

# Department of Integrated Engineering and Technology

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## Faculty

*Professors:* James Burns, Ph.D., Desmond Penny, Ph.D.; *Associate Professors:* Leo Scott Hansen, Ph.D., C. Jeff Salehi, David Ward; *Assistant Professors:* Boyd Fife, John Murray, Ph.D., Nicholas Winowich, Ph.D.; *Professionals in Residence:* Richard Cozzens, Matt Edwards, Roger Greener

## DEGREES OFFERED

### Engineering

#### Bachelor of Science

Integrated Engineering Composite

#### Associate of Pre-Engineering

### Technology

#### Bachelor of Arts and Bachelor of Science

Construction Management Composite  
Engineering Technology Composite – CAD/CAM  
Architectural/Civil Design Emphasis  
Engineering Technology Composite-CAD/CAM emphasis  
Engineering Technology Composite-CAD/GIS emphasis  
Engineering Technology Composite-Electronics and Computer emphasis  
Technology Education Composite-Career and Technical emphasis

#### Associate of Applied Science

Construction Technology  
CAD/CAM Technology  
Electronics Technology

#### Minors

Construction Technology  
CAD/CAM Technology  
Electronics Technology

#### Certificates

Civil Design/CAD  
Construction Technology

## DEPARTMENT STATEMENT

The Integrated Engineering and Technology Department (IET) offers ABET accredited professional-track interdisciplinary engineering programs and certified, in-demand, technology-track programs. IET supports the mission of the College of Computing, Integrated Engineering, and Technology and the mission of the University by providing a high quality undergraduate education to

our students through baccalaureate, associate, and certificate degree programs.

## ENGINEERING

Engineers and technologists play an increasingly important role in solving the varied problems of a complex and increasingly international society. There are many rewarding and high-paying job opportunities in the engineering fields, requiring proven skills and leadership. Two engineering programs are offered to provide students with opportunities to gain these qualities: Integrated Engineering and Pre-Engineering. The Integrated Engineering program is a four-year, ABET-accredited program leading to the B.S. degree in Integrated Engineering. The pre-engineering program leads to the Associate of Pre-Engineering degree. All courses offered in these majors are professional-track in nature.

## CREDIT TRANSFER

Southern Utah University has course articulation agreements with a large number of other schools of higher education in the state of Utah. Students transferring to SUU from any of these schools will be able to transfer courses taken at any of these schools provided: the courses are equivalent in content and number of credit hours to those in the engineering curricula; a grade of C or better has been earned for the courses. In all other instances, transfer of credit will be determined by the engineering faculty on a case-by-case basis.

## INTEGRATED ENGINEERING

### Mission



The mission of the Integrated Engineering program is to support and to realize with excellence the overall mission and vision of the University. IE does this by providing a broadly based, interdisciplinary engineering education with a design-oriented curriculum offering the skills and knowledge of several disciplines with ample opportunity for exploration and practice in the junior and senior years. The knowledge and experiences gained enable our graduates to undertake the wide variety of design and manufacturing challenges that modern society faces.

### Educational Objectives

Students who successfully complete the baccalaureate degree in Integrated Engineering will have:

1. a solid understanding of the fundamentals of mathematics, physical science, and engineering science, which re-occur in diverse technical applications and form the foundation for work in all fields of engineering;
2. the ability to practice engineering design and analysis and to integrate several engineering concepts into a system or process;
3. the ability to pursue professional careers in multidisciplinary fields by the development of effective teaming abilities and communication skills;
4. the ability to pursue advanced studies and/or assume leadership roles along diverse career paths;
5. a strong appreciation for and commitment to ethical responsibilities, professionalism, lifelong learning, and a concern for society and the environment.

