems. Topics include system identification methods, performance parameter design trade-offs, and designing higher-order controllers. Practical applications of microcontroller-based controller design are emphasized; 2 hours of lecture, 4 hours of laboratory per week. Prerequisite: ELM 4231 [Course fee: \$50.00]

ELM 4701 ELM 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 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 electrical and mechanical components; 1 hour of lecture, 3 hours of laboratory per week. Prerequisite: Senior standing in the BS.ELM program *OR* instructor permission [Course fee: \$75.00]

ELM 4702 ELM 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 inform everyone of 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: ELM 4701 [Course fee: \$75.00]

Electrical Engineering (ELT)

ELT 1011 Fundamentals of Circuits I (3)

fall

This is the first of a two-semester study of basic electrical circuits. Course content includes electric charge, voltage, resistance, energy, and power. DC circuit theory includes Ohm's Law; Kirchhoff's Laws; series and parallel circuits; and electrical sources. The concepts of superposition and Thevenin's Theorem are introduced as well. Laboratory sessions are used to verify and reinforce concepts introduced in lecture. A weekly recitation is used to review problem sets. Teamwork is emphasized throughout the course; 2 hours of lecture, 2 hours of laboratory, 1 hour of recitation per week. Prerequisite: Concurrent enrollment in MAT 1111 [Course fee: \$115.00]

ELT 1012 Fundamentals of Circuits II (3)

spring

This is a continuation of ELT 1011. Course content includes the AC concepts of frequency, period, magnitude, and phase of sine waves. Circuit parameters are studied as phasors and complex numbers and are expressed in polar and rectangular forms. Topics studied include reactance, impedance, and power in series and parallel circuits and the transient behaviors of RC and RL circuits. Theorems developed in DC are now used to analyze AC circuits. A weekly recitation is used for mastery of the subject. Laboratory sessions include the use of function generators and oscilloscopes; 2 hours of lecture, 2 hours of laboratory, 1 hour of recitation per week. Prerequisite: MAT 1111 and ELT 1011, concurrent enrollment in MAT 1112 or 1340 [Course fee: \$150.00]

ELT 1021 Fundamentals of Digital Circuits I (3)

fall

This is a first course in the fundamentals of digital logic with applications. Basic principles are presented along with Boolean theorems and algebraic reduction techniques, number systems, Karnaugh mapping, and analysis of combinational logic circuits, digital arithmetic, synchronous counters, decoders, encoders, and multiplexers. Concepts and theorems developed in the classroom are explored in the laboratory through practical examples and applications. Troubleshooting techniques for digital circuits are also developed and students learn how to properly document their results; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: Concurrent enrollment in ELT 1011

ELT 1022 Fundamentals of Digital Circuits II (3)

spring

This follow-on course to ELT 1021 introduces students to flip-flops, asynchronous counters, shift registers, state tables, and state diagrams. Analog-to-digital and digital-to-analog converters are covered as well as basic system memory elements. Students are introduced to the Altera software simulation program in the laboratory and learn how to burn their own chips; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1021

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. 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. Prerequisite: Concurrent enrollment in MAT 1420 [Course fee: \$150.00]

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 transformers, poly phase circuits, 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 1012 or 1031 and MAT 1420, concurrent enrollment in MAT 1520

ELT 1051 Presentation Graphics I (1)

fall

This course provides hands-on experience in creating technical presentations using many different software programs including MS Word, Excel, and PowerPoint. Topics include terminology, layout, chart creation, effective chart usage, and integrating text, graphics, and audio. Upon successful completion of this course, students will be able to assemble and demonstrate an effective presentation. Additional topics covered are the use of analog and digital simulation tools such as MS Office, MultiSim, and Podcasting; 3 hours of laboratory per week; Prerequisite: Concurrent enrollment ELT 1011 or 1031 and MAT 1111 or 1420.

ELT 1052 Presentation Graphics II (1)

spring

This is a continuation of ELT 1051 that provides the fundamentals of AutoCAD and continuing topics on schematic capture, circuit analysis, and printed circuit board (PCB) creation. The fundamentals of webpage documentation are also presented. At the end of the course there will be a two-week project that will use all tools explored in the course; 3 hours of laboratory per week. Prerequisite ELT 1051 and 1110 or 1022, concurrent enrollment in ELT 1032 [Course fee: \$25.00]

ELT 1080 Electronics for Computer Engineering (4)

fall/spring

This course gives students an overview of topics from solid-state electronics. Topics include diode circuits; the transistor as a small signal amplifier and as a switching element; op-amp circuits; and interfacing circuits common to computer applications; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1031 or 1012

ELT 1101 General Electronics I (4)

fall

This is an introductory course for students who are not majors in the EET or the CPE programs. It presents a survey of the fundamental principles of electrical theory in order to provide basic understanding for further study and application in other areas. Key topics in direct current (DC) and alternating current (AC) circuits are presented including current, voltage, resistance, capacitance, inductance, reactance, impedance, energy, power, electrical sources, magnetism, and transformers. A brief introduction to semiconductors is presented. Common measurement instruments are discussed and used in laboratory experiments; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: Concurrent enrollment in MAT 1420

ELT 1102 General Electronics II (4)

as required

This course continues the topics from ELT 1101 as a survey of the fundamental principles of electronic theory for students who are not majors in the EET or CPE programs. Prerequisite: ELT 1101

ELT 1110 Introduction to Digital Circuits (4) fall/spring

This first course in digital electronics introduces hardware programmable (wired) digital structures from a functional perspective. The logic function, its representation, simplification, and implementation, is developed as a central concept. Two network classes are identified and analyzed: combinatorial and sequential. The nature of digital signals, number systems, the algebra of logic, and graphical minimization are among the topics investigated. Common logic functions are realized in the laboratory using currently popular digital integrated circuits of varying complexity (small-, medium-, and large-scale integration). A familiarity with vendor offerings and knowledge of data book specifications are emphasized; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

ELT 2010 Analog Electronics (4) as required

This course for General Engineering Technology majors introduces the use of diodes and transistors as basic circuit elements in power supplies, amplifiers, and digital gates. Operational amplifier configurations are examined in detail. Transfer functions, frequency response, and the effects of feedback are explored; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: Concurrent enrollment in ELT 1031

ELT 2030 Digital Electronics II (4) as required

This is the second course in a sequence of digital electronics for students majoring in Telecommunication Technology. This course is designed to train students in the organization, architecture, and hardware aspects of digital computer systems. Topics include an introduction to microprocessors; types and characteristics of different chips; microprocessors architecture; introduction to programming; PC system organization; operating systems; motherboards; bus structures; memory; I/O interface devices; disc drives; video displays; and printers. Serial and parallel buses are discussed. Applications include the interfacing of peripherals, data communications between computers, and a team project; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1110

ELT 2040 Computer System Components/Interfaces (4) spring

This course is a continuation of the interfacing concepts started in ELT 2050 from the local processor level to the board and systems level. Topics studied include data communications standards and techniques; data structures; multiple interrupt problems; and advanced assembly language programming. Computer systems and peripherals are studied with emphasis on dealing with systems, reading documentation, and interconnecting subsystems. Software will be written to test the systems; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1080 and 2050 and CIS 2025 [Course fee: \$70.00]

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: ELT 1110 or 1022, CIS 2025, and concurrent enrollment in ELT 2051 and 3030 [Course fee: \$120.00]

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 and MAT 1520

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 and 2060 and MAT 1520

ELT 2060 Electronic Applications (4)

fall/spring

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 seen appropriate. Analysis will often use MultiSim to assist with concepts; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1032, concurrent enrollment in ELT 2050 and 2051

