



Computer Engineering Undergraduate Student Handbook

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Chapter 1

Introduction

The department of Electrical and Computer Engineering (ECE) developed this handbook to assist you with your Computer Engineering (CpE) program. We provide the names of a number of professors and administrators that you can contact for various purposes. We also summarize information available in other Missouri S&T documents and provide web addresses where you can find more information.

This handbook is available at <https://ece.mst.edu/academic-programs/>. We recommend that you review the table of contents of this handbook so that you will know what information this document contains. We further suggest that you read all of chapters 1 and 3.

If there appears to be a discrepancy between information in this handbook and other university documents, contact your advisor or the CpE coordinator for undergraduate studies. We always welcome suggestions for improving or correcting this handbook. You should direct your comments to the coordinator for CpE undergraduate studies.

1.1 Departmental Administration

1.1.1 ECE Department Chair

Dr. Jonathan Kimball, 139 EECH, 341-4503, kimballjw@mst.edu

The chair of ECE coordinates and monitors the efforts of the ECE faculty and enforces graduation requirements that are specific to ECE. Most questions and forms are handled by the associate chair for Academic Affairs or one of the four coordinators. However, you should contact the department Chair directly when you have concerns, complaints, or even compliments regarding a member of the faculty.

1.1.2 ECE Associate Chair for Academic Affairs

Dr. Joe Stanley, 127 EECH, 341-6896, stanleyj@mst.edu
Dr. Kelvin Erickson, 221 EECH, 341-4757, kte@mst.edu

The associate chair coordinates the accreditation process for the computer engineering (CpE) and electrical engineering (EE) undergraduate degree programs. The associate chair also deals with questions about the EE and CpE programs that the EE and CpE undergraduate coordinators cannot resolve. Drs. Stanley and Erickson alternate this role every other year.

1.1.3 ECE Coordinator for Graduate Studies

Dr. Rui Bo, 235 EECH, 341-6400, rbo@mst.edu

Anyone seeking admission into the ECE graduate program should contact this associate chair. He coordinates all aspects of the department's graduate program, including admission, and selection of chancellor's fellows, graduate teaching assistants (GTAs) and graduate research assistants (GRAs).

1.1.4 Coordinator for Electrical Engineering Undergraduate Studies

Dr. Kelvin Erickson, 221 EECH, 341-4757, kte@mst.edu

Direct your inquiries about the electrical engineering (EE) degree program to this coordinator. He deals with all aspects of the EE undergraduate program, including admission. Relative to the EE program, he has the same signature authority that the coordinator for CpE undergraduate studies has for the CpE program.

1.1.5 Coordinator for Laboratory Development

Dr. Theresa Swift, 217 EECH, 341-4540, thswift@mst.edu

This coordinator supervises all required ECE laboratories. She is also responsible for improving and developing laboratory experiments and courses. If you have questions, suggestions, or problems concerning a laboratory course or GTA instructor for a laboratory course, this is the person to contact.

1.1.6 Coordinator for Distance Education

Dr. Sahra Sedighsarvestani, 135 EECH, 341-7505, sedighs@mst.edu

This coordinator will assist you with inquiries about distance courses for the electrical and computer engineering undergraduate and graduate programs. She will assist you with questions regarding issues such as distance course enrollment and options for on- and off-campus students. She is the contact person for questions or suggestions about distance course offerings.

1.1.7 Coordinator for Computer Engineering Undergraduate Studies

Dr. R. Joe Stanley, 127 EECH, 341-6896, stanleyj@mst.edu

The coordinator handles most of the questions and forms generated by undergraduate CpE students. He has the authority to sign for the chairman on these forms:

- ADD/DROP
- COURSE SUBSTITUTIONS AND WAIVERS
- REQUEST TO TRANSFER PART OF THE LAST 60 HOURS FOR A DEGREE
- NOTIFICATION OF SCHOLASTIC ACTION
- AUTHORIZATION TO CHANGE UNDERGRADUATE CATALOG YEAR
- UNDERGRADUATE READMISSION REQUEST
- REQUEST TO WITHDRAW FROM SCHOOL
- PETITION FOR EXCESS SCHEDULE ON PROBATION
- UNDERGRADUATE REQUEST TO CHANGE MAJORS

This coordinator can also sign other documents in the absence of the chair or coordinator related to the CpE undergraduate program. Most of these forms can be found at <https://ece.mst.edu/resources/current-students/undergraduate-advising/> (Common Forms). Questions and forms ready for approval should be submitted to the Undergraduate Advising and Recruiting office in 140 EECH.

1.1.8 ECE Undergraduate Advising

Upon admission to the B.S. CpE program, you will be assigned an advisor to help you develop a coherent plan of study, career planning, and must approve your class schedule, adding and dropping classes, enrollment course prerequisite waivers, and any course substitution or waiver. The advising

specialist can assist you with these questions. Links to common forms can be found at <https://ece.mst.edu/resources/current-students/undergraduate-advising/>.

The website <https://ece.mst.edu/resources/current-students/undergraduate-advising/> has contact information for ECE department advising resources, as well as relevant links to the Registrar's office for common advising questions.

- **Advising Week:** One week during fall and winter semester is advising week. This is the most efficient time for you to meet with your advisor to make a new schedule. Check the website <http://registrar.mst.edu/calendars/> for the precise dates for this week. During advising week, you should meet with your advisor to set up your next-semester class schedule. You should be sure to sign up for an appointment on the schedule that will be posted beside your advisor's office door. Your advisor must remove the advising hold in order for you to register. After your advising session, you should check Joe'SS to find out the first date and time that you can register. You should register as soon as possible to improve your chance of getting the course sections you prefer.
- **Open Registration:** Open registration dates are also listed in the semester class schedule. Use the link <http://registrar.mst.edu/calendars/> to find these dates.

1.2 Required Reading for Every Undergraduate CpE Student

Your academic advisor expects you to read certain documents published by the university that explain university rules and regulations. These documents can answer many of your questions and allow you more time to discuss important topics, such as career guidance, with your advisor. We provide a brief description of some important documents below. While you will never be tested on this material, failing to understand these requirements may needlessly delay graduation or cause other problems.

1.2.1 Missouri S&T Student Academic Regulations

The Student Academic Regulations is the definitive guide to the rules and policies governing all students at Missouri S&T. You are responsible for knowing and meeting these regulations. This document is available at <http://registrar.mst.edu/academicregs/>.

1.2.2 Missouri S&T Undergraduate Catalog

The Missouri S&T Undergraduate Catalog describes the undergraduate degree programs and requirements at Missouri S&T. It is published annually and can be found online at <http://catalog.mst.edu/undergraduate/>. You should read the sections relating to the CpE curriculum and courses.

We occasionally change graduation requirements to improve our program, but students attending Missouri S&T are allowed to continue under the catalog in force when they began their college studies. You should view the most recent copy of this catalog for the newest graduation requirements. The graduation requirements for different catalog years can be found at <http://catalog.mst.edu/archivedcatalogs/>. Please note that the most recent version (referred to as the current catalog year) of the CpE BS program requirements (updated, if there are any changes, at the beginning of fall semester every academic year) is given at <https://catalog.mst.edu/undergraduate/degreeprogramsandcourses/computerengineering/#bachelorstext>. If you prefer the new set of requirements, you may file a petition to change to the new program by filling out

an AUTHORIZATION TO CHANGE UNDERGRADUATE CATALOG YEAR FORM obtained from the registrar's office or at <http://registrar.mst.edu/forms/>.

If you are a transfer student or have interrupted your studies, special rules may apply you. See section 3.1 for the details.

1.2.3 Schedule of Classes

You can find the most recent schedule of classes at <http://registrar.mst.edu/classofferings/>. This schedule describes which courses are offered, their reference numbers, meeting times, locations, section letters, and other information. In addition, this document contains a reporting schedule that lists dates such as when classes begin, final examination schedules, holidays, vacations, important dates for adding/dropping courses, and registering for classes. Before enrolling in a class, you should check the schedule of classes and make plans to attend every class meeting including the final examination. If you are unable or unwilling to attend some of these meeting times, you should either not enroll in the class, or contact the instructor prior to enrolling. Instructors have the authority to drop you from a class because of absences.

1.2.4 Degree Audit Report

The registrar's office maintains a computerized academic progress system (degree audit) report for each student. Your degree audit report lists all of your courses and grades. The report also lists your degree requirements, including which requirements have been satisfied. You can view your degree audit report at <https://joess.mst.edu/> at any time, and you should receive a current copy from your advisor during priority registration. The registrar's office publishes a short document describing how to interpret your degree audit report.

You should review your degree audit report every semester to ensure that all information on your report is correct. This is particularly important as graduation approaches. The registrar's office will not allow you to graduate until all requirements listed on your degree audit report are satisfied.

1.2.5 CpE Undergraduate Bulletin Boards

Several bulletin boards are available in Emerson Electric Company Hall (EECH) to provide accurate and timely information for students.

Main Departmental Bulletin Board: This is in the first-floor lobby near the north entrance of EECH. It contains general information for the current semester such as a schedule of classes, web addresses for ECE related sites, a listing of candidates for graduation, GTA offices, and special notices. **NOTE: Only departmental staff may post to this board.**

Undergraduate Job Postings Bulletin Board: This is located in the ECE student library, 113 EECH. Job openings of interest to students are posted here. **Only departmental staff may post to this board.**

Students/Student Organizations Bulletin Boards: The locations of the three bulletin boards in EECH where students may post approved notices are:

- Between rooms 101 and 102 EECH
- In the canteen area, G15 EECH
- Near G1 EECH

- Near 201 EECH (This board also contains advertisements from other universities)

All postings must be done using thumbtacks. **DO NOT USE TAPE OR STAPLES. No postings are allowed on doors, windows, or walls. Items posted improperly will be removed.** *Please see the staff (142/143/144 EECH) if you have any questions regarding where to post items.*

1.2.6 World Wide Web Documents

The ECE Department distributes a considerable amount of information over their website at <http://ece.mst.edu/>. This site lists information on faculty, staff, ECE computer labs, graduate and undergraduate students, and professional organizations. See Section 1.2.8 on how to create your computer account.