### Program Outcomes

The outcomes embraced by the Integrated Engineering program for students are those proposed by the Accreditation Board for Engineering and Technology (ABET). Each graduate will take from the IET programs:

1. an ability to apply knowledge of mathematics, science, and engineering;
2. an ability to design and conduct experiments, as well as to analyze and interpret data;
3. an ability to design a system, component, or process to meet desired needs;
4. an ability to function on multidisciplinary teams;
5. an ability to identify, formulate, and solve engineering problems;
6. an understanding of professional and ethical responsibility;
7. an ability to communicate effectively;
8. the broad education necessary to understand the impact of engineering solutions in a global and societal context;
9. a recognition of the need for, and an ability to engage in lifelong learning
10. a knowledge of contemporary issues;
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### The Discipline

Engineers work to meet the present and future technological needs of a complex society. Their work provides everything from basic necessities such as power, fuel and water to the modern conveniences of satellite communications, high rise office buildings, and supersonic aircraft. Successful engineers today are well versed and practiced in a wide range of engineering fundamentals. They communicate with the public, other engineers and with scientists in many different disciplines all over the world to better understand society's needs and what is available to meet a specific need. They are proficient problem solvers and well trained in the latest, as well as traditional, methods of analysis, design and construction. The Bachelor of Science degree in Integrated Engineering combines and emphasizes study in fundamental and advanced areas of science and engineering that are traditionally taught in a wide variety of engineering disciplines. This integrated course of study prepares Southern Utah University graduates to provide cross discipline design solutions for the wide range of demands encountered by today's practicing engineers in consulting offices, manufacturing businesses, industrial companies, and government agencies utilizing smaller, highly versatile engineering staffs. Cross discipline engineering solutions encompass traditional as well as emerging methodology, technology and materials in order to optimize economical solutions for the complex problems encountered in a constantly changing world. Integrated Engineering graduates are equipped with the knowledge and broad background necessary to effectively function in a multidisciplinary problem solving environment. They achieve a level of mastery in engineering science and design that enables them to pursue successful careers in industry, consulting, or public service, or to continue their education in graduate studies.


### Curriculum

The Integrated Engineering curriculum is founded upon fundamentals in mathematics, sciences, and engineering, and includes courses common to many Civil, Mechanical, Electrical, Industrial, and Manufacturing engineering programs. Advanced engineering topics maintain an emphasis on cross-discipline applications, versatility, and improved problem solving and communication skills. Engineering study culminates in

multidisciplinary team projects that integrate the principles of scientific research and analysis with the applied art of engineering design.

### Graduation Requirements

To be awarded the Bachelor of Science degree in Integrated Engineering the student must:

1. achieve a grade of "C" or better in each and every prescribed course in the Integrated Engineering curriculum;
2. achieve a cumulative GPA of 2.3 or better;
3.  pass the Fundamentals of Engineering (FE) exam, or take the examination a minimum of two times.

## PRE-ENGINEERING

### Mission

The Associate of Pre-Engineering (APE) program is designed for students who plan to complete the first two years of their engineering education at Southern Utah University and then transfer to another institution of their choice to complete the requirements of the curriculum in the specialized discipline of their choice. Students in the APE program may also transfer to the Integrated Engineering program, with the approval of the engineering faculty.

### Disciplines and Curricula

Note: The student must complete a total of at least 60 credit hours in the discipline of his/her choice. Different disciplines may require different number of credit hours and it is highly recommended that students carefully study the course requirements of the Institution where they intend to finish their degree. The Quantitative Literacy and Science requirements of General Education are automatically satisfied. ENGR 1010 is not transferable as an Interdisciplinary course.

## TECHNOLOGY




Technology programs provide students with in-depth skill development in the program discipline areas of construction technology/construction management, electronics and computer engineering technology, CAD/CAM engineering technology, CAD/GIS engineering technology, through professional, credentialed faculty using state of the art facilities and equipment. In addition, it offers Technology Education teacher certification with a secondary endorsement. Furthermore, we aim to provide meaningful service to industry, government, and all communities served by the university.


Technology Education majors must earn a "C" or better in all courses in their major. All technology majors must earn a "C-" or better in courses required for the major and an overall GPA of at least 2.0.

*Students are strongly encouraged to work closely with a faculty adviser and an academic adviser in their major emphasis area, both at initial registration and throughout their program experience.*

## DEGREE REQUIREMENTS

Integrated Engineering (no minor required) Bachelor of Science Degree	
Course Number and Title	Credits
<b>Required General Education (38 hours)</b>	
English Requirements - must take the following:	
ENGL 1010 Academic Writing	3
ENGL 2010 Intermediate Writing	3