ELT 2061 Electromechanical Systems I (4)

spring

The course introduces applied system mathematics including block diagram algebra, Laplace transforms, and graphical technique such as Bode analysis. Basic modeling techniques for first and second order systems are covered. Open loop characteristics are initially developed and system models are then constructed for closed loop simulations. Damping coefficients and stability are looked at with an initial introduction to PID controllers. Some time is spent looking at a commercial Programmable Logic controller; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1520, ELT 1032 and 1110 or 2072 and 3060

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 1420

ELT 2072 Electronics (4)

spring

Linear and digital electronics, including microprocessors, are studied from the standpoint of the electrical-mechanical interface. Concepts of sensors and transducers, amplifiers, semiconductor control devices, and integrated logic circuits account for approximately two-thirds of the course. The last third is spent on learning the application of a small microcomputer to simple industrial control problems. Related laboratory exercises reinforce the class material; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 2071 and CIS 1050 *or* MEC 1050 *or* equivalent

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 2051 and 2060

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: PHY 1041 and MAT 1420 [Course fee: \$100.00]

ELT 2720 Electrical Project (3)**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; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: Sophomore standing in the EET program *or* instructor permission [Course fee: \$50.00]

ELT 2730 Engineering Project (3)**as required**

The goal of the capstone course is to provide students with an opportunity to use their technical knowledge to develop a final technical project. Students need to use their abilities in analysis, synthesis, and interpersonal skills to solve engineering or manufacturing problems. The objectives of the course are for students to apply technical knowledge to solving problems; practice decision-making skills; demonstrate teamwork; perform technical analysis; demonstrate synthesis; develop documentation and presentation skills; and develop time management. The course is normally offered on-line; 3 hours of lecture/laboratory per week. Prerequisite: ELT 1051, 2050, and 2051

ELT 3010 Digital II (4)**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); 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1022 or 1110 and 1080 or 2050

ELT 3020 Electrical Circuits and Controls (4)**fall**

This course provides an intense introduction to the basics of DC and AC circuits. The applications of these principles to electromechanical systems, transformers, power distribution, and motors are explored. Transducers, sensors, and the fundamentals of digital systems are examined as well; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1520, junior standing *or* instructor permission

ELT 3030 Solid State Electronics (4)**spring**

This course reviews solid state theory and introduces students to multilayer semiconductor devices (diodes, bipolar and field effect transistors, thyristors, PUTs, etc.). Other topics include integrated circuit amplifiers, comparators, timers, regulators, multiplexers, and oscillators. Computer simulation software is used; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 1032 or 3060 [Course fee: \$150.00]

ELT 3040 Electronic and 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: MAT 1520, ELT 2050, 3030, and CIS 2025

ELT 3050 Microprocessor Techniques II (4)

spring

This third course in digital electronics focuses on implementing an embedded system. Topics include a review of programmable peripherals; interfacing standard i/o devices and sensors found in embedded systems; standard communication interfaces; battery-based operation; ROMable code; mixed language programming (assembly language and C); real time programming issues; and hardware based debugging techniques (in-circuit emulation). The students work with a single board computer and build a complete, stand-alone embedded system; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 2050 and 3010

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, transformers), Kirchhoff's laws, network theorems (mesh, nodal, Thevenin, Norton, superposition), dependent sources, two port models, and transient response. This course emphasizes alternating current concepts and makes use of computer simulation software; 3 hours of lecture per week. Prerequisite: MAT 1520 and ELT 2072 or 1031 and junior standing in the BS.ELM program

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

ELT 4020 Digital Signal Processing (4)

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. The student also gains familiarity with DSP hardware system design and peripheral interface techniques; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: ELT 2050 and MAT 2532 [Course fee: \$25.00]

English (ENG)

ENG 1041 Basic College Writing (4)

fall

This integrated course helps students develop basic reading and writing skills. Comprehension and vocabulary skills are taught through analysis of technical reading selections. Students write regularly and improve their grammar skills through systematic review; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: Placement level 1

ENG 1042 Expository Writing (4)

fall/spring

Students develop their reading skills by analyzing examples of professional writing in class. They develop their writing skills by writing at least five essays and completing various writing exercises. Students review principles of grammar and sentence construction. 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. The course also includes optional oral presentation and library exercise; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: ENG 1041 or Placement level 2

ENG 1043 Research Writing (4)**fall/spring**

This course is a continuation of ENG 1042 and completes the English composition sequence. Students develop their expository and argumentative writing skills through writing exercises, essays, a research paper, and an optional oral presentation. Research skills are developed through library assignments and research exercises. The Writing Graduation Standard is assessed in this course; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: ENG 1042

ENG 1060 Freshman Composition (4)**fall/spring**

This course teaches the same writing concepts as ENG1042 and 1043. Successful completion of this course prepares students for ENG 2080. All students are introduced to composing on the word processor and the use of rhetorical strategies. They complete a variety of writing exercises, essays, a research paper, and an optional oral presentation. The Writing Graduation Standard is assessed in this course; 3 hours of lecture, 2 hours of laboratory per week. Prerequisite: Placement level 3 or higher

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; 3 hours of lecture per week. Prerequisite: Placement level 4

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 Ed: AH) Prerequisite: None

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 technical reports, proposals, instructions, graphic aids, and correspondence. Students are prepared for employment interviews through their study of principles of oral communication and their writing of job application letters and resumes. A major technical report written on a topic in the student's area of interest is required. The Writing Graduation Standard is assessed in this course; 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; 3 hours of lecture per week. (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 and 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, and poetry, responding critically to war and suggesting peaceful alternatives; 3 hours of lecture per week. (General Education: AH) Prerequisite: None

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. Students will read and discuss classic and contemporary novels, short stories, and poetry addressing 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

ENG 3590 The Films and 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 junior standing

English for Speakers of Other Languages (ESL)

ESL 1041 Basic College English Skills (4) summer/fall

This integrated course helps non-native English speaking students at the intermediate and high intermediate level to develop their skills in grammar, writing, reading, listening, and speaking. These basic academic skills are taught, practiced, and tested in the classroom, the writing laboratory, and the language laboratory, which has ESOL software. Students develop academic writing skills through weekly assignments. Reading comprehension and vocabulary skills are taught through analysis of general and technical reading selections. Students must achieve at least a "B" and demonstrate improved skills in two post-course placement tests in order to take ENG 1042; 2 hours of lecture, 2 hours of language laboratory, 2 hours of writing laboratory per week. Placement assessment of intermediate to high intermediate level of English and the Vermont Tech writing placement test are required to determine placement level.

Environmental Studies (ENV)

ENV 2070 Environmental Law (3) as required

This course will analyze various aspects of environmental policy-making in both the U.S. and internationally. It will begin with various philosophical and ideological perspectives concerning the relationship between man and nature. There will be consideration of how environmental issues interact with various other types of societal goals, particularly economic prosperity, security, and freedom. The class will study aspects of the environmental policy process and its outcomes in the U.S. through the use of a number of case studies relevant to particular policy problems (including air and water pollution, biological engineering, and energy); 3 hours of lecture per week. (General Ed: SS) Prerequisite: None

ENV 3050 Issues in Environmental Studies (3)**as required**

Technological advances have been used to lessen or solve many of humanity's problems. However, there seems to be one major area, the environment, where advances in technology have not accomplished that end. What is so different about an environmental problem that leads to reluctance to use technological advances to find and implement solutions? This course uses political, economic, and sociological perspectives to look at environmental problems, proposed solutions, and the failure of society to implement effective solutions; 3 hours of lecture per week. (General Education: SS) Prerequisite: Junior standing or instructor permission

Equine Studies (EQS)**EQS 1011/1012 Introduction to Equine Studies (2/2)****fall/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. Prerequisite: EQS 1012 requires EQS 1011

EQS 1021, 1022, 2023, 3024, 4025, 4026 Equitation I-VI (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 continue to 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. Prerequisite: preceding equitation course in the sequence [Course fee: \$500.00 for EQS 1021 and 1022, \$150 for remaining classes]