1.2.7 Information Technology

Curtis Laws Wilson Library, 341-4357, ithelp@mst.edu

The department of Information Technology is in charge of operating the computers on campus. As a Missouri S&T student, you are encouraged to have a computer account and use email. The staff of information technology will assist you in establishing your account and can answer your questions concerning the use of university computers. The information technology website is <http://it.mst.edu>. You can find a list of all Missouri S&T computer learning centers (CLC's) at [Help Desk – Information Technology | Missouri S&T \(mst.edu\)](#). IT help for personal computers can be provided at the Curtis Laws Wilson Library. Information about computing services can be found at <https://it.mst.edu/help-desk/>.

1.2.8 Disability Support Services

204 Norwood Hall, 341-4211, dss@mst.edu

Contact the coordinator of disability support services to request special accommodations regarding a disability related service. You can find the Missouri S&T policy related to students with disabilities at <https://saat.mst.edu/>.

Chapter 2

Admission/Admission Standards

In applying for admission to Missouri S&T, you may apply for general admission or direct admission into a specific program, including CpE. Your questions concerning general Missouri S&T admission procedures and requirements should be directed to the admissions office. You can answer many of your questions by visiting the admissions office website at <http://admissions.mst.edu/> and the future students website <https://futurestudents.mst.edu/>.

You may enroll in CpE classes if you have completed the prerequisites and have the consent of your advisor. However, you can graduate with a B.S. CpE degree only if you have been accepted into the CpE program.

Information about Missouri S&T, including freshman admission, transfer admission, military and veterans, distance and online students, and dual enrollment, can be found at <https://futurestudents.mst.edu/>.

Students who are undecided, studying engineering and computer science are admitted to the S&T Advising Center. During the first two or three semesters on campus, you will work to complete a common set of pre-engineering courses while acquiring information to help you determine your major and career. After successfully completing the pre-engineering requirements, you may apply for admission to the CpE program. Read the next section for further details.

2.1 S&T Advising Center

Suite G6, 400 W 14th St, 341-4424, advising@mst.edu

The S&T Advising Center is designed to help you adjust to life at Missouri S&T and to make an informed selection of a career path. You will be routinely admitted into the B.S. CpE program if you have:

- Earned a cumulative GPA of 2.250 or above
- Phys 1135 Engineering Physics I with a grade of C or better
- Math 1214 Calculus for Engineers I with a grade of C or better¹
- Math 1215 Calculus for Engineers II with a grade of C or better
- Chem 1305 Fundamentals of General Chemistry & Chem 1319 General Chemistry Lab
- FE 1100 Study and Careers in Engineering
- Engl 1120 Exposition and Argumentation
- One or more courses in the humanities or social sciences

¹Alternatively the combination of Math 1210/1211 with grades of C or better

If you fail to meet these requirements, you should contact the CpE coordinator for undergraduate studies for counseling before applying to CpE. Experience has shown that few students who enter the B.S. CpE program with a Missouri S&T GPA below 2.50 are able to successfully complete the program.

2.2 Academic Advisors

Upon acceptance into the B.S. CpE program, you are assigned a new advisor by the ECE advising specialist for undergraduate studies.

2.3 Transfer Students/Courses

Information for transfer students is located at <https://futurestudents.mst.edu/admissions/transfer/>.

2.3.1 Definition of a Transfer Student

If you are currently attending another university or college, or a Missouri S&T student enrolled as an undeclared major, and wish to transfer to ECE, we consider you to be a transfer student. We will routinely admit you to ECE if you have:

- Earned a cumulative grade point average (GPA) above 2.750
- Over 50 credit hours of course work in a high-quality pre-engineering program
- Phys 1135-Engineering Physics I with a grade of C or better
- Phys 2135-Engineering Physics II with a grade of C or better
- Math 1214-Calculus for Engineers I with a grade of C or better
- Math 1215-Calculus for Engineers II with a grade of C or better
- Math 2222-Calculus with Analytic Geometry III with a grade of C or better
- Math 3304-Elementary Differential Equations with a grade of C or better
- Chem 1305-Fundamentals of General Chemistry & Chem 1319 General Chemistry Laboratory
- Engl 1120-Exposition and Argumentation
- Comp Sci 1500-Intro to Problem Solving
- One or more courses in the humanities or social sciences

If you fail to meet these requirements, you should contact the CpE coordinator for undergraduate studies for counseling before applying for the CpE program.

2.3.2 Transferring Credit to Missouri S&T

Prior to graduation, you must transfer to Missouri S&T all college courses taken at institutions of higher education. These affect your cumulative GPA. Some of these courses may also fulfill some graduation requirements. The restrictions and procedures for transferring courses are too numerous to list here. You should contact the transfer coordinator for CpE undergraduate studies or the Missouri S&T transfer admissions coordinator to answer specific questions concerning transferring courses.

2.3.3 Transfer Coordinator

Computer Engineering Transfer Coordinator/Advisor

Dr. R. Joe Stanley, 127 EECH, 341-6896, stanleyj@mst.edu

Computer engineering students who transfer to Missouri S&T from another college or university are assisted by the ECE undergraduate advisor to set up their first schedule of classes. The students are then assigned an ECE permanent advisor (see section 1.1.8).

2.3.4 Model Transfer Agreements (Transfer Students Only)

Missouri S&T has Model Transfer Agreements with numerous other colleges and universities which list the Missouri S&T equivalent course numbers for specific courses at the other institutions. You may contact the Missouri S&T transfer coordinator in the admissions office to obtain a list of schools and courses covered by model transfer agreements. As a transfer student, you should acquire and keep a copy of the agreement with your school. Copies of model transfer agreements are available from the Missouri S&T transfer coordinator in the admissions office, or at <https://registrar.mst.edu/transferecredit/>.

2.3.5 Transferring Non-CpE Courses to Missouri S&T

You may wish to transfer a non-CpE course to Missouri S&T. If the course is not covered by a model transfer agreement, you should contact the Missouri S&T Transfer Admissions or the Missouri S&T department chair in the area in which the course is taught. The chair will decide if there is an equivalent course at Missouri S&T and notify the Missouri S&T transfer coordinator. More information about course transfers and credit can be obtained at <https://futurestudents.mst.edu/admissions/transfer/>.

2.3.6 Transferring EE 2100 and EE 2120 Courses to Missouri S&T

To transfer Circuits I or Circuits II (equivalent to Missouri S&T EE 2100 and EE 2120) courses to Missouri S&T, you must pass special examinations known as the EE Advancement Exam I (EEAE I) and EE Advancement Exam II (EEAE II). You must pass EEAE I before attempting EEAE II. See sections 3.2.12 and 3.2.13.

2.3.7 Transferring Upper-Level CpE courses (CpE 2xxx and 3xxx, CpE 4xxx and 5xxx) to Missouri S&T

The department applies stringent rules to students who wish to transfer 2xxx and 3xxx- and 4xxx and 5xxx-level CpE courses to Missouri S&T. (These courses are also known as CpE 2xxx and 3xxx and CpE 4xxx and 5xxx). The rules for transferring courses depend on where the course was taken.

- Courses taken at another ABET accredited B.S. CpE Program. If you take a course in a CpE program accredited by ABET, you may be allowed to transfer the course to Missouri S&T. You should contact the CpE coordinator for undergraduate studies to determine if there is a Missouri S&T equivalent course number for the course you want to transfer. Currently, the only ABET accredited CpE programs in the state of Missouri are Missouri S&T, UM-Columbia, St. Louis University, and Washington University in St. Louis.
- Courses taken at the Engineering Education Center (EEC), UMSL, St. Louis, MO. Missouri S&T offers a number of CpE courses at the EEC in St. Louis. These courses are targeted toward graduate students. However, undergraduate students who are temporarily place-bound in the St. Louis area may be able to take a 4xxx or 5xxx level CpE course at the EEC. These courses have a Missouri S&T course number, and can be transferred to Missouri S&T.
- Courses taken at non-ABET accredited schools. If a school is not ABET accredited, it is difficult for Missouri S&T to determine the quality and scope of their upper level CpE courses. For this reason, you will be allowed to either transfer the course as a general-credit course, or you will need to receive credit by examination.

2.3.8 Distance and Continuing Education

216 Centennial Hall, 341-6222, dce@mst.edu

Missouri S&T offers a number of distance courses that may be taken by correspondence or over the internet. Missouri S&T treats these courses as if they were taken at the University of Missouri-Columbia campus. This means all model transfer agreements will apply. The grade in the course will affect the student's UM GPA, but not the student's Missouri S&T GPA, and the course will be considered off-campus for the last 60 hours on campus rule. Distance and correspondence courses from other schools are treated in the same way as other courses transferred from those institutions. Additional information about Missouri S&T distance courses may be found at <https://distance.mst.edu/>. Contact the ECE coordinator for distance education if you have specific questions (See section 1.1.6.).

Chapter 3

Graduation Requirements

To earn a Bachelor of Science (B.S.) in Computer Engineering, students must satisfy the following set of graduation requirements. These requirements apply to the fall 2007 or later catalog years.

3.1 Catalog Years

Each student is assigned a “Catalog Year” which appears in the upper right-hand corner of their degree audit report. One must satisfy the graduation requirements for their catalog year. The catalog year is generally the year the student first enrolled as a freshman, either at Missouri S&T or at a transfer institution.

When the University changes graduation requirements, currently enrolled students have the option of changing to the new catalog requirements. Students interested in changing their catalog year should pick up an AUTHORIZATION TO CHANGE UNDERGRADUATE CATALOG YEAR form from the Registrar’s Office or at <http://registrar.mst.edu/forms/>.

Students who interrupt their studies for two or more consecutive semesters (excluding summer semesters) must meet the graduation requirements published at the time of their readmission into a degree program. For example:

- Spring 2017 - Graduates from High School
- ‘17/’18 Academic Year - Attends a Community College
- ‘18/’19 Academic Year - Attends Missouri S&T - has a catalog year of 2017
- ‘19/’20 Academic Year - Attends Missouri S&T - has a catalog year of 2017
- ‘20/’21 Academic Year - Does not attend any school of higher education.
- ‘21/’22 Academic Year - Attends a Community College
- ‘22/’23 Academic Year - Attends Missouri S&T - has a catalog year of 2022
- ‘23/’24 Academic Year - Attends Missouri S&T - has a catalog year of 2022

When this student returned to college in the fall of 2022, the student lost the right to use the 2017 catalog year because of nonattendance for two consecutive semesters.