Quantitative Literacy Requirement: must take MATH 1210 Calculus I	4
Information Literacy Requirement: must take LM 1010 Information Literacy	1
Student Success Requirement: must take UNIV 1000 Student Success	1
Computer Literacy Requirement: must take CSIS 1400 Fundamentals of Programming	3
American Institutions Requirement: (see Chapter 14)	3
Knowledge Area Requirements: (see Chapter 14) One course from each of the following areas: Humanities, Fine Arts, Social & Behavioral Sciences, and Life Science.	12
Interdisciplinary Requirement: must take ENGR 1010 Engineering in the 21 <sup>st</sup> Century	3
Physical Science Requirement: must take CHEM 1210 Principles of Chemistry I CHEM 1215 Principles of Chemistry I Lab	5
<b>University Requirements</b>	
BS Degree – Math or Science minimum requirement (12 hours)	
<b>Core Requirements (82 hours)</b>	
CCET 1040 Computer Aided Design	3
 ENGL 3120 Writing in the Sciences	3
ENGR 2010 Statics	3
ENGR 2030 Dynamics	3
ENGR 2140 Strength of Materials	3
ENGR 2145 Strength of Materials Lab	1
ENGR 3000 Thermodynamics	3
ENGR 3010 Material Science Engineering	3
ENGR 3015 Material Science Engineering Lab	1
ENGR 3045 Engineering Design Lab I	2
ENGR 3050 Fluid Mechanics	3
ENGR 3055 Fluid Mechanics Lab	1
ENGR 2270 Electro Mechanical Systems	3
ENGR 2275 Electro Mechanical Systems Lab	1
ENGR 3095 Engineering Design Lab II	3
ENGR 4000 Mechatronics	3
ENGR 4010 Heat Transfer	3
ENGR 4025 Integrated Engineering Design Lab I	3
ENGR 4030 Electronics	3
ENGR 4035 Electronics Lab	1
ENGR 4050 Structural Analysis	3
ENGR 4060 Manufacturing	3
 ENGR 4070 Intro to Steel & Concr. Design	3
ENGR 4085 Integrated Engineering Design Lab II	3
MATH 1220 Calculus II	4
MATH 2210 Calculus III	4
 MATH 2250 Linear Algebra & Diff Equation	4
PHYS 2210 Physics for Scientists & Engineers I	4
PHYS 2215 Physics for Scientists & Engineers I Lab	1
PHYS 2220 Physics for Scientists and Engineers II	4
PHYS 2225 Physics for Scientists and Engineers II Lab	1

 <b>Total Credits</b>	<b>121</b>
<i>Comment:</i> This is a composite major, no minor required.	

<b>Associate of Pre-Engineering Degree</b>	
<b>Course Number and Title</b>	<b>Credits</b>
<b>General Education Requirements (15 hours)</b>	
ENGL 1010 Introduction to Academic Writing	3
ENGL 2010 Intermediate Writing	3
LM 1010 Information Literacy	1
UNIV 1000 Student Success	1
MATH 1210 Calculus I	4
CSIS 1400 Fundamentals of Programming	3
<b>Math (Choose a minimum of 10 hours)</b>	
<b>Choose a minimum of 10 credits from the following:</b> MATH 1220 Calculus II (4) MATH 2210 Calculus III (4) MATH 2270 Linear Algebra (3) MATH 2280 Differential Equations (3)	10
<b>Science Electives (15 hours)</b>	
<b>Choose 15 credits from the following:</b> BIOL 1610 General Biology I (3) BIOL 1615 General Biology I Lab (1) BIOL 1620 General Biology II (3) BIOL 1625 General Biology II Lab (1) CHEM 1210 Principles of Chemistry I (4) CHEM 1215 Principles of Chemistry I Lab (1) CHEM 1220 Principles of Chemistry II (4) CHEM 1225 Principles of Chemistry II Lab (1) CHEM 2310 Organic Chemistry I (4) CHEM 2320 Organic Chemistry II (4) CHEM 2325 Organic Chemistry II Lab (2) PHYS 2210 Physics for Scientists & Engineers I (4) PHYS 2215 Physics for Scientists & Engineers I Lab (1) PHYS 2220 Physics for Scientists & Engineers II (4) PHYS 2225 Physics for Scientists & Engr. II Lab (1)	15
<b>Engineering Electives (20 hours)</b>	
<b>Choose 20 credits from the following:</b> ENGR 1010 Engineering in the 21 <sup>st</sup> Century (3) ENGR 1040 Computer Aided Design* (3) ENGR 2010 Statics (3) ENGR 2030 Dynamics (3) ENGR 2140 Strength of Materials (3) ENGR 2145 Strength of Materials Lab (1) ENGR 2240 Surveying & Global Positioning (2) ENGR 2245 Surveying & GPS Lab (1) ENGR 2270 Electro Mechanical Systems (3) ENGR 2275 Electro Mechanical Systems Lab (1) ENGR 3000 Thermodynamics (3) ENGR 3010 Material Science Engineering (3) ENGR 3015 Material Science Engineering Lab (1)	20
*May substitute CCET 1040, 1630	
<b>Total Credits</b>	<b>60</b>