EQS 1031 Stable Management I (2)**fall**

Students will be introduced to stable management principles and will combine theory and practice by providing daily horse care and stable maintenance as needed under the supervision of the Equine Center Supervisor; 1 hour discussion, 2 hours animal care/chores per week. Prerequisite: None

EQS 1220 Horse Judging (1)**fall**

This course provides an introduction to the theory and practice of horse and horse show judging, with the goal that students will participate on the Vermont Tech horse judging team and/or pursue certifications in judging; 3.5 hours on one Saturday per month during the term. Prerequisite: None

EQS 1032 Stable Management II (2)**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. Emphasis in this course will be on successful winter care of equines and the facility. Topics include regular health assessment; first aid; bandaging; use of restraints; facility design; saddle fit and tack care; and safe trailering; 1 hour discussion, 2 hours animal care/chores per week. Prerequisite: EQS 1031

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 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: EQS 1022 [Course fee: \$150.00]

EQS 2020 Farrier Care & Lameness (2)

fall

This course is designed to teach students to recognize anatomical issues with a horse's hoof and leg structure and to evaluate the care provided by a farrier. They will learn how to do a basic hoof trim and to provide emergency care until the farrier can arrive; 1 hour of lecture, 2 hours of laboratory per week. Prerequisite: EQS 1021 and 1022 *or* instructor permission [Course fee: \$150]

EQS 2041 Equine Massage I (3)

fall

This course provides an introduction to the theory of equine massage. It includes intensive 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 and stretching exercises 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 Summer Internship/Internship Review (0/1)

summer/fall

Students may participate in summer 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 record of hours and activities. In addition to completing the required documents, there is a 45 hour minimum requirement. The student will take part in an internship review the subsequent fall term, at which point credit will be awarded and a fee will be assessed; graded Pass/No Pass. Prerequisite: Permission [Course fee: \$250]

EQS 3012 Equine Training II (3)

spring

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; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: EQS 2011 with a C or better [Course fee: \$150.00]

EQS 3031 Riding Instruction I (3)

fall

This course provides analysis of effective teaching techniques for equine riding and/or driving instruction for beginners to beginner/intermediate riders, including the psychological factors that influence rider/horse interaction. There are opportunities for observing, assisting with, and providing instruction. Students will begin to accumulate hours toward the required total necessary for ARIA certification testing; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: None [Course fee: \$150.00]

EQS 3042 Equine Massage II (3)

fall

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. Laboratory sessions will provide students with the increasing responsibility for determining areas of concern, developing plans for improvement, and implementing and assessing such measures; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: EQS 2041

EQS 4010 Law and the Equine Professional (3)**fall**

Students in this course will review equine-specific legal cases and learn about structure, risk, liabilities, and other pertinent topics necessary to running a successful equine-related business. The course will include in-depth examination of differences, advantages, and disadvantages of different structures for equine businesses; equine liability laws; insurance issues; and equine contracts; 3 hours of lecture per week. Prerequisite: None [Course fee: \$150.00]

EQS 4110 Equine Health and Diseases (3)**fall**

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; 3 hours of lecture per week. Prerequisite: AGR 2030 and VET 1020

EQS 4120 Therapeutic Programs (2)**fall**

This course provides the historical and social context of the ever-increasing popularity of therapeutic riding and driving programs. Students will learn about how such program are operated, the clientele they serve, and the crucial role that therapy horses play in peoples' lives. There will be opportunities to meet individuals involved with such programs and to visit an operational equine therapy program; 2 hours of lecture per week. Prerequisite: None

EQS 4032 Riding Instruction II (3)**fall**

Students will continue to develop their skills as riding and/or driving instructors, including class preparation, assessment of student progress, and variety of teaching methods used. After completion of Riding Instruction I and II, students should have a strong foundation of riding instruction experience. They will be able to apply for Level I Certification with the American Riding Instructors Association. If a sufficient number of students are interested, ARIA testing can be conducted at Vermont Tech; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: EQS 3031 with a grade of C or better [Course fee: \$150]

EQS 4610 Equine Studies Senior Project (3)**spring**

Under the joint supervision of the Program Director 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 Program Director) and will conclude with a substantive written report and an oral presentation; 3 hours of lecture per week. Prerequisite: None

Fire Science (FSC)**FSC 1000 Freshman Orientation (1)****fall**

This course is designed to facilitate a successful transition to college and focuses on orientation to college; academic success strategies, study skills, professional development; introduction to Web Services, critical thinking skills, academic advising services, time management, and developing an understanding of the fire service as a public trust; 1 hour of lecture per week; graded Pass/No Pass. Prerequisite: None

FSC 1010 Principles of Building Construction and 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, preplanning fire operations, and operating at emergencies; 3 hours of lecture per week. Prerequisite: None

FSC 1021 Firefighting Services I (3)

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; 3 hours of lecture per week. Prerequisite: None

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. This procedure includes passing a written exam, proficiency skill based testing, and participation in a live burn exercise at the Vermont Fire Academy; 4 hours of lecture per week. 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. Prerequisite: None

FSC 1122 Independent Study (3)

as required

Students will have the opportunity to pursue an independent or public research project and participate in a service-learning project such as fire education. Students will be required to submit a thesis for their project which outlines the topic, research methods, and evaluation method. Prerequisite: Departmental permission

FSC 1210 Fire Inspector I (3)

spring

The Fire Inspector I course is designed as an introductory course to educate the student in the principles and techniques of fire prevention, life safety inspection, and code compliance. It conforms to National Fire Protection Association 1031: Standard for Professional Qualifications for Fire Inspector I and Plan Examiner. Built as a beginning course to certification, the course will include case studies, field inspection exercises, and report writing; 3 hours of lecture per week. Prerequisite: None

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, managing 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. Prerequisite: None

FSC 2020 Fire Service Hydraulics and Water Supply (3)

fall

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 2030 Firefighter Occupational Health and Safety (3) as required

Students learn the basic concepts of occupational health and safety as it relates to emergency service organizations. Topics include risk evaluation and control procedures for fire stations, training sites, emergency vehicles, and emergency situations involving fire, EMS, hazardous materials, and technical rescue. Upon completion of this course, students should be able to establish and manage a safety program in an emergency service organization; 3 hours of lecture per week. Prerequisite: Departmental permission

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. Prerequisite: None

FSC 2220 Firefighting Strategy and Tactics (3) spring

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: None

FSC 2230 Hazardous Materials Chemistry and 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, students will be Vermont certified at the Operations Level for Hazardous Materials; 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. Prerequisite: None

FSC 2250 Fire and 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; 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, deliver safety education using the National Fire Protection Association Risk Watch program, and study the effects of tragic fires which led to new fire safety standards; 3 hours of lecture per week. Prerequisite: None

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

Geography (GEO)

GEO 1010 World Geography (3)

as required

This course introduces students to the fundamental concepts of geography and the major geographic regions of the world. The course examines the ecological interactions between the physical and the human environment. Following an introduction to the basic terms and concepts of geography, the course continues to explore each of ten regions of the globe; 3 hours of lecture week. (General Education: SS) Prerequisite: None

History (HIS)

HIS 1111 World History I (3)

as required

This course serves as an introduction to world civilizations: Ancient, Mediterranean, European, South Asian, East Asian, and African. Study includes origins of the time of global expansion of European civilizations; 3 hours of lecture per week. (General Education: SS) Prerequisite: None

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 European civilizations and the modern evolution of world powers and world problems; 3 hours of lecture per week. (General Education: SS) Prerequisite: None

HIS 1211 American History I (3)

fall

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) Prerequisite: None

HIS 1212 American History II (3)

spring

Students examine the historical roots of American society as an individualized, 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 as a superpower; 3 hours of lecture per week. (General Education: SS) Prerequisite: None

HIS 1260 Information Technology: Past, Present, and 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]) Prerequisite: None