3.2 Required Courses for Students

3.2.1 Computer Engineering Core

Computer Engineering students must complete all of the following courses or their equivalents:

Computer Engineering courses

- CpE 2210 - Introduction to Digital Logic
- CpE 2211 - Computer Engineering Lab I
- CpE 3150 – Introduction to Microcontrollers and Embedded System Design
- CpE 3151 – Computer Engineering Lab II
- CpE 3110 – Computer Organization and Design
- CpE 5410 – Introduction to Computer Communication Networks
- CpE 4096 – Computer Engineering Senior Project I
- CpE 4097 – Computer Engineering Senior Project II

Computer Science (CS) courses

- CS 1500 – Computational Problem Solving
- CS 1570 – Introduction to Programming
- CS 1580 – Introduction to Programming Lab
- CS 1200 – Discrete Mathematics
- CS 1575 – Data Structures
- CS 3800 – Introduction to Operating Systems OR CS 2500 - Algorithms

Electrical Engineering courses

- EE 2100 - Circuits I
- EE 2101 - Circuit Analysis Lab I
- EE 2120 - Circuits II
- EE 2200 – Introduction to Electronic Devices
- EE 2201 – Electronics Devices Lab
- EE 3410 – Digital Signal Processing

Students must earn a ‘C’ or higher on all core computer engineering courses.

3.2.2 Computer Engineering Electives (ABCDE Electives)

Students must earn a ‘C’ or higher on computer engineering senior elective ABCDE courses.

CpE Senior Electives A and B

CpE Senior Electives A and B, respectively, must be selected from 4xxx or 5xxx courses in CpE, except CpE 4000, 4099, 4096, 4097, 5000, and 5099. The two courses selected for electives A and B, respectively, should be from two different CpE emphasis areas. The emphasis areas, with course number options, are as follows:

- Integrated Circuits and Logic Design: 42xx/52xx
- Computational Intelligence 53xx
- Computer Architecture and Embedded Systems: 41xx/51xx, 45xx/55xx, 46xx/56xx
- Networking, Security, and Reliability: 44xx/54xx, except Comp Eng 5410

CpE Senior Elective C

CpE Senior Elective C must be selected from 3xxx, 4xxx or 5xxx courses in CpE, EE, or CS, except CpE/EE/CS 3000, 4000, 4096, 4097, 4099, 5000, and 5099 and CS 4010, 3610 and 5600.

CpE Senior Elective D and E

Comp Eng Senior Electives D and E must be selected from an approved list that contains most 3xxx, 4xxx and 5xxx courses in science, mathematics, and engineering except required courses in Comp Eng, Elec Eng, and Comp Sci and except COMP SCI 3610 and COMP SCI 5600.

CpE Senior Electives C, D and E are to be selected from an approved list. This list contains most 3xxx, 4xxx and 5xxx and 3xx level science, mathematics and engineering courses except required courses in CpE, EE, and CS and except CS 3610 and CS 5600.

- Aerospace Engineering – Any 3xxx or 4xxx or 5xxx level course except AE 4099
- Chemical Engineering – Any 3xxx or 4xxx or 5xxx level course
- Ceramic Engineering – Any 3xxx or 4xxx or 5xxx level course except ChE 4099
- Chemistry – Any 3xxx or 4xxx or 5xxx level course
- Civil Engineering – Any 3xxx or 4xxx or 5xxx level course except CE 4099
- Computer Engineering – Any 3xxx or 4xxx or 5xxx level course except 4096, 4097 and required courses
- Computer Science – Any 3xxx or 4xxx or 5xxx level course except CS 4099 and required courses
- Electrical Engineering – Any 3xxx or 4xxx or 5xxx level course except EE 2800, 4096, 4097, and required courses
- Engineering Management – Any 3xxx or 4xxx or 5xxx level course except EMgt 4099
- Engineering Mechanics – Any 3xxx or 4xxx or 5xxx level course except EM 4099
- Geological Engineering – Any 3xxx or 4xxx or 5xxx level course
- Geology – Any 3xxx or 4xxx or 5xxx level course
- Geophysics – Any 3xxx or 4xxx or 5xxx level course
- Biological Science – Any 3xxx or 4xxx or 5xxx level course
- Mathematics – Any 3xxx or 4xxx or 5xxx level course except Math 2002, Math 3304 and Math 3329
- Mechanical Engineering – Any 3xxx or 4xxx or 5xxx level course except ME 4099
- Metallurgical Engineering – Any 3xxx or 4xxx or 5xxx level course
- Mining Engineering – Any 3xxx or 4xxx or 5xxx level course
- Nuclear Engineering – Any 3xxx or 4xxx or 5xxx level course
- Petroleum Engineering – Any 3xxx or 4xxx or 5xxx level course
- Physics – Any 3xxx or 4xxx or 5xxx level course

A grade of C or better is required in all ABCDE electives.

3.2.3 Fundamental Sciences (Chemistry and Physics)

Computer engineering students must complete all of the following courses or their equivalents:

- Chem 1310 - General Chemistry
- Chem 1319 - General Chemistry Lab
- Phys 1135 - Engineering Physics I (**Must earn a grade of C or higher.**)
- Phys 2135 - Engineering Physics II (**Must earn of grade of C or higher.**)

The “C or higher grade” rule applies to the substitute classes just as it applies to the standard courses listed above.

3.2.4 Engineering Science Elective

Computer engineering student must complete three (3) hours of science electives. Students must take one of Mech Eng 2340, Mech Eng 2519, Mech Eng 2527, Physics 2311, Physics 2401, Chem 2210,

Bio Sci 2213, Bio Sci 2223, Civ Eng 2200, Mech Eng 2350, Physics 2305, Physics 4311, Cer Eng 4240, or Nuc Eng 3205.

3.2.5 Fundamental Mathematics (Calculus)

Computer engineering students must complete all of the following courses or their equivalents:

- Math 1214* – Calculus with Analytic Geometry I (**Must earn a grade of C or higher.**)
- Math 1215 – Calculus with Analytic Geometry II (**Must earn a grade of C or higher.**)
- Math 2222 – Calculus with Analytic Geometry III (**Must earn a grade of C or higher.**)
- Math 3304 – Elementary Differential Equations (**Must earn a grade of C or higher.**)
- Statistics 3117 – Introduction to Probability and Statistics

*The course combination Math 1210 and Math 1211 may be taken in place of Math 1214.

A list of standard substitutions is provided below. No forms need to be filled out when using these substitutions. The substitutions will be applied automatically by the Registrar's Office.

- Statistics 3115 – Engineering Statistics or Statistics 5643 – Probability and Statistics, may be taken in place of Statistics 3117.

The "C or higher grade" rule applies to the substitute classes just as it applies to the standard courses listed above.

3.2.6 Remedial Mathematics (Algebra and Trigonometry)

Students who have not had strong High School Algebra and Trigonometry courses may wish (or be required) to enroll in:

- Math 1140 – College Algebra
- Math 1160 – Trigonometry

*Note that Math 1140 and Math 1160 are considered remedial courses for CpE majors. For this reason, these courses cannot be used to satisfy any graduation requirement aside from their effect on the student's cumulative and UM GPA. These courses are not used when calculating the total number of credit hours earned toward a B.S. CpE degree.

3.2.7 Mathematics Elective

Computer engineering students must complete at least one course from the following list:

Students must take one of the following courses:

[MATH 3108](#), [MATH 3109](#), [MATH 5302](#), [MATH 5603](#), [MATH 5105](#), [MATH 5106](#), [MATH 5107](#), [MATH 5108](#), [MATH 4209](#), [MATH 4211](#), [MATH 5215](#), [MATH 5222](#), [MATH 5325](#), [MATH 4530](#), [MATH 5737](#), [MATH 5351](#), [MATH 5154](#), [MATH 4096](#), [MATH 5483](#), [MATH 5585](#), [STAT 5644](#), [STAT 5346](#), [STAT 5353](#).

Use of other courses for the Mathematics Elective requires approval of the student's advisor and the coordinator CpE Undergraduate Studies.

3.2.8 Humanities and Social Sciences

Electrical and Computer Engineering degree programs will require a minimum of 21 credit hours of humanities/social-sciences as specified below:

- [ENGLISH 1120](#)
- [HISTORY 1200](#) or [HISTORY 1300](#) or [HISTORY 1310](#) or [POL SCI 1200](#)
- [ECON 1100](#) or [ECON 1200](#)
- Technical Communication Elective: [ENGLISH 1160](#) or [ENGLISH 3560](#)
- [SP&M S 1185](#)
- The remaining minimum of 6 additional credit hours must be three-credit hour lecture courses offered in disciplines in the humanities and social sciences. Humanities courses are defined as those in: Art, English and Technical Communication, Etymology, Foreign Languages, Music, Philosophy, Speech and Media Studies, and Theatre. Social Sciences courses are defined as those in: Economics, History, Political Science, and Psychology. Study abroad courses may count as H/SS courses. H/SS courses numbered 2001, 3001, and 4001 (experimental courses) may also be used to complete these elective requirements.

3.2.9 Professional Development

Students must take on of the following courses:

[BUS 5980](#), [ECON 4430](#), [ECON 5337](#), [ENG MGT 2310](#), [ENG MGT 3320](#), [ENG MGT 4110](#), [ENG MGT 5514](#), [PHILOS 3225](#).

This course requirement has is intended to enhance the experience for students in Preparation for Professional Service, Systems and Project Engineering, and/or System Resource Management.

3.2.10 Freshman Engineering Orientation

All students who enter Missouri S&T as freshman must enroll in the following orientation course:

- FE 1100 - Study and Careers in Engineering

Students that transfer to Missouri S&T as sophomores, juniors, or seniors do not have to enroll in this orientation course. Students that transfer into CpE as sophomores, juniors, or seniors from non-engineering majors (such as Computer Science, Physics, etc.) also do not have to enroll in FE 1100.

3.2.12 Electrical Engineering Advancement Examination I (EEAE I)

After completing EE 2100, Computer Engineering students must take the EEAE I (Electrical Engineering Advancement Examination I). Students must earn a passing grade on this examination before they will be allowed to enroll in EE 2120 or subsequent EE courses at Missouri S&T.