<b>Total Credits, B.A. degree</b>	<b>126</b>
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\*Upper division management courses must be approved through Business Advisor to waive pre-requisite requirements. Signature required for registration.

<b>Construction Management Composite Bachelor of Arts/Bachelor of Science</b>	
<b>Course Number and Title</b>	<b>Credits</b>
<b>General Education Core (see Chapter 14)</b>	
Core Course Requirements	18
Knowledge Areas Requirements	19
<b>University Requirements</b>	
BA Degree – Foreign Language/ASL Requirement (16 hours or proficiency test)	
BS Degree – Math or Science minimum requirement (12 hours)	
<b>Core Requirements (81 hours)</b>	
ACCT 2010 Accounting Principles	3
ACCT 3350 Business Law I	3
CCET 1040 Computer Aided Design	3
CM 1290 Electrical Systems	3
CM 2010 Framing Systems	3
CM 2015 Framing Systems Lab	2
CM 2050 Concrete & Masonry	3
CM 2055 Concrete & Masonry Lab	2
CM 2100 Finishing Systems	3
CM 2105 Finishing Systems Lab	2
CM 3240 Estimating	3
CM 3270 Building Codes	3
CCET 3610 Architectural Design	3
CM 4400 HVAC & Plumbing Principles & Design	3
CM 4405 HVAC & Plumbing Principles & Design Lab	1
ECON 2010 Principles of Microeconomics OR ECON 2020 Principles of Macroeconomics	3
CM 2000 Statics for Construction Management	2
ENGR 2240 Surveying & Global Positioning	2
ENGR 2245 Surveying & GPS Lab	1
ENGR 3030 Project Management Processes	3
MATH 1050 College Algebra	4
MATH 1060 Trigonometry	3
MATH 1210 Calculus I	4
MATH 2040 Business Statistics	4
MGMT 3100* Operations Management	3
MGMT 3180* Management & Organizations	3
MGMT 3210* Entrepreneurship	3
MGMT 3240* Human Resource Management	3
MGMT 4100* Organizational Behavior	3
<b>Other Electives</b>	
Free Electives	3
<b>Total Credits, B.S. degree</b>	<b>120</b>

<b>Engineering Technology Composite CAD/CAM Emphasis Bachelor of Arts/Bachelor of Science</b>	
<b>Course Number and Title</b>	<b>Credits</b>
<b>General Education Core (see Chapter 14)</b>	
Core Course Requirements	18
Knowledge Areas Requirements (must take COMM 1010 for Humanities Knowledge Area Requirement)	19
<b>University Requirements</b>	
BA Degree – Foreign Language/ASL Requirement (16 hours or proficiency test)	
BS Degree – Math or Science minimum requirement (12 hours)	
<b>Engineering Technology Core (21 hours)</b>	
CCET 4960 Capstone Project for CAD/CAM	3
CSIS 1040 Intro to Programming w/ MatLab	3
MATH 1210 Calculus I	4
PHYS 2010 College Physics I /PHYS 2015 Lab	5
CCET 4610 Advanced Solid Modeling	3
ENGR 1030 Computer-Assisted Drafting	3
<b>CAD/CAM Engineering Technology (CCET) Composite (45 hours)</b>	
CCET 1010 Engineering Technology Graphics	3
CCET 1030 Intro to CAD 3-D	3
CCET 1040 Computer Aided Design	3
CCET 2620 3-Design	3
CCET 2650 Mechanical Blueprint Reading	2
CCET 3610 Architectural Design	3
CCET 3630 Fundamentals of CATIA	3
CCET 3670 Civil Design	3
CCET 3680 CNC Design	3
CCET 4600 Engineering Design	3
CCET 4610 Advanced Solid Modeling	3
CCET 4690 CNC Software & Applications	3
EET 3760 Electronic Design & Fabrication	3
ENGR 2010 Statics	3
ENGR 2140 Strength of Materials	3
ENGR 2145 Strength of Materials Lab	1
<b>Major CAD/CAM Electives (9 hours)</b>	
<b>Choose 9 credits from the following:</b>	
CCET 3610 Architectural Design (3)	9
CM 3650 Residential Drafting (3)	
ENGR 2240 Surveying & Global Positioning (2)	
ENGR 2245 Surveying & GPS Lab (1)	
GEOG 3500 Intro to Cartography (3)	
GEOG 3505 Intro to Cartography Lab (1)	
<b>CAD/CAM Free Elective:</b>	
Free Electives, includes completing B.A. or B.S.	8