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: None

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 of our history: the 1960s. Through documentary films and other media, readings, websites, and discussion, students will study such topics as the civil rights movement, the Kennedy administration and assassination, the student movement, the impact of the Vietnam War, and the music, art, and literature of the counterculture 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: None

HIS 2270 Society and 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: None

HIS 2660 European Classroom (3) fall

This course will immerse students in the art, history, and architecture of a foreign city through participation in intensive coursework combined with the experience of a guided travel tour to Europe. The course will use visual perception and critical analysis to study the interconnected fields while expanding student learning by facilitating experience of works of art and architecture first hand. It will reinforce each student's understanding of topics in the history, culture, art, and architecture of the target city. This is a cultural experience intended to enrich and broaden student perspectives in our increasingly global world; 3 hours of lecture per week. (General Education: SS) Prerequisite: ENG 1061 *and* instructor permission

HIS 3165 Vermont History and 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: None

Humanities (HUM)

ANT 1010 Introduction to Cultural Anthropology (3) as required

This course is a survey of basic issues, concepts, theories, and methods of cultural anthropology. Students think critically about the evolution of culture and society from the perspective of the past and the present. Topics include social and political organization, gender, myth, religion, language, cultural ecology, and cultural exchange; 3 hours of lecture per week. (General Education: SS) Prerequisite: None

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: None

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: None

HUM 2060 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: None

HUM 2070 The Vampire in Literature (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; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 *or* equivalent

HUM 2080 The Literature and 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; 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 that we can apply to our own lives. We'll watch films, hear speakers, read, discuss, and take a field trip to the Green Mountain Dharma Center. Grades are based on attendance and participation; weekly short informal writing assignments; midterm and final take-home essay exams; and a final research paper/project and presentation; 3 hours of lecture per week. (General Education: AH) Prerequisite: None

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 and practice meditation and stress-reduction techniques. We'll hear speakers, read, watch films, discuss, and practice; 3 hours of lecture per week. (General Education: AH) Prerequisite: ENG 1061 *or* equivalent

HUM 2660 European Classroom (3) as required

This course will immerse students in the literature, art, and architecture of a foreign city through participation in intensive coursework combined with a guided travel tour to Europe. The course will use visual perception and critical analysis to study the interconnected fields while expanding student learning by experiencing the works of art and architecture first hand. It will reinforce each student's understanding of topics in the history, culture, art, and architecture of the country being studied. This is a cultural experience intended to enrich and broaden student perspectives in our increasingly global world. Prerequisite: ENG 1061 and instructor permission

HUM 3050 Theories of Science and 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: Junior standing *or* instructor permission

HUM 3070 The Vampire in Literature--Upper Level (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; 3 hours of lecture per week. (General Education: AH) Prerequisite: Junior standing *or* instructor permission

HUM 3330 Peace Studies and Peacemaking (3) as required

This course studies the ideas, principles and practices of peacemaking in depth. It will examine the literature and philosophy of peace, pacifism, and nonviolence in the context of historical experience and teach practical ways of peacemaking through mindfulness, nonviolent communication, and nonviolent conflict resolution; 3 hours of lecture per week. Prerequisite: ENG 1061 *or* instructor permission

HUM 3490 Crime and Punishment in Film and 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: Junior standing *or* instructor permission

Interdisciplinary (INT)

INT 0010 Effective Learning (0)

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; 1 hour of lecture per week; graded Pass/No Pass. Prerequisite: None

INT 1000 Freshman Orientation (1)

as required

This course is designed to facilitate a successful transition to college and 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; student information technologies and data base orientation; campus/site resources; time management; note taking; introduction to career opportunities; and program specific topics; 1 hour of seminar per week; graded Pass/No Pass. Prerequisite: None

Landscape (LAH)

LAH 1000 Freshman Orientation (1)

fall

This course is designed to facilitate a successful transition to college and focuses on four primary areas: orientation to the college, academic success strategies, professional development, and introduction to program-specific careers. Topics include student rights and responsibilities; campus resources; time management; note taking; test taking, learning styles and study skills; self esteem, group dynamics and stress management; and an introduction to career opportunities; 1 hour of seminar per week; graded Pass/No Pass. Prerequisite: None

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. Prerequisite: None

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 mechanical drawing; 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. Prerequisite: None

LAH 1030 Woody Ornamentals (3)

fall

This course covers the identification of approximately 90 to 120 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; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

LAH 1031 CAD for Landscape Design (1)**spring**

Students are introduced to landscape drafting and design using AutoCAD and other computer-aided drafting software; 3 hours of studio per week. Prerequisite: LAH 2011

LAH 1040 Greenhouse Management (4)**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; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

LAH 1050 Introduction to Soils (4)**spring**

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 deals with problems of soil drainage and the tillage methods best suited to erosion control. Students learn about soil testing and the most effective liming and fertilizing practices for economical crop production. The college and home farms are used in soil and fertilizer problem solving; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

LAH 2010 Landscape Construction and Management (4)**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 site and detail level, resolved according to sound principles of construction, and professionally documented according to conventional standards. Specific coursework includes surveying; map making; construction of freestanding and retaining walls; construction of patios and walkways; basic equipment operation and safety procedures; grading (earthworks); and the principles of statics and mechanics as they apply to landscape design. Theory and practice are emphasized equally; 6 hours of laboratory per week. Prerequisite: LAH 2011

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 laboratory per week. Prerequisite: LAH 1021, ARC 1210, or CPM 1021

LAH 2012 Advanced Landscape Design (3)**spring**

This course explores two essential aspects of landscape design: the art of site analysis and planning and the art of appropriate plant and materials selection in support of a design idea. During the course of the semester, students work on a “real world” project where they are asked to complete a thorough site analysis in preparation for the development of a working master plan; develop a detailed planting and construction plan; and develop a cost estimate for the client. Throughout the semester, design composition and emphasis are stressed, as are oral and graphic presentation skills. Individual design projects are developed under faculty supervision and presented to a jury of faculty and distinguished practitioners; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: LAH 2011

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

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; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

LAH 2720 Landscape Design/Ornamental Horticulture Seminar (2) spring

This course is designed with a two-fold purpose: to assist all Landscape Development & Ornamental Horticulture students in developing the attitudes and skills essential for career success and to act as a capstone course with a focus on the many possibilities within the broad field of horticulture and design. As such, it concentrates on the following critical areas: researching the job market and targeting the specific discipline area within the horticulture/design field the student is interested in pursuing; researching the various options with that targeted field; writing a resume and cover letter; and preparing either a portfolio, business plan, or some other significant project that demonstrates the student's readiness to seek employment. In addition, students are introduced to a broad spectrum of practicing professionals from all walks of the landscape design and horticultural fields, which also allows for opportunities for discussion of employment possibilities. This course is designed to develop attitudes and skills essential for career success; 1 hour of seminar, 2 hours of laboratory per week. Prerequisite: Sophomore standing

LAH 2801/2802 Summer Internship/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 the freshman year *or* instructor permission

Languages

ITA 1011 Italian I (3)

as required

This course is designed for students with little or no previous knowledge of Italian. At the end, students will be able to ask and answer simple questions, to use several verb tenses, and to understand conversations necessary to being a tourist in Italy. As part of the Humanities requirement, students will also read from Dante's *L'Inferno*, and, through it, learn about Italy's art, culture, history, and geography. Assignments include bi-weekly journals as well as a 1,500-word research paper on *L'Inferno*, three quizzes, and two hour-long exams on the language; 3 hours of lecture per week. Prerequisite: None

SLS 1011 American Sign Language I

as required

This course provides instruction in elementary communication with deaf and hard-of-hearing individuals. It emphasizes basic aspects of American Sign Language and attention is also given to deaf culture as well as issues and concerns of the deaf community; 3 hours of lecture per week. Prerequisite: None