At Missouri S&T, the EEAE I exam will be given in place of the EE 2100 final examination. The exam score will be reported separately from the EE 2100 grade. However, the exam will impact the course grade just as with any other final exam. Students must pass the advancement exam and earn a grade of C or better in EE 2100 before they will be allowed to enroll in EE 2120.

This examination is for internal use only. The grade for this examination will not appear on the students' degree audit report or transcript. Students should contact the instructor that administered the exam for their grade results. The grade on the exam will not directly impact the students GPA (The grade may indirectly impact the GPA through the students EE 2100 grade.)

Students that enroll in an EE 2100 equivalent course at another school have two options:

- The student may take the EEAE I exam off campus. The student will need to find someone to proctor the exam. The proctor should be an instructor or counselor at the school where the student enrolled in the EE 2100 equivalent course. Once the student has found a proctor, the student should contact the Missouri S&T Department of Electrical and Computer Engineering for more details. Phone or email the Secretary for Undergraduate Studies.
- The student can take the examination at Missouri S&T immediately before the start of the semester the student plans to enroll in EE 2120 or a subsequent EE course. The student should contact the department to find out the exact date and location of the exam.

Students that fail this exam should consider re-taking EE 2100 on the Missouri S&T campus. Students are not required to retake EE 2100 before trying the examination a second time, but are highly advised to do so. There is no limit on the number of times students can attempt to pass this examination. However, students are only allowed one attempt per semester. If a student fails this exam more than once, the student should seriously reconsider their choice of computer engineering as a major field of study.

3.2.13 Electrical Engineering Advancement Examination II (EEAE II)

After completing EE 2120, a computer engineering student must take the EEAE II (Electrical Engineering Advancement Exam II). Students must earn a passing grade on this examination before they will be allowed to enroll in EE courses that use EE 2120 as a prerequisite.

At Missouri S&T, the EEAE II is given in the place of the EE 2120 final examination. The exam score will be reported separately from the EE 2120 grade. However, the exam will impact the course grade just as with any other final exam. Students must pass the advancement exam and earn a grade of C or better in EE 2120 before the student will be allowed to enroll in courses that use EE 2120 as a prerequisite. Students should contact the instructor that administered the exam for their grade results.

Aside from the changes outline above, all the rules for the EEAE II are identical to the rules for the EEAE I.

3.2.14 Computer Engineering Advancement Examination (CpEAE)

After completing CpE 2210, a computer engineering student must take the CpEAE (Computer Engineering Advancement Exam). Students must earn a passing grade on this examination before they will be allowed to enroll in CpE courses that use CpE 2210 as a prerequisite.

At Missouri S&T, the CpEAE is given in the place of the CpE 2210 final examination. The exam score will be reported separately from the CpE 2210 grade. However, the exam will impact the course grade just as with any other final exam. Students must pass the advancement exam and earn a grade of C or better in CpE 2210 before the student will be allowed to enroll in courses that use CpE 2210 as a prerequisite. Students should contact the instructor that administered the exam for their grade results.

The rules for the CpEAE are identical to the rules for the EEAE I.

3.2.15 Fundamentals of Engineering Examination

As a computer engineering student at Missouri S&T you are not required but encouraged to take the fundamentals of engineering (FE) examination prior to graduation. This nationwide exam is the first step in obtaining certification as a registered professional engineer.

Information on the exam will be posted on the undergraduate bulletin board, outside the undergraduate secretary's office and can be found on the web at pr.mo.gov/. Information regarding the FE exam is posted at <https://testcenter.mst.edu/testingprograms/ncees/>.

3.2.16 Free Elective

In addition to the courses listed above, computer engineering students are required to complete three (3) hours of "Free Electives". The free electives allow one a great deal of flexibility in choosing their coursework. Virtually any course from any discipline may be used to fulfill this elective. The exceptions are deficiency courses (such as algebra and trigonometry), and extra credits in required courses. Any course outside of engineering and science must be at least three credits.

3.3 Minimum Number of Credit Hours

Students must earn a minimum of **128** credit hours before they can graduate. This requirement will not be waived. In some rare cases, students may be able to satisfy all other graduation requirements with less than the minimum number of hours. These students must complete additional electives to increase their total number of credit hours to the minimum given above before they will be allowed to graduate. In many cases, students will enroll in additional elective courses. Remedial courses such as Math 1140/4 and Math 1160/6 will not be used when calculating the total number of credit hours earned.

If a student retakes a course, the total number of credits earned will normally not increase. There are exceptions to this rule. Some courses, such as undergraduate research (CpE 4099), some music and physical education courses are "repeatable". Each time a student completes one of these courses, their total number of credits earned will increase. Contact the Registrar's Office to determine which courses are "repeatable".

3.4 Minimum Grade-Point Averages

To graduate, you must satisfy three grade-point average (GPA) requirements. These requirements are known as the cumulative, Missouri S&T, and CpE GPA, which are described in the following subsections. GPA requirements cannot be waived. If you satisfy all other graduation requirements, but have one or more GPAs below 2.000, you must enroll in additional courses and receive sufficiently high grades to meet these GPA requirements. You can accomplish this by enrolling in new courses or by retaking courses in which you have received a grade of D or F. Contact the registrar's if you have questions about your GPA calculations.

3.4.1 Cumulative GPA

A student must have a cumulative GPA greater than or equal to 2.000 on a 4.000 scale. This GPA includes all undergraduate courses the student has taken at all post-secondary schools (including Community Colleges and other Universities). Note that all courses taken at all schools must be transferred to Missouri S&T prior to graduation. Even if courses do not satisfy any other degree

requirements, they must be transferred and may impact the student's cumulative GPA. Courses taken for graduate credit will not affect this GPA.

3.4.2 Missouri S&T GPA

A student must have a Missouri S&T GPA greater or equal to 2.000 on a 4.000 scale. This GPA includes all courses taken at Missouri S&T, but it does not include courses transferred to Missouri S&T. Some, but not all, of the courses offered by the University of Missouri Center for Independent Study affect the Missouri S&T GPA. Contact the registrar's office to determine which independent study courses will affect your Missouri S&T GPA. Courses taken for graduate credit do not affect this GPA.

3.4.3 Computer Engineering GPA

A student must have a computer engineering GPA greater or equal to 2.000 on a 4.000 scale. This GPA is based on courses that have a course number beginning with CpE. This GPA includes both computer engineering courses taken at Missouri S&T and those transferred to Missouri S&T as CpE Credit. The calculation does not include non-CpE courses, even if the classes are required for a CpE degree (such as Calculus, Basic Sciences, Humanities and Social Sciences courses). Courses taken for graduate credit will not affect this GPA.

3.4.4 University of Missouri GPA

This GPA includes all courses you take at a University of Missouri school including Rolla, Columbia, St. Louis and Kansas City campuses and extension courses. This calculation does not include courses transferred from other schools, including Missouri schools not part of the University of Missouri such as Missouri State Schools and Community Colleges). The student is not required to attain any minimum UM GPA. Graduation honors are based on the UM GPA. Courses taken for graduate credit do not affect this GPA.

3.5 Minimum Acceptable Grades

Unless otherwise specified, a student must earn a letter grade of D or higher in every course that they wish to use to satisfy a graduation requirement. If a student takes a course more than once, their last grade must be D or better. A student's academic advisor and the associate or department Chair may require a student to re-take a course in which they have earned a grade of D or lower.

3.5.1 Basic Science, Mathematics and CpE Courses

Some courses are particularly important to computer engineering majors. Students must earn a grade of C or better in these courses. This rule applies to the courses listed below. Note that students will enroll in some, but not all, of the courses listed below. See the section on required courses to determine which of the following courses that must have a grade of C or better.

- Phys 1135 - Engineering Physics I or equivalent
- Phys 2135 - Engineering Physics II or equivalent
- Math 1214 - Calculus with Analytic Geometry I
- Math 1215 - Calculus with Analytic Geometry II
- Math 2222 - Calculus with Analytic Geometry III
- Math 3304 - Elementary Differential Equations

- CpE 2210 - Introduction to Digital Logic
- CpE 2211 - Computer Engineering Lab I
- CpE 3150 – Introduction to Microcontrollers and Embedded System Design
- CpE 3151 – Computer Engineering Lab II
- CpE 3110 – Computer Organization and Design
- CpE 5410 – Introduction to Computer Communication Networks
- CpE 4096 – Computer Engineering Senior Project I
- CpE 4097 – Computer Engineering Senior Project II
- CS 1500 – Computational Problem Solving
- CS 1570 – Introduction to Programming
- CS 1580 – Introduction to Programming Lab
- CS 1200 – Discrete Mathematics
- CS 1575 – Data Structures
- CS 3800 – Introduction to Operating Systems
- EE 2100 - Circuits I
- EE 2101 - Circuit Analysis Lab I
- EE 2120 - Circuits II
- EE 2200 – Introduction to Electronic Devices
- EE 2201 – Electronics Devices Lab
- EE 3410 – Digital Signal Processing
- Computer Engineering ABCDE electives

Up to two exceptions can be made for Ds in Computer Engineering ABCDE electives at the discretion of the student's advisor and with agreement of the Coordinator for Computer Engineering Undergraduate Studies.

3.6 Residency Requirement (Last 60 Hours at Missouri S&T)

A student receives a Missouri S&T degree, because the student completed the requirements of the degree while attending Missouri S&T. To protect the integrity of this seemingly obvious statement, all students are required to take their last 60 credit hours of instruction at Missouri S&T.

Up to 15 credit hours of this 60-hour requirement may be waived with the prior permission of the student's advisor and the Coordinator for Computer Engineering. Waiving more than 15 credit hours requires obtaining prior permission from the student's advisor, the Coordinator for Computer Engineering Undergraduate Studies and the Vice Provost for Academic Affairs. Requests to waive this requirement are handled on a case-by-case basis. The Coordinator for Computer Engineering will typically approve requests only when the student has taken well over 60 credit hours at Missouri S&T and can show good reason for the need to take courses at another school late in their program of study.

If the student wishes to have this requirement waived, the student must submit a REQUEST TO TRANSFER PART OF LAST 60 HOURS FOR A DEGREE form and have the form approved before enrolling in the course(s) off campus. The form can be obtained from the Registrar's Office, the ECE Undergraduate Secretary in 140 EECH, or on the web at <http://registrar.mst.edu/forms/>.