degree requirements	
<b>Total Credits B.S. degree</b>	<b>120</b>
<b>Total Credits B.A. degree</b>	<b>124</b>

ENGR 3240 Advanced Surveying	2
ENGR 3245 Advanced Surveying Lab	1
ENGR 3030 Project Management Processes	3
<b>Total Credits B.S. degree</b>	<b>124</b>
<b>Total Credits B.A. degree</b>	<b>136</b>

<b>Engineering Technology Composite CAD/CAM-Architectural/Civil Design Emphasis Bachelor of Arts/Bachelor of Science</b>	
<b>Course Number and Title</b>	<b>Credits</b>
<b>General Education Core (see Chapter 14)</b>	
Core Course Requirements	18
Knowledge Areas Requirements (must take COMM 1010 for Humanities Knowledge Area Requirement)	19
<b>University Requirements</b>	
BA Degree – Foreign Language/ASL Requirement (16 hours or proficiency test)	
BS Degree – Math or Science minimum requirement (12 hours)	
<b>Engineering Technology Core (21 hours)</b>	
CCET 4960 Capstone Project for CAD/CAM	3
CSIS 1040 Intro to Programming w/ MatLab	3
MATH 1210 Calculus I	4
PHYS 2010 College Physics I /PHYS 2015 Lab	5
CCET 4610 Advanced Solid Modeling	3
ENGR 1030 Computer-Assisted Drafting	3
<b>CAD/CAM Engineering Technology (CCET) Composite (45 hours)</b>	
CCET 1010 Engineering Technology Graphics	3
CCET 1030 Intro to CAD 3-D	3
CCET 1040 Computer Aided Design	3
CCET 2620 3-Design	3
CCET 2650 Mechanical Blueprint Reading	2
CCET 3610 Architectural Design	3
CCET 3630 Fundamentals of CATIA	3
CCET 3670 Civil Design	3
CCET 3680 CNC Design	3
CCET 4600 Engineering Design	3
CCET 4610 Advanced Solid Modeling	3
CCET 4690 CNC Software & Applications	3
EET 3760 Electronic Design & Fabrication	3
ENGR 2010 Statics	3
ENGR 2140 Strength of Materials	3
ENGR 2145 Strength of Materials Lab	1
<b>Architectural/Civil Design Emphasis (21 hours)</b>	
CM 3270 Building Codes	3
CCET 3610 Architectural Design	3
CM 3650 Residential Drafting	3
CM 3240 Estimating & Bidding	3
ENGR 2240 Surveying & GPS	2
ENGR 2245 Surveying & GPS Lab	1