SPA 1011 Spanish I (3)**as required**

This is the first course in a two course sequence and includes systematic introduction to the Spanish language and development of aural comprehension, speaking, reading, and writing skills. The course also provides an introduction to the cultures of Latin America and Spain; 3 hours of lecture per week, laboratory may be required. Prerequisite: None

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 1040 Mathematics for Allied Health (2)**spring**

This course gives an introduction to basic concepts in general mathematics; ratio; proportions; variation; financial applications; 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)**fall**

This course provides an introduction to technical mathematics for students in the ATT, CPM, and DPT programs. 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; and right triangle trigonometry; 3 hours of lecture per week. Prerequisite: Placement level 2

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 that will provide the skills necessary to be successful in MAT 1420. Topics covered include fundamental algebraic concepts; geometry; right triangle trigonometry; factoring and algebraic fractions; systems of equations; quadratic equations; radicals; and exponents; 5 hours of lecture per week. Prerequisite: MAT 1112 or placement level 3

MAT 1112 Introduction to Technical Mathematics II (5)**spring**

This course is the second of a two semester sequence giving an introduction to technical mathematics that will provide the skills necessary to be successful in MAT 1420. Topics covered include review of factoring and algebraic fractions; exponents and radicals; exponentials and logarithms; trigonometric functions of any sized angle; oblique triangles and vectors; graphing trigonometric functions; trigonometric identities; and complex numbers; 5 hours of lecture per week. Prerequisite: MAT 1111

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 pocket 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

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

MAT 1340 Algebra and Trigonometry (5)

spring

This course is a one semester course covering the necessary topics in algebra and trigonometry that will provide the student with the skills necessary to be successful in MAT 1420. It is designed as a bridge for qualified students and covers all the topics covered in MAT 1111 and 1112; 5 hours of lecture per week. Prerequisite: Placement, MAT 1221, or a grade of C or better in MAT 1210 or 1100 *or* placement level 3

MAT 1420 Technical Mathematics (5)

fall/spring

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; solution of linear and quadratic equations; exponents and radicals; logarithms; exponential functions; sine and cosine laws; vectors; operations with imaginary and complex numbers; trigonometric identities and equations; and graphs of trigonometric functions; 5 hours of lecture per week. Prerequisite: MAT 1112 or 1340 *or* placement level 4

MAT 1421 Technical Mathematics I (4)

as required

This course is a study of selected topics and applications of mathematics. Topics include algebraic expressions; linear equations and inequalities; algebraic equations in one, two, and three variables; quadratic equations; and right angle trigonometry. The use of the graphing calculator is integrated into the course; 4 hours of lecture per week. Prerequisite: Placement level 4, basic algebra and geometry skills recommended

MAT 1422 Technical Mathematics II (4)

as required

This course is a continuation of the topics of MAT 1421; 4 hours of lecture per week. Prerequisite: MAT 1421

MAT 1520 Calculus for Engineering (4)

fall/spring

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 applications; 4 hours of lecture per week. Prerequisite: MAT 1420 *or* Placement level 5

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: MAT 1100, 1210, 1221, and 1420 *or* Placement level 3

MAT 2120 Discrete Structures (3)

fall/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: MAT 1210 and 1221 *or* Placement level 3

MAT 2532 Calculus II (4)**fall/spring**

Topics include techniques of integration; numeric integration; hyperbolic functions; indeterminate form and improper integrals; polar coordinates; partial function expansion; differential equations; and infinite series; 4 hours of lecture per week. Prerequisite: MAT 1520

MAT 2533 Calculus III (4)**spring**

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: MAT 2532

MAT 3170 Applied Mathematics for Engineering (3)**spring**

This course introduces selected topics of advanced mathematics and applies them directly to key areas of electrical and mechanical analysis. The curriculum includes selected topics in solutions of first and second order differential equations; Laplace transforms; Fourier series; partial differential equations; numerical methods of solving ordinary and partial differential equations; and systems modeling concepts; 3 hours of lecture per week. Prerequisite: Junior standing *or* instructor permission, ELT 1080 or 3020, and MAT 2532

MAT 3720 Topics in Discrete Mathematics (3)**fall**

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 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

Mechanical Engineering Technology (MEC)

MEC 1000 Freshman Orientation (1)**fall**

This seminar presents an introduction to the mechanical engineering technician career and to the skills of life-long 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. Prerequisite: None

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 email are also introduced; 6 hours of laboratory per week. Prerequisite: None

MEC 1012 Design Communication II (2)

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. Prerequisite: None [Course fee: \$35.00]

MEC 1040 Introduction to Materials Science and 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: \$15.00]

MEC 1050 Computer Applications for Mechanical Engineering (1)

fall

This course introduces the student to the college network, Microsoft, email, 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. Prerequisite: None

MEC 1060 Metrology and 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. Prerequisite: None

MEC 1070 Tool Geometry and 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. Prerequisite: None

MEC 2010 Fluid Mechanics and Fluid Systems (4)

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; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1520, MEC 1050, and PHY 1041 or 1022.

MEC 2020 Applied Mechanics (3)

fall

At the completion of this course, the student should be familiar with equilibrium as it applies to coplanar and non-coplanar force and moment systems and friction. Principles of centroids and moments of inertia are discussed. In addition, the course includes dynamics using Newton's second law as it applies to rectilinear and curvilinear motion; 3 hours of lecture per week. Prerequisite: MAT 1420, MEC 1050 or ELT 1051, PHY 1041 or 1022, and MEC 1011

MEC 2030 Strength of Materials (4)**spring**

This course will familiarize the student with stress analysis by studying coaxial and shear stress and strain; temperature relationships; torsion; shear and bending moments; beam stresses; and deflections. Columns, joints, thin-walled cylinders, combined stresses, Mohr's circle, and the effects of fluctuating loads on machine parts will be introduced. 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 2020 and 1040 [Course fee: \$35.00]

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 1020, 1011, and 1050 [Course fee: \$45.00]

MEC 2050 Thermodynamics and Heat Transfer (4)**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; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MEC 2010 and PHY 1042

MEC 2060 Mechanisms (3)**fall**

The student in this course should acquire a thorough understanding of the displacement, velocity, and acceleration characteristics of plane motion and the associated graphical and computer-aided methods of analysis; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: MEC 1050, 1011, and PHY 1041 or 1022

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. Prerequisite: None

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 and 2060, concurrent enrollment in MEC 2030 [Course fee: \$75.00]

MEC 3020 Manufacturing Processes and 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: \$40.00]

MEC 3030 Properties and Mechanics of Materials (3)

spring

This course provides an overview of the nature and structure of materials, the properties of different materials classes (metals, ceramics, polymers, composites), and materials processing and testing methods. The course also introduces the student to concepts of materials strength such as stress analysis and design by studying stress and strain produced by direct, torsion, and bending loads using shear and moment diagrams and beam deflections; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1520, MEC 2010 and 2020 [Course fee: \$15.00]

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) Prerequisite: None

MUS 1028 Introduction to Rock and 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) Prerequisite: None

Nursing (NUR)

NUR 0111 Principles and 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. Prerequisite: Concurrent enrollment in NUR 1111

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. Prerequisite: Concurrent enrollment in 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. Prerequisite: Concurrent enrollment in NUR 1131

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-à-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: NUR 1111, 0111, 1020, and BIO 2011, concurrent enrollment in BIO 2012

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 and 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 health care 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. Prerequisite: Concurrent enrollment in BIO 1030 and 2011, NUR 1020 and 0111

NUR 1121 Principles and 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 and 2011, NUR 1111, 0111, and 1020, concurrent enrollment in NUR 1010 and 0121, PSY 1050, and BIO 2012

NUR 1131 Principles and Practices of Nursing III (5)**spring**

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 health care 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 2012 and 1030, NUR 1021, 1121, and 0121 and PSY 1050, concurrent enrollment in NUR 0131 [Course fee: \$60.00]