If a student fails to complete this form prior to enrolling in the course, the department may refuse to allow the student to use the course to satisfy ANY graduation requirements. Students in their last 60

hours should never take a course off campus until checking with their advisor, completing the appropriate form, and obtaining signatures.

Students will not normally be allowed to transfer 3xxx or 4xxx or 5xxx or 300 level CpE courses to Missouri S&T unless the courses were taken at an ABET accredited program or a program with an international reputation for excellence in engineering education.

3.7 Substitutions and Waivers

There are many specific courses that must be completed before graduation. The student has four (4) options for each of these courses:

- Complete the specified course at Missouri S&T. In some cases, the student is allowed to select a course from an approved list.
- Complete an equivalent course at another institution and transfer credit to Missouri S&T.
- Complete a related course at Missouri S&T or another institution and request to substitute the related course for the required course.
- Petition to have the requirement waived.
- Obtain credit by examination for the course.

Students who wish to transfer credit to Missouri S&T should read the appropriate section in Chapter 2 of this handbook. There are many restrictions placed on transfer credit. Students unfamiliar with these requirements risk losing credit for the transferred courses.

Students wishing to substitute or waive course requirements should read Section 3.18 “Waiving and/or Changing Graduation Requirements” in this chapter.

A detailed explanation of each requirement is presented in Section 3.2 along with typically approved course substitutions. Unless otherwise noted, students must complete a COURSE SUBSTITUTIONS AND WAIVER form on the web at <http://registrar.mst.edu/forms/> and submit the form to ECE undergraduate advising specialist at room 143 ECE.

3.8 Emphasis Areas within Computer Engineering

A declared emphasis area is not required, and it is not required that students obtain an emphasis specialty within computer engineering. A student may choose to obtain a Computer Engineering degree without a formal emphasis or may choose to obtain a Computer Engineering degree with a declared emphasis in one or more of the emphasis areas of computer engineering. A major change request is required to add the emphasis area option to the degree program.

Emphasis areas that may be declared, include:

- **Computational Intelligence** topics include **machine vision**, **neural networks**, and fuzzy logic control.
- **Computer Architecture and Embedded Systems** topics include computer organization, computer architecture, microprocessor system design, hardware/software co-design, microprocessor systems, and real-time systems.
- **Integrated Circuits and Logic Design** includes chip (VLSI) design, digital systems modeling, electronic circuits, and fault tolerant systems design.

- **Networking, Security and Dependability** topics include design of digital networks, reliable and secure computing, fault tolerance, development of secure networks, secure and reliable computing infrastructure, and design of fault-tolerant digital systems.

Note that **Computational Intelligence** is also a Computer Engineering emphasis area but is focused on the graduate program.

For students who seek a Computer Engineering degree without a formal emphasis, these emphasis areas may guide the choice of their CpE Electives A, B, C, D, and E as well as their free electives. Students should consult with their advisors on such course selections.

For students who seek a Computer Engineering degree with a declared emphasis, courses in the declared emphasis area will be applied to CpE Electives A, C, and D in the degree requirements. For students who choose to have multiple emphasis areas, the additional courses will apply to CpE Electives B and E and free elective requirements. Students should seek guidance from their advisors on emphasis areas and on courses that are relevant to more than one emphasis area. Students may have an emphasis area or emphasis areas listed on their transcript by completing **three three-credit-hour courses** in computer engineering from the designated lists. For a single emphasis area, this requirement will be satisfied by completing the relevant 4XXX-level or above course for Elective A and 3XXX-level or above courses for Electives C and D from the designated emphasis area course list. For a second emphasis area, this requirement will be satisfied by completing the relevant 4XXX-level or above course for Elective B, a 3XXX-level or above course for Electives E, and a 3XXX-level or above course for the free elective from the designated second emphasis area course list. Courses not on the emphasis area list, including experimental courses (5001) require departmental approval to apply toward the designated emphasis area.

Students seeking to declare a CpE emphasis area, meeting the course requirements specified above, as part of their B.S. CpE degree program must complete a change of major form with B.S CpE as the major program of study and one (or two) of the CpE emphasis areas.

The emphasis areas, with course number options, are as follows:

- Integrated Circuits and Logic Design: 42xx/52xx
- Computational Intelligence 53xx
- Computer Architecture and Embedded Systems: 41xx/51xx, 45xx/55xx, 46xx/56xx
- Networking, Security, and Reliability: 44xx/54xx, except Comp Eng 5410

3.9 Multidisciplinary Programs

The Bachelor of Science in Computer Engineering is an excellent degree for multidisciplinary opportunities. A careful selection of electives can prepare a student for a unique career at the bachelor's level as well as an advanced degree in a field like business, computer science, electrical engineering, law or medicine.

As an example, a student interested in Computer Engineering and Medical Science should consult with a Biological Sciences advisor early in their program. A careful selection of science electives and technical electives along with additional classes in Chemistry and Biological Sciences can prepare a student for medical careers along with the Computer Engineering Degree.

Computer engineering is particularly well suited for combination with degrees in Electrical Engineering or Computer Science, as discussed in section 3.15.

3.10 Minor Programs

Students are allowed to minor in computer engineering and in an area outside of computer engineering. Several departments offer minors, as can be seen at <https://catalog.mst.edu/undergraduate/minors/>. By carefully selecting elective courses, students can often complete a minor with only a small increase in the number of credit hours required to graduate. The minor will appear on the student's transcript upon graduation.

EE Minor Advisor

Coordinator for EE Undergraduate Studies (See 1.1.4)

CpE Minor Advisor

Coordinator for CpE Undergraduate Studies (See 1.1.7)

The Electrical and Computer Engineering Department offers minor programs in both Electrical Engineering and in Computer Engineering. If you complete a minor program, the designation Minor in Electrical Engineering or Minor in Computer Engineering will be placed on your transcript, in addition to any academic honors based upon your Missouri S&T GPA. Minor elective courses may be in one or more of the available emphasis areas.

3.10.1 Minor in Computer Engineering

A minor in Computer Engineering will require the following:

- Pass the EI Eng Advancement Exam I (EI Eng 2100 Final) with a C or better*
- Pass the Cp Eng Advancement Exam (Cp Eng 2210 Final) with a C or better**
- Pass Cp Eng 3150 with a C or better
- Pass Cp Eng 3110 with a C or better***
- Pass 3 hours of 4XXX-level or above Cp Eng or EI Eng or Cmp Sc coursework with a C or better, excluding special problems and undergraduate research. Transfer courses cannot be used to satisfy this requirement. The course choice for this requirement is subject to the approval of the minor advisor.

*One opportunity will be given to pass the EI Eng Advancement Exam I if a student has prior coursework or experience in circuits. Otherwise, the student must pass EI Eng 2100.

**One opportunity will be given to pass the Cp Eng Advancement Exam if a student has prior coursework or experience in digital circuits. Otherwise, the student must pass Cp Eng 2210.

***EE 2200 may be substituted for CpE 3110.

3.10.2 Minor in Electrical Engineering

A minor in Electrical Engineering will require the following:

- Pass the EI Eng Advancement Exam I (EEAE-I: EI Eng 2100 Final) with a C or better*
- Pass EI Eng 2120 and EI Eng Advancement Exam II (EEAE-II) with a C or better
- Pass 12 additional hours of EI Eng coursework excluding EI Eng 28XX, 38XX, 4096, 4097, and 4099. At least 3 lecture hours at the 4XXX-level or above are required. A C or better is required for all 12 hours. No transfer courses and no more than 3 hours of EI Eng 3000, EI Eng 4000, or EI Eng 5000 may be used to meet the requirements. The course choice for the 12 additional hours is subject to the approval of the minor advisor.

*One opportunity will be given to pass the EI Eng Advancement Exam I if a student has prior circuits coursework or experience. Otherwise, the student must pass EI Eng 2100.

An Admission Form is needed to start the program and the Registrar's Undergraduate Minor Form is required upon completion. The Admission form should be submitted to the EE or CpE Minor Advisor. See:

<https://ece.mst.edu/academic-programs/electrical-engineering/undergraduate-degree/> or
<https://ece.mst.edu/academic-programs/computer-engineering/undergraduate-degree/>

3.10.3 Procedure for obtaining a Minor in Electrical or Computer Engineering

Procedure for obtaining a Minor in Computer or Electrical Engineering

- Meet with the EE or CpE Minor Advisor for course selection and approval signature
- Complete and submit a signed *Application for Admission to the EE or CpE Minor Program** to the ECE Undergraduate Secretary
- Complete the courses for the minor (if alternate courses are desired, meet again with the minor advisor to seek approval for the minor program changes.)
- Upon completion of an approved minor program, complete and submit a signed Registrar's *Undergraduate Minor Form**

*The student is responsible for completing and submitting the required forms.

A minor will take multiple semesters to complete. Make plans to meet the introductory requirements in each minor as soon as possible, e.g. the EI Eng Advancement Exam I or EI Eng 2100 and the Cp Eng Advancement Exam or Cp Eng 2210 are basic prerequisites for courses in EI Eng and Cp Eng, respectively. The use of minor courses to meet in-major course requirements is subject to the major department's approval. Note that the C or better requirement must be satisfied for all courses.

3.11 Combining and Splitting Courses

With a few exceptions, students are allowed to combine courses to satisfy degree requirements. For example, a student who has taken three (3) separate one (1) credit hour courses can combine them to satisfy a three (3) credit hour elective requirement. Students need to complete a SUBSTITUTION AND WAIVER form to update their degree report when combining courses. One exception is the Free Elective, which must be at least three credit hours if the course is outside of engineering and science.

Students are not allowed to "split" courses and count some of the credit toward one requirement and the rest toward a second requirement. For example, a four (4) credit hour course can be used to satisfy a three (3) hour course requirement. However, the "extra" or "dangling" credit hour may not be used to help satisfy some other requirement other than the total hour requirement. All four (4) credit hours will be counted toward the three (3) hour requirement.

3.12 Retaking Courses

On occasion, students may wish to, or be required to, retake a course. Before retaking a course, students should consider how this action will affect their total number of credits toward a degree, their grade-point average and how it may fulfill or nullify specific graduation requirements.