<b>Engineering Technology Composite CAD/GIS Emphasis Bachelor of Arts/Bachelor of Science</b>	
<b>Course Number and Title</b>	<b>Credits</b>
<b>General Education Core (see Chapter 14)</b>	
Core Course Requirements	18
Knowledge Areas Requirements (must take COMM 1010 for Humanities Knowledge Area Requirement)	19
<b>University Requirements</b>	
BA Degree – Foreign Language/ASL Requirement (16 hours or proficiency test)	
BS Degree – Math or Science minimum requirement (12 hours)	
<b>Core Requirements (20 hours)</b>	
CCET 4960 Capstone Project for CAD/CAM OR GEOG 4500 GIS Research Project	3
CSIS 1410 Object Oriented Programming	3
MATH 1210 Calculus I	4
PHYS 2010 College Physics I	4
TECH 3000 Occupational Safety	3
ENGR 4060 Manufacturing	3
<b>CAD/GIS Emphasis (35 hours)</b>	
CCET 1010 Engineering Technology Graphics	3
CCET 1040 Computer Aided Design	3
CCET 3630 Fundamentals of CATIA	3
CCET 3670 Civil Design	3
EET 2750 PC Hardware	3
ENGR 2010 Statics	3
ENGR 2240 Surveying & Global Positioning	2
ENGR 2245 Surveying & GPS Lab	1
GEOG 2900 GPS Theory, Techniques & Methods	2
GEOG 3500 Intro to Cartography	3
GEOG 3505 Intro to Cartography Lab	1
GEOG 3550 Principles of GIS	3
GEOG 3560 Principles of GIS Lab	2
GEOG 4150 Advance GIS Analysis Methods Lab	3
<b>One of the following (3 hours):</b>	
<b>Choose 3 credits from the following:</b>	
GEOG 4893 GIS Internship (3)	3
GEOG 3993 Undergraduate Research in Geography/GIS (3)	
TECH 4893 Technology Internship (3)	
<b>Other Electives (23 hours)</b>	
Free Electives (includes completing B.A. or B.S. requirement)	26
<b>Total Credits</b>	<b>120</b>

<b>Total Credits, B.S. degree</b>	<b>123</b>
<b>Total Credits, B.A. degree</b>	<b>135</b>

<b>Engineering Technology Composite Electronics Emphasis Bachelor of Arts/Bachelor of Science</b>	
<b>Course Number and Title</b>	<b>Credits</b>
<b>General Education Core (see Chapter 14)</b>	
Core Course Requirements	18
Knowledge Areas Requirements (must take COMM 1010 for Humanities Knowledge Area Requirement)	19
<b>University Requirements</b>	
BA Degree – Foreign Language/ASL Requirement (16 hours or proficiency test)	
BS Degree – Math or Science minimum requirement (12 hours)	
<b>Core Requirements for EET (21 hours)</b>	
CSIS 1410 Object Oriented Programming	3
EET 4960 Capstone Project for EET	3
MATH 1210 Calculus I	4
PHYS 2010 College Physics I / PHYS 2015 Lab	5
MGMT 3180 Management & Organizations	3
TECH 3000 Occupational Safety	3
<b>Electronic Engineering Technology Composite (EET Composite, 49 hours)</b>	
CSIS 2810 Computer Organization & Architecture	3
CSIS 2420 Intro to Algorithms & Data Structures	3
CSIS 2600 Data Communications & Networking	3
CSIS 3150 C & C++ Programming	3
CSIS 3600 Operating Systems	3
EET 1700 Circuit Analysis I	3
EET 1730 Electronic Devices I	3
EET 2710 Electronic Devices II	3
EET 2750 PC Hardware	3
EET 2760 Industrial Control Systems	3
EET 3080 Digital Electronics II	3
EET 2780 Digital Electronics I	3
EET 3710 Op-Amps & Linear Integrated Circuits	3
EET 3760 Electronic Design & Fabrication	3
EET 3780 Apps of Microprocessors	3
MATH 1040 Intro To Statistics	4
<b>Major EET Electives (Choose 6 Hours)</b>	
<b>Choose 6 credits from the following:</b> CSIS 2620 Network Administration I (3) EET 3720 Communication Circuits (3) EET 3790 Computer Interfacing (3)	3
<b>Upper Division Elective Credit Hours (10 Hours)</b> (required to meet minimum graduation requirements)	
	10

<b>Technology Education Composite with Career and Technical Emphasis Bachelor of Arts/Bachelor of Science</b>	
<b>Course Number and Title</b>	<b>Credits</b>
<b>General Education Core (see Chapter 14)</b>	
Core Course Requirements	18
Knowledge Areas Requirements	19
<b>University Requirements</b>	
BA Degree – Foreign Language/ASL Requirement (16 hours or proficiency test)	
BS Degree – Math or Science minimum requirement (12 hours)	
<b>Secondary Education Licensure Requirements (34-37 hours)</b>	
Please see page 178 for the degree requirements for Secondary Education Licensure. Some classes required for the licensure cannot be taken until the teacher candidate has been admitted to the Teacher Education Department. Please consult your advisor or the Teacher Education Department for further instruction.	
<b>Technology Education Requirements (48 hours)</b>	
Students must take 48 hours of engineering technology, engineering, or construction management courses, of which 12 must be upper division level. Students are advised to carefully review the requirements of the school system they intend to teach in to insure that their course of study meets the requirements of the district. The course of study must be approved by the college advisor.	48
<b>Total Credits, B.S. degree</b>	<b>120</b>

**Vocational Endorsement**

An applicant for the Basic Vocational-Technical Certificate with endorsement(s) must have: A bachelor's degree in an approved teacher education program and at least two years of successful related occupational experience.