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. Prerequisite: Concurrent enrollment in NUR 2030 and 2040 *or* departmental 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 pharmacologic needs; 1 hour of lecture per week. Prerequisite: NUR 2030 and 2040, BIO 2120, concurrent enrollment in NUR 2130, 2140 *or* departmental permission

NUR 2030 Principles and 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. Students 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* course work *or* departmental permission, plus concurrent enrollment in NUR 2010 and 2040 [Course fee: \$125.00]

NUR 2040 Principles and Practices of Nursing IV Lab (2)

fall

This course is the laboratory component of NUR 2030; 6 hours of clinical/laboratory per week. Prerequisite: Concurrent enrollment in NUR 2030

NUR 2130 Principles and 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, and 2040, concurrent enrollment in NUR 2140 [Course fee: \$60.00]

NUR 2140 Principles & Practices of Nursing V Lab (4)**spring**

This course is the laboratory component of NUR 2130; 12 hours of clinical/laboratory per week. Prerequisite: Concurrent enrollment in NUR 2130

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) Prerequisite: None

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) Prerequisite: None

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) Prerequisite: None

Physics (PHY)**PHY 1021 Introduction to Newtonian Mechanics (4)****fall/spring**

Students taking this one-semester course study the fundamental topics necessary for further study in physical sciences and engineering technologies. The topics covered are: systems of units; converting units; one- and two-dimensional kinematics; vectors; Newton's Laws of Motion; and static equilibrium and torque; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: None

PHY 1022 Energy Conservation and Equilibrium (4)**fall/spring**

This one-semester course is a continuation of PHY 1021. It is designed to familiarize the student with the concepts of work, energy, power, impulse-momentum, and the laws of conservation. These concepts are used to investigate both translational and rotational motion. Other topics covered include elasticity and the physics of static and dynamic fluids; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: PHY 1021

PHY 1030 General Physics (4)**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 1100 *or* equivalent

PHY 1041 Physics I (4)

fall/spring/summer

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 nonconcurrent 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: Concurrent enrollment in MAT 1420 or equivalent

PHY 1042 Physics II (4)

fall/spring/summer

This course is a continuation of PHY 1041 for electrical engineering technology and computer engineering technology students. Emphasis is on understanding basic physical concepts that relate both to practical situations and to subsequent technical courses. Topics include heat; wave motion; electrical and magnetic field theory; electricity; light; and semi-conductor physics; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: PHY 1041 or 1022

PHY 1043 Physics II for Architectural Programs (3)

fall

This course for architectural students is a continuation of PHY 1041 and is a study of heat (including specific heat, latent heat, and heat transfer); wave motion; light, (including such topics as mirrors, lenses, refraction, interference, and polarization); and electricity (including such topics as electrical and magnetic field theory; light; solid-state physics; current; DC series and parallel circuits; energy; power; and AC series circuits); 3 hours of lecture per week. Prerequisite: PHY 1041 or 1022

PHY 2041 Fundamentals of Physics I with Calculus (4)

spring

This course, an alternative for Physics 1041, is intended for engineering technology students who have demonstrated above-average ability in verbal skills and mathematics and whose mathematics and science preparation includes algebra, plane trigonometry, and basic physics. Prior completion of a course in calculus or concurrent enrollment in MAT 1520 is required. Topics covered are systems of measurement; dynamics (including motion, acceleration, forces producing motion); work, energy, and power; momentum and conservation laws; statics (including concurrent and nonconcurrent forces); and fluids (including properties of gases, fluid pressure, density, buoyancy, and hydraulics); 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1420, concurrent enrollment in MAT 1520

PHY 2042 Fundamentals of Physics II with Calculus (4)

fall

This course is a continuation of calculus-based PHY 2041. Topics in wave motion; heat; electricity and magnetism; light; and solid-state and modern physics are covered; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: PHY 2041 and MAT 1520

PHY 3120 Introduction to Modern Physics (4)

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, 3 hours of laboratory per week. Prerequisite: 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) Prerequisite: None

POS 2110 State and 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: None

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) Prerequisite: None

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 health care maintenance needs of each developmental stage are emphasized; 3 hours of lecture per week. (General Education: SS) Prerequisite: None

PSY 2310 Adolescent Development (3) as required

This course is an examination of the physiological, psychological, and social development of adolescents and explores puberty, adolescent sexuality, adolescent rebellion, and identity formation, peer relations, idealism, and alienation; 3 hours of lecture per week. (General Education: SS) Prerequisite: None

Respiratory Therapy (RSP)

RSP 1000 Freshman Orientation (1) fall

This course is designed to facilitate a successful transition to college and 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; student information technologies and data base orientation; campus/site resources; time management; note taking; introduction to career opportunities; and program specific topics; 1 hour of seminar per week; graded Pass/No Pass. Prerequisite: None

RSP 1010 Foundations of Respiratory Care (3)

fall

This course establishes the basis for the respiratory care profession. The history of respiratory medicine and science will be presented. 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 practice of respiratory care. 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. The topics of communication, medical ethics, and legal implications of practice will be introduced; 3 hours of lecture per week. Prerequisite: concurrent enrollment in RSP 1011

RSP 1011 Respiratory Care I (4)

fall

Students will begin to learn the skills and techniques of managing and treating patients with respiratory needs. 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. 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. Prerequisite: concurrent enrollment in RSP 1010

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: RSP 1011 and BIO 2011

RSP 1210 Respiratory Anatomy and 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: RSP 1011 and BIO 2011

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 and RSP 1011

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 1210 and 1012 and BIO 2012

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: RSP 2011 and 2013

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 and 1210 and BIO 2012

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 1601 and 2801 and BIO 2012

RSP 2603 Respiratory Clinical 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 2602

RSP 2801/2802 Respiratory Internship/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: Permission for summer, RSP 2801 for fall

Sustainable Design (SDT)**SDT 1550 Erosion Prevention and Sediment Control (3)****as required**

This course will focus on storm water runoff during the construction phase of a project and will present the various methodologies employed to control this potential pollution source. Coursework will provide a basic understanding of soils and how they behave when exposed during construction; 2 hours of lecture with occasional laboratory demonstrations. Prerequisite: MAT1221 or placement level 3 *or* equivalent *or* instructor permission

SDT 2550 Storm Water Modeling and Permitting (3) as required

This course will focus on Vermont storm water permitting and modeling of storm water systems using HydroCAD; 2 hours of lecture, 2 hours of laboratory/studio per week. Prerequisite: None

SDT 3000 Sustainable Design and Technology Seminar (1) fall

This course brings together the diverse group of students who enter the SDT program and introduces them to the concept and ethos of sustainability. Readings, films, and other media will be used and outside speakers will be invited. Students will explore their own particular interests in sustainability and present their findings to the class. Internship opportunities will be discussed; 1 hour of seminar per week. Prerequisite: None

SDT 3010 Conflict and Communication (3) spring

This course introduces students to the basic causes and nature of human conflict. Students will use case studies and role playing to explore the nature of working in groups, the types of conflict that occur, and very basic techniques that can be used to discuss, explore, and sometimes resolve conflict; 3 hours of lecture per week. Prerequisite: None

SDT 3020 Environmental Permitting (2) spring

This course introduces student to the federal, state, and local permitting process. Issues include an introduction to the legal foundation of the permitting process and a historic prospective on environmental permits. Typical topics include the Clean Water and the Clean Air Acts, the Vermont 2000 Farm Bill, Act 250 hearings, and planning and zoning boards. Students will be required to attend permit hearings outside of regular class hours; 1 hour of lecture, 3 hours of studio per week. Prerequisite: None

SDT 3110 Codes & Loads & LEED (3) fall

This course provides students with an understanding of the codes and specifications that govern the determination of designing structural, heating/cooling, and lighting/electrical loads for buildings, as well as an introduction to the LEED (Leadership in Energy & Environmental Design) rating system. 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, Electrical/Lighting, Controls & Commissioning, and Studios. Lectures introduce topics and methods of application, the laboratory emphasizes the application of codes and methods on varying structure types; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: None

SDT 3111 Energy Systems and Sustainability (3) fall

This survey course introduces all SDT students to the technical issues related to the application of renewable energy systems for power and heat generation. The systems will be studied in terms of current and potential production capacity; resources and distribution issues; technology installation; and life-cycle costs. Specific technical topics will include small and large scale power grids and power transmission; fuels; electrical energy storage; combustion systems (diesel and hydrogen); fuel cells; solar and geothermal systems; photovoltaic systems; wind and hydropower; hybrid systems; and combined heat and power; 3 hours of lecture per week. Prerequisite: CIS 1050 and MAT 1111 or equivalent.