3.12.1 Retaking Courses and Grade-Point Averages

Normally, every course a student takes is treated the same way when calculating the UM Cumulative GPA (grade point average) for graduation honors. If a student enrolls in EE 2100 a total of four times and receives grades of D, F, D and A, the student's Missouri S&T Cumulative GPA will record this as four (4) separate 3 credit hour EE courses with the grades listed above. A student must submit a REPEAT COURSE GPA ADJUSTMENT form from the Registrar's Office (<http://registrar.mst.edu/forms/>) to request an exception to this rule. If the students request a repeat course GPA adjustment, only one course will count toward the GPA calculation (for example, only the A might be used to calculate the students GPA). All course grades will still appear on the student's transcript.

Computer engineering students are not allowed to retake a course if they have already earned a grade of C or better in the course (with the exception of "retakeable" courses such as CpE 4000, CpE 5001, CpE 4099, music, performance and other selected classes).

The grade adjustment policy only applies to courses taken at Missouri S&T that have a D or F grade. A maximum of 15 semester hours may be adjusted and the course must be repeated at Missouri S&T. The grade adjustment policy does not affect the UM Cumulative GPA which is used for graduation honors.

3.12.2 Retaking a Course, Fulfilling and Nullifying Graduation Requirements

If a course is failed that the student must complete to fulfill a specific graduation requirement (such as EE 2100), the student must retake the course and earn a passing grade. However, if a student passes a course with a D or better, then retakes the course and fails the course, the credit for having passed the course the first time will be lost. This means the student has to take the course yet a third time and earn a passing grade. To satisfy a graduation requirement, the student must earn a passing grade in the course the last time the student was enrolled in that course.

3.13 Taking Graduate-Level Courses for Undergraduate Credit

The department offers graduate-level courses (numbered CpE 6xxx or higher) for students who have already obtained a B.S. degree, and who are pursuing M.S. and Ph.D. degrees. Under normal circumstances, an undergraduate student may not enroll in these courses. In some special cases, students may use a graduate course as their Computer Engineering ABCDE elective. To use a graduate course for this purpose, an undergraduate student must meet the following requirements:

- Have a cumulative GPA above 3.50.
- Have completed all prerequisite courses.
- Obtain permission from the instructor teaching the graduate course.
- Obtain permission from the student's faculty advisor.
- Complete an UNDERGRADUATES TAKING A 6000 LEVEL COURSE form available at <https://registrar.mst.edu/forms/> and have the form signed by the course instructor, the student's advisor, and the Coordinator for Computer Engineering Undergraduate Studies.

3.14 Taking Graduate-Level Courses for Graduate Credit

If a student plans to attend graduate school, the student may wish to consider "dual enrollment" in their last semester as an undergraduate student. This allows the student to complete the undergraduate coursework and start the graduate studies in the same semester. This is particularly helpful, when the

student would normally carry a very light course load in his/her final semester. To “dual enroll” a student must do the following:

- Receive permission from their faculty advisor.
- Apply and be admitted as a “dual enrolled” student. Application forms are available from the Registrar’s Office (<http://registrar.mst.edu/forms/>). The Associate Chair for Graduate Studies will decide if a student will be allowed to dually enroll. The entrance requirements for the dual enrollment program are slightly more stringent than the entrance requirements for the graduate program.
- On the registration form, indicate which of the courses will be counted for undergraduate credit and which for graduate credit. (This decision may be changed during the normal add/drop period for classes. However, it may not be changed after the last day to drop a course, and it may not be changed, after the final grade has been assigned.)

Normally, students are eligible for dual enrollment during their last semester as an undergraduate. Students participating in the honors program are eligible for dual enrollment during their last two semesters as an undergraduate.

Any courses taken for graduate credit will not affect the student’s undergraduate GPA, total number of credits earned toward a B.S. degree or is used to satisfy any other B.S. graduation requirement. Likewise, a course taken for undergraduate credit cannot be used to satisfy any M.S. or Ph.D. graduation requirement.

3.15 Dual B.S. Degrees

A student may wish to earn a B.S. degree in more than one area at a time (such as a B.S. in Computer Engineering and a B.S. in Electrical Engineering or Computer Science). This usually involves a substantial amount of effort beyond earning a single degree. Careful selection of electives, however, will let a student earn a dual B.S. degree in Electrical Engineering and in Computer Engineering with about one (1) semester of extra work. (See “To receive a B.S. degree in both Electrical and Computer Engineering” below). Similarly, a student can earn a dual B.S. degree in Computer Engineering and Computer Science with about one (1) semester of extra work. Students should discuss a dual B.S. plan with their advisor(s). Students who are working to earn a dual B.S. degree should have an advisor in CpE and an advisor in the other degree area. Both advisors should approve all course selections, Add/Drops and all other academic decisions. Additional information is given below about dual degrees in Computer Engineering and either Electrical Engineering or Computer Science.

3.16 Second B.S. Degree

A student that has already received a B.S. degree in a field other than CpE may wish to obtain a B.S. degree in CpE from Missouri S&T. The student should apply for admission to Missouri S&T and apply for admission to CpE. Once admitted to the CpE program, the student will be assigned a faculty advisor. The student should contact the faculty advisor and complete a SECOND BACHELOR OF SCIENCE DEGREE PROGRAM form (available at <http://registrar.mst.edu/forms/>). This form will explicitly list every course the student must complete to obtain a B.S. degree in CpE.

3.17 To Receive a BS Degree in Both Electrical and Computer Engineering

A dual degree in Electrical and Computer Engineering can be received by taking 11 credit-hours of additional coursework, provided one carefully plans their course schedule. While the plan will vary for each student, one possibility is given beginning on the next page. In any case, students should discuss their plans with their advisor and carefully monitor their degree audit reports to ensure they are consistently meeting the requirements of both programs.

While the plan will vary for each student, one possibility is given in the link below.

[Example course-plan for a dual degree in CpE and EE.](#)

3.18 To Receive a BS Degree in Both Computer Engineering and Computer Science

A dual degree in Computer Engineering and Computer Science can be received by taking 25 credit-hours of additional coursework, provided one carefully plans their course schedule. While the plan will vary for each student, one possibility is given on the following pages. In any case, students should discuss their plans with their advisor and carefully monitor their degree audit reports to ensure they are consistently meeting the requirements of both programs.

[Example course-plan for a dual degree in CpE and CS.](#)

3.19 Graduate Track Pathway (GTP) Program

The Graduate Track Pathway (GTP) program offers early **provisional admission to the MS program** to exceptional undergraduate students and is designed for these students to earn coursework credit towards their Electrical Engineering (EE) or Computer Engineering (CpE) MS degree while completing their BS degree in EE or CpE. Students may begin working on their MS study (either thesis or non-thesis options) as an undergraduate and may apply up to nine ECE lecture credit hours (5xxx-level or above) to satisfy both BS and MS requirements.

[Explore Program](#)

3.20 Credit by Examination

Students may receive credit for a course by taking an examination. The official examination policy for the Department of Electrical and Computer Engineering is as follows:

To receive credit by examination, the student must request **in writing** to take the examination. This request should normally be made during fall semester. The request must be turned into the Coordinator for Computer Engineering Undergraduate Studies. There is no standard form for this request. The student does not need to officially enroll in the course. There is currently no fee charged for taking the exam and a failing grade will not appear on the student's transcript.

Upon receipt of the student's request for an examination to earn course credit, the Coordinator for Computer Engineering Undergraduate Studies will appoint an examiner from among the faculty. The examiner will prepare, administer and grade the examination. This examination will require no less than one hour but no more than two hours of scheduled examination time for each unit of credit sought. The examination will be a substantial effort. (For a three-credit hour course, the examination will last

between three (3) and six (6) hours.) In laboratory courses, this examination could include a demonstration of proficiency with the appropriate equipment.

The examination will be completed within two weeks of the student's request as long as the request is made more than two weeks before the beginning of the "Spring Semester Final Examination Period" of any academic year. No examination for course credit will be administered on dates other than those designated as "class days" for the fall and spring semesters of a given academic year.

The examiner's grade will be final. No repeat examination will be allowed. No Computer Engineering course credit earned by examination will count toward satisfaction of the residency requirement for any degree.

3.21 Waiving and/or Changing Graduation Requirements

Occasionally, a student will have a valid reason to petition to waive or change a degree requirement. The general guideline that the Electrical and Computer Engineering department will follow when reviewing these requests is that any waiver or substitution should result in an equally, if not more, demanding program of study. Some requests are routinely approved, while some requirements are very firm and can never be waived. If it appears that the requirement is flexible, the student should complete a COURSE SUBSTITUTION AND WAIVER FORM from <http://registrar.mst.edu/forms/>.

The student should complete the form with the help of the student's academic advisor, provide justification for the request, and have the advisor sign in the appropriate location. Submit the form (email or hard copy) to the ECE undergraduate advising specialist (See 1.1.8) in room 143 ECEH. Approval of most forms require the signature of the Coordinator for Computer Engineering and other administrators. The student will be notified by mail after the request has been officially approved or denied. If the request is approved, the student should keep a copy of the approval until their graduation.

3.21 Accreditation Board for Engineering and Technology (ABET)

The B.S.CpE degree that students receive from Missouri S&T is valuable, in part, because the Accreditation Board of Engineering and Technology (ABET) has accredited the degree. This board of university faculty and other engineering professionals periodically reviews the curriculum and policies of the department to insure they are both relevant and sufficiently advanced to warrant accreditation. This board also reviews representative student work, to ensure tests and homework problems are reasonable, and grades are being assigned in a reasonable manner. If the faculty were to change the program or alter graduation requirements in a way that ABET did not approve, the board could remove this accreditation. This would be a serious disservice to all ECE students, and significantly reduce the value of the degree. While students will rarely, if ever, contact ABET, their presence on campus is very real and significant. Often course substitution and waiver requests will be denied because they would violate ABET guidelines.

Details about CpE and EE accreditation can be found at <https://ece.mst.edu/accreditation/>.

Chapter 4

The Mechanics of Taking Courses

4.1 Registering

Registrar

Deanne Jackson, 103 Parker Hall, 341-4181, registrar@mst.edu

The registrar's office publishes numerous documents, including the schedule of classes and the undergraduate catalog. The registrar also maintains class rolls, records grades, and checks graduation requirements. This office does not make any graduation requirements, but is charged with enforcing the requirements. If you believe that you have satisfied a requirement, but your degree audit does not indicate that the requirement is satisfied, check with your faculty advisor. If you believe that a requirement is inappropriate, and wish to change or waive the requirement, or wish to substitute one course for another, you should contact your faculty advisor. The registrar will not, and should not, answer these types of questions.