<b>Construction Technology Associate of Applied Science</b>	
<b>Course Number and Title</b>	<b>Credits</b>
<b>General Education Core (see chapter 14)</b>	
General Education	20-21
<b>Construction Emphasis Required (37 hours)</b>	
CCET 1040 Computer Aided Design	3
CM 1290 Electrical Systems	3
CM 2010 Framing Systems	3
CM 2015 Framing Systems Lab	2
CM 2050 Concrete & Masonry	3
CM 2055 Concrete & Masonry Lab	2
CM 2100 Finishing Systems	3
CM 2105 Finishing Systems Lab	2

CM 3240 Estimating & Bidding	3
CM 3270 Building Codes	3
ENGR 3030 Project Management Processes	3
CM 3650 Residential Drafting	3
CM 4400 HVAC & Plumbing Principles & Design	3
CM 4405 HVAC & Plumbing Principles & Design Lab	1
<b>Elective (3 hours)</b>	
<b>Choose 3 credits from the following:</b>	
ACCT 2010 Accounting Principles (3)	3
ACCT 3350 Business Law I (3)	
ECON 2010 Principles of Microeconomics (3)	
ECON 2020 Principles of Macroeconomics (3)	
<b>Total Credits</b>	<b>60</b>

<b>CAD/CAM Technology Associate of Applied Science</b>	
Course Number and Title	Credits
<b>General Education Core (see Chapter 14)</b>	
General Education (must take MATH 1050)	20-21
<b>Core Requirements (6 hours)</b>	
CCET 1010 Engineering Technology Graphics	3
TECH 3000 Occupational Safety	3
<b>CCET Emphasis Required Credit (18 hours)</b>	
CCET 1030 Intro to CAD/CAM 3D Design	3
CCET 1040 Computer Aided Design	3
CCET 3670 Civil Design	3
CCET 3680 CNC Design	3
CCET 4600 Engineering Design	3
MATH 1060 Trigonometry	3
<b>CCET Courses selected with approval of advisor (12 hours)</b>	
Choose 12 credits from the following: CCET 2620 3-D Design (3) CCET 2650 Mechanical Blueprint Reading (2) CCET 3610 Architectural Design (3) CCET 3630 Fundamentals of CATIA (3) CCET 4610 Advanced Solid Modeling (3) CCET 4690 CNC Software & Applications (3) CM 3650 Residential Drafting (3) EET 3760 Electronic Design & Fabrication (3) ENGR 2240 Surveying & Global Positioning (2) ENGR 2245 Surveying & GPS Lab (1) GEOG 2900 GPS Theory, Techniques & Methods (2) GEOG 2920 Workshop (1-3) GEOG 3500 Intro to Cartography (3) GEOG 3505 Intro to Cartography Lab (1) GEOG 3550 Principles of GIS (3) GEOG 3555 Principles of GIS Lab (2) GEOG 4150 Advanced GIS Analysis Methods Lab (3) GEOG 4500 GIS Research Project (3) GEOG 4920 Workshop (1-3)	12
<b>Other Electives</b>	
Electives (6-7 credit hours)	7-8
<b>Total Credits</b>	<b>64</b>