SDT 3121 Sustainable Design Studio I (3) spring

Through short team projects, all SDT 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 draw from 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; 6 hours of studio per week. Prerequisite: SDT 3010, concurrent enrollment in SDT 3111

SDT 3130 Environmental Soils (3)**fall**

This course will give students an introduction to soils using lecture and labs to gain hands-on experience. Topics include the mechanical classification of soils; the identification of the seasonal high water table; an overview of wetlands classification and applicable regulations; and an overview of issues of soils and agriculture; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: MAT 1210 *or* placement level 2

SDT 4010 Water and Wastewater (3)**fall**

This course introduces student to water quality issues and water and wastewater treatment for centralized and decentralized systems. Students will gain a broad overview of the treatment of water and wastewater including the permitting and regulatory requirement; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: Junior standing in the SDT program

SDT 4020 Ground Water and Storm Water (3)**spring**

This course introduces student to ground water, storm water, and erosion control including the permitting and regulatory requirements; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: Junior standing in SDT program

SDT 4030 Renewable Energy Systems (3)**spring**

This course introduces students to renewable energy systems including resource assessment, system design, installation, and performance monitoring. Laboratory activities include work with solar thermal, wind, solar PV, and other technologies. Topics covered include resource assessment and site selection; installation practices and requirements; monitoring and performance analysis; maintenance; and life-cycle analysis. Visits to renewable energy facilities in the region may be included; 2 hours of lecture, 3 of hours of laboratory per week. Prerequisite: ARC 3050 or MEC 2010 and 2050, ELT 2072, 1032, or 1080

SDT 4110 Building Controls/Commissioning (3)**spring**

This course in the Green Buildings technical core looks at two important areas for sustainable commercial buildings: integrated control systems and the hands-on ‘fine tuning’ that is essential for a building to operate efficiently. The first part of the course will concentrate on an overview of digital control systems (electrical circuits and basic system design). The second part of the course focuses on the detailed knowledge needed for the emerging field of building commissioning, now a requirement of the LEED certification process; 2 hours of lecture, 2 hours of laboratory per week. Prerequisite: ARC 3010 and SDT 3110, concurrent enrollment in ARC 4030

SDT 4112 Green Sites Technical Survey (3)**fall**

This modularized course introduces students to issues related to environmentally responsible site design: site assessment; landscaping and aesthetic considerations; nutrient management and agricultural potential; and mapping, water, utility, and permitting issues. This survey course also introduces students to the use of Geographic Information Systems (GIS). LEED and other best practice standards will be discussed; 2 hours of lecture, 2 hours of studio per week. Prerequisite: None

SDT 4113 Green Buildings Technical Survey (3)**spring**

This course introduces all SDT students to the technical issues related to Green Buildings and teaches students to act as a knowledgeable member of a multi-disciplinary team. By comparing sustainable design approaches to standard practice, the student learns about energy conservation in buildings. Topics covered include energy use in buildings; sustainable options; residential versus commercial construction; building energy modeling; economics of sustainable buildings; state and national regulations; voluntary standards such as LEED; professional and ethical responsibilities; and designing with a holistic team approach; 3 hours of lecture per week. Prerequisite: SDT 3111 and 4112

SDT 4122 Sustainable Design Studio II (3)

spring

This capstone project course will serve to bring multi-disciplinary student teams together to solve a real life problem that integrates the knowledge of all the SDT tracks. Working with a client and experts in the field, each team will develop and present their concepts for a sustainable solution. This course requires that students draw upon solid knowledge of the SDT core, as well as the technical courses in their own concentration. The final solutions will be presented to the class and a panel of professionals. 6 hours of studio per week. Prerequisite: SDT 3121

SDT 4801/4802 Summer Internship/Internship Review (0/1) summer/fall

Students enroll in the internship upon successful completion of their junior year core curriculum. The internship requires students to spend at least 5 weeks in an employment setting with an institution or firm that is employing, or seeks to employ, sustainable technology. This practicum is designed to broaden a student's understanding of how sustainable technologies are implemented in the real world. Students will be enrolled in the 1 credit internship review in the following fall term; graded Pass/No Pass.

Social Science (SSC)

SSC 2010 Science, Technology, and 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: None

SSC 2030 Energy and Society (3)

as required

This course is designed to enable students to gain insights into the energy issue and to promote energy awareness and conservation. Topics will include a history of energy use; forms of energy; energy resources; renewable sources; the economics of energy production and consumption; and relevant social issues regarding energy. Appropriate field trips and guest lectures are scheduled; 3 hours of lecture per week. (General Education: SS) Prerequisite: None

SSC 3010 Revolution and the Call to Serve (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

SSC 3045 News and Newspapers (3)

on-line

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 on-line. Prerequisite: ENG 1061 *or* equivalent

Individual Research (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 and are subject to departmental approval. Details of specific course content are available from the instructor or from the department chair for the subject offered.

XXX X910 Individual Research/Study

as required

These courses are subjects on course material that do not have an approved course number. They may vary in subject area and the credits may vary. These courses are for individual research. The research project must be related to the student's major field of study or another area approved for independent study. Prerequisite: Departmental and Academic Dean's permission

Telecommunications (TCT)

TCT 1000 Telecommunications Orientation (1)

fall

This course is an orientation to the college experience including an analysis and discussion of learning styles, time management, test-taking, and study skills. 1 hour of lecture per week. Prerequisite: None

TCT 1001 Telecommunications I (4)

fall

This course is an introduction to the techniques, principles, and terminology of voice telecommunications. Public and private telecommunication networks will be examined. Telecommunication equipment, switching, and transmission technology will be demonstrated. The frequency spectrum, modulation schemes, and multiplexing techniques will be explored. Lectures, interactive learning, and demonstrations will be employed. Laboratory exercises will be required; 3 hours of lecture, 3 hours laboratory per week. Prerequisite: None

TCT 1002 Telecommunications II: Introduction to Voice & Data (4) **spring**

An introduction to the techniques, principles, and terminology of data communications will be presented. Public and private networks will be examined. Data communication equipment, multiplexing, and interactive learning demonstrations will be employed. Laboratory exercises will be required; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: TCT 1001

TCT 2003 Telecommunications III: LANS and WANS (4)

fall

This course is designed to train students in the organization, architecture, setup, maintenance, hardware, and software aspects of computer networks. Topics include an introduction to networks; types and characteristics of different network architectures (LAN to WAN); network topologies and cabling; intra- and inter-network devices; network operating systems; peer-to-peer and client/server environments; LAN setup and maintenance; inter-network communications, including connecting a LAN to the Internet; remote network access; network printing; network security; and world wide web servers. A hands-on approach will be taken, with team projects throughout; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: TCT 1002

TCT 2004 Telecommunications IV: Advanced Topics (4)

spring

A survey of current and emerging technologies in Telecommunications will be presented. Lectures, interactive learning, demonstrations, and site visits will be employed; 3 hours of lecture, 3 hours of laboratory per week. Prerequisite: TCT-2003

Technical Education (TEC)