The registrar's office maintains a website located at <http://registrar.mst.edu/> that contains the following:

- People Soft student records: assign/change PIN #, registration, fee payment, class schedule, degree audit, grades, financial-aid information, biographic update, and address update
- Course information: schedule of classes, final-exam schedule, course equivalencies
- Dates and deadlines: semester calendar
- Student academic regulations: quick reference, confidentiality policy, student conduct, etc.
- Graduation information: commencement, deadlines, graduation list
- Catalog information: undergraduate & graduate catalogs and admission Information
- Faculty information: deadlines
- Official documents: transcripts, certification letters, diplomas
- Enrollment: enrollment statistics

4.1.1 Priority Registration

Just after you receive mid-semester grades, you should register for the following semester during priority-registration week. Faculty members set aside additional office hours to meet with their advisees during this week. The exact dates for priority registration are listed in the schedule of classes each semester (see <http://registrar.mst.edu/classofferings/>). The week prior to priority registration, you should

1. Sign up for a meeting time with your advisor (your advisor should give you details for how to sign up for an advising appointment)
2. Review your most recent degree audit report (<https://joess.mst.edu>) for progress toward your degree
3. Decide which classes you should take

Meet with your advisor during priority-registration week. Your advisor should review progress toward your B.S. CpE degree, course options for your upcoming schedule, actions that need to be taken regarding your degree program and discuss your career path. Once you and your advisor have agreed upon a schedule, your advisor will use Joe'SS to release the advisor hold on your registration. You should then register using the Joe Miner's Student Self Service (Joe'SS). See the schedule of classes

to see how to register using Joe'SS, and the dates that registration is open to you. Appropriate forms can be found at <http://registrar.mst.edu/forms/>.

It is important that you register during priority-registration week. Insufficient numbers can cause class cancellations before regular registration, and other classes may be full by regular registration.

4.1.2 Regular Registration

If you miss priority registration, you must attend regular registration. This is usually two school days before classes start. See the schedule of classes at <http://registrar.mst.edu/classofferings/> for the exact date.

4.1.3 Useful Links for Registration Process

Here are some useful links for the registration process:

- [Advisor/Student Scheduling Agreement Form](#)
- [Degree Audit-MyDegree](#)
- [Family Educational Rights and Privacy Act \(FERPA\) - Annual Notification](#)
- [Academic Registration Guidelines](#) (Advisors)
- [Academic Registration Guidelines \(Students\)](#)
- [How to Register for Classes using Joe'SS](#)
 - Advising Hold
 - Instructions for Registration and Add/Drop
- [Registration Instructions](#)
- [Textbook Info](#)
- [Registration Forms-How to](#)
- [Prerequisite Information for Students and How to Register Using a Permission Number](#)
- [Prerequisite Enforcement Information](#)
- [Course Instruction Modes](#)
- [Classroom Building Abbreviations](#)
- [Information for Adding/Dropping Courses](#)
- [Missouri S&T Academic Regulations \(Hearer Status, Dropping a Course, Academic Probation, Academic Deficiency\)](#)

4.1.4 Changing Sections of a Course

Guidance for changing sections for a course may be found at [Registration Forms-How to](#). Note that a permission number form will need to be obtained from the ECE undergraduate advising specialist in 143 ECEH.

4.1.5 Dropping a Course

During the first six-weeks of the semester, you may drop a course for any reason. No record that you ever enrolled in the class will be kept. A dropped course in the first six-weeks will not affect your GPA, and it will not appear on your transcript or degree audit reports. One should be careful when dropping a course, however, that they do not drop below the 12 credit-hour load required to be considered a full-time student. Losing your full-time status may impact student loans, scholarships, insurance rates or coverage, or other items. Carefully consider your options – like changing to hearer status – before dropping below a 12 credit-hour load.

See [Information for Adding/Dropping Courses](#) for details about how to drop a course.

You may still drop any course for any reason from the seventh-through-the-twelfth week of the semester; however, a grade of WD will appear on your permanent transcript. This is not a passing or failing grade, but merely indicates that you withdrew from the class. The class will not affect your GPA. Reviewers of your transcript may, however, be unfavorably impressed by withdrawals.

After the twelfth week of the semester, you may not drop a course for any reason. You also may not withdraw from school after the twelfth week. If you are unable to attend a class, due to illness or other unavoidable circumstances, you may ask the instructor to assign a grade of I for Incomplete. This is a temporary grade that will eventually be changed into a normal letter grade. See the following section on grading options for a more-complete description of incomplete grades.

4.2 Grading Options

4.2.1 Taking a Class as a Hearer

Every student who attends a class must be registered for that class. If you wish to attend the lectures for a course, but not receive a grade, you must register as a hearer. You may register as a hearer, or may change to hearer status during the first-six weeks of the fall or winter semesters. To register as a hearer, you should use one of the two following procedures:

1. Prior to the start of classes, pick up an AUTHORIZATION FOR PASS/FAIL OR HEARER (AUDIT) GRADING form at the registrar's office or at <http://registrar.mst.edu/forms/>. Fill out and submit the form.
2. After classes have started: Pick up a SECTION CHANGE form from the registrar's office or the ECE secretary for undergraduate studies.
 - a) Complete the student-information portion on the top of the form, and then fill in all requested information at the bottom of the form under Credit Hour–Grading Option Only.
 - b) Obtain the signatures from both your academic advisor, and the instructor teaching the course.
 - c) Deliver the completed form to the registrar's office.

- [Missouri S&T Academic Regulations \(Hearer Status, Dropping a Course, Academic Probation, Academic Deficiency\)](#)
- [Academic Registration Guidelines \(Students\)](#)

4.2.2 Incomplete Grades

If you are unable to complete a class due to sickness or other unavoidable reasons in the last-four weeks of the fall or winter semesters, you may request the instructor to assign a grade of I (Incomplete). This is not a passing or failing grade; in fact, it is a temporary grade. It states that you will be allowed to complete the course work after the end of the semester. To be assigned a grade of I, you must

1. Regularly attend class during the first-twelve weeks of the semester.
2. Be earning a passing grade at the time the unavoidable absence started.
3. Be sick or forced to miss class due to unavoidable circumstances during the last-three weeks of regularly scheduled class or finals week.
4. Receive permission from the instructor. Instructors are in no way required to assign a grade of I. They may assign a normal letter grade if they prefer.
5. Receive permission from the department chair of the teaching department. In the case of CpE courses, receive permission from the Coordinator for Computer Engineering Undergraduate Studies. In the case of EE courses, receive permission from the Coordinator for Electrical Engineering Undergraduate Studies. The chair is not required to approve requests for I grades, and may force instructors to assign normal letter grades.

If, and only if, you satisfy the conditions listed above, will you be assigned an I grade for the course.

If you receive a grade of I, your instructor will file an INCOMPLETE GRADE form at the end of the semester stating what work you must complete to finish the course and when it is due. This form must be approved by the department chair, and will be kept on file by the department. You should obtain a copy of this form and study it carefully. Your I grade will be translated into a conventional letter grade within one year. If not update is made to the grade, it automatically becomes a failing grade. There is no way for you, the instructor, or the department chair to prevent this. Withdrawing from school will not prevent it, and you cannot withdraw from the course. If your instructor leaves Missouri S&T before he assigns a normal letter grade, another faculty member will be given the responsibility of evaluating your work. If you do not satisfactorily perform the specified work in the allowed time, you will fail the course. Your work must be completed within one calendar year from the close of the semester in which you received the incomplete grade.

Once your work is complete, or the time to complete it has expired, your I grade will be replaced by a normal letter grade.

Note: You must meet all prerequisites before enrolling in a course. For example, if you receive an I grade in EE 2100, you cannot enroll in EE 2120 until this I has been replaced with a C or better grade.

4.2.3 Delayed Grades

If you enroll in CpE or EE 4099 for more than one semester, you may be assigned a grade of DEL (Delayed) in your first semester. This means that the instructor has chosen to wait until the next semester when you complete the project to assign a grade. Your DEL grade will be changed to a normal letter grade before you graduate. Your instructor must complete a GRADE CHANGE form to change your DEL grade to a letter grade. You are not allowed to drop a course in which you received a grade of DEL, and you are not allowed to change the grading option to pass/fail or hearer.

4.2.4 Pass/Fail Grades

If you take a course pass/fail you will receive a grade of S (satisfactory or pass) or a grade of U (unsatisfactory or fail). If a grade of S is received, courses taken pass/fail can be used to satisfy the free-elective requirement (degree audit requirement 17), the cumulative-hours requirement (degree audit requirement 2) and the last-60-hours-on-campus requirement (degree audit requirement 7). Courses taken pass/fail do not satisfy any-other degree requirements.

In order to take a course pass/fail, you must submit a completed PASS/FAIL or HEARER form, available at <http://registrar.mst.edu/forms/>, to the registrar's office prior to the start of the semester or complete the lower portion of a SECTION CHANGE FORM during the first two weeks of class.

- [Academic Registration Guidelines \(Students\)](#)

4.2.5 Graduate vs. Undergraduate Credit

To dually enroll as both an undergraduate and a graduate student, submit a DUALY ENROLLED UNDERGRADUATE – GRADUATE CREDIT INDICATION form available at <http://registrar.mst.edu/forms/> within the first two weeks of classes.

If you are dually enrolled, you must specify which courses are for undergraduate credit and which courses are for graduate credit. You may change this designation during the semester by completing the grading-option section of a SECTION CHANGE form available at <http://registrar.mst.edu/forms/>. Your advisor must sign this form. You are allowed to change the graduate/undergraduate designation after the cut-off date for changing grading options. Courses taken for graduate credit do not satisfy any undergraduate graduation requirements.

4.3 Prerequisites and Corequisites

Instructors have the right to drop you if they believe you are not prepared to take the course. Many of the courses offered at this university build on material introduced in other courses. You are required to complete all prerequisites before enrolling in a course. Corequisite courses may be taken prior to, or concurrent with, the specified course. The prerequisites and corequisites are listed in both the undergraduate catalog and the schedule of classes. Known errors in these listings will be posted on the ECE undergraduate bulletin board located in the first-floor lobby near the north entrance of EECH.