<b>Engineering Technology Electronics Emphasis Associate of Applied Science</b>	
Course Number and Title	Credits
<b>General Education Core (see Chapter 14)</b>	
General Education (must take MATH 1050)	20-21
<b>Core Required Courses (6 hours)</b>	
MATH 1060 Trigonometry	3
TECH 3000 Occupational Safety	3
<b>Electronic Technology Emphasis (28 hours)</b>	
CSIS 1400 Fundamentals of Programming	3
EET 1700 Circuit Analysis I	3
EET 1730 Electronic Devices I	3
EET 2710 Electronic Devices II	3
EET 2760 Industrial Control Systems	3
EET 2780 Digital Electronics I	3
EET 3720 Communications Circuits	3
EET 3780 Applications of Microprocessors	3
ENGR 2270 Electro-Mechanical Systems	3
ENGR 2275 Electro-Mechanical Systems Lab	1
<b>Recommended Electives (9 hours)</b>	
Choose 9 credits from the following: EET 2750 PC Hardware (3) EET 3080 Digital Electronics II (3) EET 3710 Op-Amps & Linear Integrated Circuits (3) EET 3760 Electronic Design & Fabrication (3) EET 3790 Computer Interfacing (3)	9
<b>Total Credits</b>	<b>63-64</b>

<b>Construction Technology Minor</b>	
Course Number and Title	Credits
<b>Required</b>	
CM 2010 Framing Systems	3
CM 2015 Framing Systems Lab	2
CM 2050 Concrete & Masonry	3
CM 2055 Concrete & Masonry Lab	2
CM 2100 Finishing Systems	3
CM 2105 Finishing Systems Lab	2
CM 3610 Architectural Design	3
<b>Total Credits</b>	<b>18</b>

<b>CAD/CAM Technology Minor</b>	
Course Number and Title	Credits
<b>Core Requirements (6 hours)</b>	
CCET 1010 Engineering Technology Graphics	3
CCET 1040 Computer Aided Design	3
<b>Minimum of 9 elective hours selected from the following. See CCET faculty for individual program needs.</b>	
Choose 9 credits from the following: CCET 1030 Intro to CAD/CAM 3-D Design (3) CCET 2620 3-D Design (3) CCET 2650 Mechanical Blueprint Reading (3) CCET 3610 Architectural Design (3) CCET 3630 Fundamentals of CATIA (3) CCET 3670 Civil Design (3) CCET 3680 CNC Design (3) CCET 4600 Engineering Design (3) CCET 4610 Advanced Solid Modeling (3) CCET 4690 CNC Software & Applications (3) CM 3650 Residential Drafting (3)	9
<b>Total Credits</b>	<b>15</b>

<b>Electronics Technology Minor</b>	
<b>Total Credits (minimum 16)</b>	
The electronics program offers a number of possible areas of study for a minor. For this reason there is not a specified program of study. Students wishing to minor in electronics must consult with EET faculty in that field to work out a program of study which will best suit the students' needs. Areas of study include general electronics, digital and computer electronics, communication, and servicing.	

<b>Civil Drafting/CAD Certificate</b>	
Course Number and Title	Credits
<b>Core Requirements (15 hours)</b>	
CCET 1010 Engineering Technology Graphics	3
CCET 1040 Computer Aided Design	3
CCET 3670 Civil Design	3
ENGR 2240 Surveying & Global Positioning	2
ENGR 2245 Survey & GPS Lab	1
MATH 1060 Trigonometry	3
<b>Electives Required (2 hours)</b>	
<b>Choose a minimum of 2 credits from the following:</b>	
CCET 1030 Intro to CAD/CAM 3D Design (3) CCET 2620 3-D Design (3) CCET 2650 Mechanical Blueprint Reading (3) CCET 3610 Architectural Design (3) CCET 3630 Fundamentals of CATIA (3) CCET 3670 Civil Design (3) CCET 3680 CNC Design (3) CCET 4600 Engineering Design (3) CCET 4610 Advanced Solid Modeling (3) CCET 4690 CNC Software & Applications (3) ENGR 2010 Statics (3) ENGR 2140 Strength of Materials (3) ENGR 2145 Strength of Materials Lab (1) ENGR 3010 Materials Science Engineering (3) CM 3650 Residential Drafting (3) COMM 1010 Essentials of Communications (3) EET 3760 Electronic Design & Fabrication (3) GEOG 2900 GPS Theory, Techniques & Methods (2) GEOG 2920 Workshop (1-3) GEOG 3500 Intro to Cartography (3) GEOG 3505 Intro to Cartography Lab (1) GEOG 3550 Principles of GIS (3) GEOG 3555 Principles of GIS Lab (2) GEOG 4150 Advanced GIS Analysis Methods Lab (3) GEOG 4500 GIS Research Project (Capstone) (3) GEOG 4920 Workshop (1-3)	2
<b>Total Credits</b>	<b>17</b>