TEC 1110 Issues and 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. Prerequisite: None

TEC 1120 Reading in Technical Education Content Areas (3) summer

This course is designed to assist technical center teachers in the development of techniques that will allow them to teach basic reading skills as an integrated part of their technical classroom. The primary focus will be on teaching skills for “reading to learn” about subject content. Technical center classrooms by nature are a process-centered mode. Students learn in ways that allow direct application to technical job requirements. This course emphasizes the same process-centered approach for the teaching of reading skills; 3 hours of lecture per week. Prerequisite: None

TEC 1130 Vocational Instruction for Students w/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. Prerequisite: None

Theatre Arts (THA)

THA 2070 Comedy in Film (3) as required

This course focuses on the psychological, social, and dramatic roots of comedy, as well as reviewing the social context of American comedy. Students will study paired films from different time periods, all of which use elements of comic structure, characterization, plot, symbolism, and themes; 2 hours of lecture, 2 hours of laboratory per week. (General Education: AH) Prerequisite: ENG 1061 *or* equivalent

Veterinary (VET)

VET 1000 Freshman Orientation (1) fall

This course introduces students to the wide range of employment opportunities for the veterinary technician. Presentations by guest lecturers are included. Information on using the library, Learning Center, and other support facilities on campus are provided. Students are introduced to different study skills and problem-solving techniques; 1 hour of lecture per week; graded: Pass/No Pass. Prerequisite: None

VET 1020 Animal Anatomy and 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

VET 1030 Animal Care and 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. Prerequisite: None

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; parasitologic 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: VET 1010 and 1030, BIO 2320

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. Prerequisite: None

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 (5)**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, 4 hours of laboratory per week. Prerequisite: VET 1030, BIO 2320

VET 2011 Veterinary Clinical Techniques I (3)**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; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: VET 1030, 1020, 1040, and 1060

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; 2 hours of lecture, 3 hours of laboratory per week. Prerequisite: VET 2011, 2050, and 2070

VET 2030 Animal Nutrition (2)

fall

This course familiarizes the student with various nutrients and their metabolism. Diet formulation for common 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; 2 hours of lecture per week. Prerequisite: CHE 1020, BIO 2320, and VET 1020

VET 2040 Reproduction and 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 and VET 1020 and 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, and 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 and 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, and 1060 and CHE 1020

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); 1 hour of seminar each week; graded Pass/No Pass. Prerequisite: VET 2030, 2050, 2070, and 2011.

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 and two semesters of animal care

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 experience(s). 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

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Associate Professor: Mechanical
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Index

A

Academic Advising	25
Academic Affairs	25-39
Academic Counseling	37
Academic Progress.....	54-55
Academic Standing	31, 54-55
Accounting Courses	148
Accreditation.....	10-11
Add/Drop Period.....	28
Administrators.....	223-227
Admissions.....	13-24
Admissions Requirements	19-21
Advanced Standing	23-24
Advisory Committees	236-249
Agribusiness Management Technology.....	19, 56-57
Agriculture Courses	149-151
Appeal of Dismissal	32
Application Deadlines.....	13
Architecture Courses.....	151-155
Architectural & Building Engineering Technology	19, 58-60

Architectural Engineering Technology, BS	19, 61-63
Arts/Humanities Electives	144
Attendance	25
Auditing Courses	27
Automotive Courses.....	155-157
Automotive Technology	19, 64-65

B

Biology Courses.....	157-158
Board	40-42, 45, 48
Business Courses	158-161
Business Technology & Management	19, 66-67
Business Technology & Management, BS.....	19, 68-69

C

Calculators	47
Calendar	4-7
Campus Facilities	12
Career/Transfer Center.....	38
Challenge Exams	30

Changing Programs/Majors	33
Chemistry Courses	164
Civil & Environmental Engineering Courses	162-164
Civil & Environmental Engineering Technology	19, 70-72
Computer Engineering Technology	19, 73-75
Computer Engineering Technology, BS	19, 76-78
Computer Information Technology	20, 79-80
Computer Information Technology, BS	20, 81-83
Computer Courses	165-171
Computer Software Engineering	20, 84-85
Computer Software Engineering, BS	20, 86-88
Consortium Agreement (VSC)	39
Construction Courses	171-174
Construction Management	19, 89-90
Construction Management, BS	19, 91-93
Credit by Challenge Examination	30
Credit Overload	31

D

Dairy Farm Management Technology	19, 94-95
Dental Hygiene	19, 96-97
Dental Hygiene, BS	19, 98-99
Dental Hygiene Courses	174-176
Deposits	47
Diesel Courses	177-178
Diesel Power Technology	19, 100-101
Diversified Agriculture	19, 102-104
Dismissal	31-33
Dropping courses	28-29
Dual Enrollment	17

E

Economics Courses	178-179
Education Electives	179
Electrical Engineering Courses ..	181-186
Electrical Engineering Technology	19, 105-107
Electromechanical Engineering Courses	180
Electromechanical Engineering Technology	20, 108-110

English Courses 186-188

English for Speakers of
Other Languages18, 188

Environmental Studies Courses . 188-189

Equine Courses 189-191

Equine Studies20, 111-113

Expected Family Contribution51

Expenses47

F

Faculty..... 228-233

Fees 45-46

FERPA.....38

Fire Science.....20, 114-115

Fire Science Courses 191-194

Financial Aid 51-55

G

General Education
Requirements 141-146

General Engineering
Technology116

Grading System.....26

Graduation Honors36

Graduation Participation35

Graduation Requirements34

Graduation Standards 33-34

H

History Courses 194-195

Honor Societies 35-36

Honors35

Humanities Courses 196-197

I

Incomplete Course Work.....28

Interdisciplinary Courses198

International Students 17-18

L

Landscape Courses..... 198-200

Landscape Development &
Ornamental Horticulture20, 117-119

Language Courses 200-201

Learning Center38

Leave of Absence 29-30

Location of Campus10

M	
Mathematics Courses	201-203
Mechanical Engineering Courses	203-206
Mechanical Engineering Technology	20, 120-122
Multiple Majors	33
Music Courses	206
N	
Non-degree Students	22-23
Non-discrimination and Equal Opportunity Policy	3
Nursing	20, 123-125
Nursing Courses	206-209
O	
Orientation	25
P	
Payment Policy	47-48
Philosophy Courses	209
Physics Courses	209-210
Placement Testing	22
President and Cabinet	223
Probation	31
Psychology Courses	211
R	
Refunds	48-49
Registration Information	22
Repeated Courses	28
Residency Requirements	49-50
Respiratory Courses	211-213
Respiratory Therapy	20, 126-127
Returning Students	32
Room Expense	40-42
RSP-Approved Programs	44
S	
Services for Students with Disabilities	37-38
Social Science Courses	216
Social Sciences Electives	145-146
Sources of Financial Aid	51-54
Staff	234-235
Stafford Loans	52

Student Class Level..... 30-31

Student Records

Review and Release Policy39

Student Right-to-Know39

Student Support Center37

Student Support Services/
TRIO Program37

Substitution of Courses30

Summer Programs24

Sustainable Design &
Technology 21, 128-134

Sustainable Design Courses 213-216

T

Technology Education.....135

Technology Education Courses.....218

Telecommunications Courses217

Telecommunications
Technology21, 136

Textbooks and Supplies47

Three-Year Options16

Time Limitation on
Graduation Requirements34

Transcripts27

Transfer Credit23

Trustees, VSC222

Tuition & Fees 40-50

U

Undeclared Associate Program138

V

Vermont Academy of
Science & Technology (VAST).....11

Veterans' Education Benefits 53-54

Veterinary Technology 21, 139-140

Veterinary Technology
Courses 218-221

W

Waiver of Courses30

Withdrawal from a Course 28-29

Withdrawal from VTC29, 48

Writing/Communication Center.....38