You may wish to take a course before completing all of the prerequisite courses. If your faculty advisor agrees, you can enroll in the class. Since the instructor teaching the course has the right to drop you, you should contact the instructor before enrolling, or, at the latest, the first day of class.

In the case of laboratory courses, you should contact the ECE Coordinator for Laboratory Development for permission to take the lab without the prerequisites. You will be allowed to enroll in, or complete, the course if this assistant chair decides that you are properly prepared. If you are not prepared, you will be forced to drop the course. This means that you can lose both credit for any completed work in the course and some or all of the fees paid.

4.4 Special CpE Courses

4.4.1 Special Problems (CpE 3000 & CpE 4000)

The CpE 3000 and CpE 4000 courses are individual-study courses referred to as special-problems courses. You might study a topic that is not regularly taught in the department. CpE 3000 is considered a junior level course, and CpE 4000 is at the senior level. If you are interested in enrolling in CpE 3000 or CpE 4000, contact a faculty member in your area of interest and request to take a special-problems course. Faculty are often eager to work with students in this way, but a faculty member is under no obligation to do so. CpE students may take a maximum of six credit hours of CpE 3000 or CpE 4000. These courses may be taken for a letter grade and used for CpE Elective CDE or as free electives, or under the pass/fail option and used as free electives. These courses may not be used as CpE Elective A or B and no more than 3-hours may be used as CDE electives. You must have a cumulative Missouri S&T and CpE GPA above 2.000 before you can enroll in CpE 4000. There will be no mention on your transcript of the topics covered.

4.4.2 Special Topics (CpE 3001 & CpE 5001)

In developing and modifying the curriculum, the department frequently offers experimental courses known as special-topics courses. These are conventional lecture courses that are given the temporary course numbers of CpE 3001 (junior level coursework) or CpE 5001 (senior level coursework). After the experimental course is taught once or twice, it is given a permanent course number or dropped from the curriculum. You may use CpE 3001 as an CpE elective CDE or as a free elective. CpE 5001 may be used as CpE elective ABCDE or as a free elective. You will normally receive a letter grade in these courses but may request to take them with the pass/fail grading option for use only as free electives. You may re-take CpE 3001 and CpE 5001 for additional credit as long as each identically numbered course covers a different topic. The subtitle of the course will appear on your permanent transcript.

4.4.3 Undergraduate Research (CpE 4099)

The course CpE 4099 is an individual-study course, similar to CpE 4000. The primary difference between these two courses is in the scope of the material covered. A CpE 4000 course should cover a range of topics similar to conventional lecture courses. CpE 4099 courses have a much more limited scope. This course allows you to study a research-specific problem in great depth. CpE 4099 is an integral part of both the CpE honors program and the OURE program; however, any student may enroll in CpE 4099.

You should contact faculty members individually to discuss potential research topics. CpE students may take a maximum of six credit hours of CpE 4099. If CpE 4099 is taken for a letter grade, the course may be used for CpE elective CDE or as a free elective. If taken under the pass/fail option, the course can only be used as a free elective. This course will appear with the title Undergraduate Research on the student's transcript, but the area of research will not be documented.

4.4.4 Cooperative Engineering Training (CpE 3002)

Computer Engineering 3002 Advisor

Dr. R. Joe Stanley, 127 EECH, 341-6896, stanleyj@mst.edu

Electrical Engineering 3002 Advisor

Dr. Kelvin Erickson, 221 EECH, 341-4552, kte@mst.edu

Cooperative Education (Co-op) is a structured educational strategy integrating classroom studies with learning through productive work experiences in a field related to your academic or career goals. If you

wish to have academic credit for a co-op experience, the department has one-credit-hour courses CpE 3002 and EE 3002 that can apply toward your free-elective requirements.

You should register with Handshake at <https://career.mst.edu/handshake/>, then register your co-op experience with the campus Career Opportunities & Employer Relations (COER) office (<http://career.mst.edu/>) to maintain continuing student status. Upon registering, you will be enrolled in “Co-op Work Program” for zero (0)-credit hours (this item does not appear on your transcript). It is possible to earn one (1)-credit hour to receive academic credit for your co-op experience and to have CpE 3002 and EE 3002 appear on your transcript. *Consent of the Coordinator of EE Undergraduate Studies, Coordinator of CpE Undergraduate Studies, or the Department Chair is required to enroll in the course.* This one (1)-hour course may be taken only once, has a pass-fail grading option only, and may be used only for the free-elective degree requirements. You will be required to prepare a report related to your co-op assignments. The report and any work evaluations from your supervisors on the co-op work assignment will be used for pass-fail grading by an ECE faculty instructor as assigned by the department.

You are responsible for obtaining department approval and for understanding grading criteria prior to enrolling in the course.

The assignment details regarding report topic, general format, and grading criteria will be available from the course instructor (typically the Coordinator for EE Undergraduate Studies or the Coordinator of CpE Undergraduate Studies). The ECE Department Chair has the authority to approve a CpE 3002 and EE 3002 course for students who can document they have had appropriate employment experience, even when the employment was not part of a university-approved cooperative education assignment. (Refer to section 5.4 of the EE or CpE Undergraduate Handbook for more information on the co-op program.)

Minimum Report Requirements

(The Course Instructor may specify other requirements, formatting, and grading criteria):

Page 1 (Cover Page)

Student Name, Co-op Dates, Co-op Company, Location, Supervisor (w/Contact Information)

Page 2-3

Summary of Tasks, Lessons Learned with emphasis on project management, teamwork, economics, salesmanship, company culture, ethics, etc.

Evaluations from the student’s co-op work supervisor may be required.

It is possible to earn up to 3 credit hours for co-op related experience. To earn this credit, you must first complete a minimum of twelve months of co-op experience (typically three assignments). The number of credit hours should depend on the level of the work performed while on co-op. If significant technical learning took place, equivalent to a 5xxx-level 3-hour CpE lecture course, then it may be appropriate to register for up to 3 credit hours of CpE 4099. Note that you *cannot* apply your co-op experience to receive credit for both CpE 3002 and CpE 4099. You should discuss the number of hours with your advisor before signing up, as signing up for more hours than are appropriate for the work performed could result in a poor grade for the course. This course must be taken for a letter grade if used to satisfy CpE elective CDE. Your advisor will be your instructor for this course. You will be required to write a technical report on your co-op assignments. Your advisor will define the exact topic, format and level of detail for this report. Your grade in the course will be determined by the quality of the report, the level of the tasks performed on co-op, and the evaluations completed by your supervisors of the co-op work assignments. These evaluations are automatically forwarded to your advisor each time you complete a work assignment. Refer to section 5.4 for more information on the co-op program.

Chapter 5

Programs

5.1 Opportunities for Undergraduate Research (OURE) Program

Coordinator

Dr. Daryl Beetner, 126 EECH, 341-6203, daryl@mst.edu

Traditionally, research has been reserved for faculty and graduate students. In an attempt to extend this privilege to undergraduate students, the OURE program was initiated. This program allows you to receive credit, and in some cases financial assistance, for working on research projects with an ECE faculty member. An OURE program may be combined with the departmental honors programs. Additional information about this program can be found at <https://experientiallearning.mst.edu/oure/> or 341-7585.

Any student can apply for an OURE grant. Your best bet is typically to contact faculty you might like to work with and let them know your interest in this program. They may have research that is appropriate for an undergraduate. The Department of Undergraduate Studies or the department OURE coordinator may also know of other research projects that are looking for undergraduate assistance.

5.2 Departmental Honors Program

Coordinator

Dr. Steve E. Watkins, 121 EECH, 341-6321, watkins@mst.edu

If you are performing exceptionally well in your undergraduate studies, you may wish to join the honors program. This allows you to perform research in your area of interest with a faculty member. If you complete the program, the designation Honors Scholar in Computer Engineering will be placed on your diploma, in addition to any academic honors based upon your UM GPA. As an honors-program student, you may dually enroll for the last-two semesters.

To be admitted to the ECE-department honors program, you must be at the junior level, have a minimum of 60 credit hours with at least a 3.50 Missouri S&T GPA. If you are a transfer student, you must have a minimum of 60 credit hours with 15 hours at Missouri S&T and a 3.50 Missouri S&T GPA.

Participation in the honors program provides an opportunity for individual learning and creativity through your honors project. Your honors project is an independent project under the supervision of a faculty advisor of your choice. Your project will constitute a minimum of 2 credit hours and a maximum of 6 hours of CpE 4099 course work. Typically, projects are a total of 3 credit hours, with 2 credits earned in one semester and 1 credit earned in the other. Your project will culminate in a formal report approved by the supervising faculty advisor and an additional ECE faculty member appointed by either the EE or the CpE coordinator for undergraduate studies. Your research advisor will assign a letter grade to both your final report and CpE 4099 courses. If you take CpE 4099 for a letter grade, you can use it as CpE elective CDE. If graded pass/fail, it can only be used only as a free elective.

You can combine your departmental honors program with the MSF and OURE programs.

5.3 Master Student Fellow (MSF) Program

Coordinator

Dr. Steve E. Watkins, 121 EECH, 341-6321, watkins@mst.edu

The MSF program is an integrated, research-oriented program of study leading to an undergraduate degree followed by an M.S. degree. The program facilitates the involvement of sophomores and juniors in ECE faculty research. The recommended curriculum includes 6 credit hours of CpE 4099 coursework which meets degree requirements. The undergraduate-research experience is designed to prepare you for your graduate thesis work. The MSF curricula plan facilitates the rapid achievement of a master's degree. Participating students are automatically dually enrolled after completing ninety credit hours. Upon completion of an undergraduate degree, students in the MSF program are automatically accepted for graduate school and are guaranteed to receive at least two semesters of half-time graduate support. The graduate support may require teaching or research duties.

To be admitted to the MSF program on admission as a freshman you must have a minimum ACT score of 32 and be in the top-ten percent of your high-school graduating class. Upon leaving the FEP you are guaranteed continuing MSF status in your new department. Students already on campus may also enter the MSF program. You must have completed at least 30 credit hours of Missouri S&T work with a Missouri S&T GPA of 3.5 or higher, and you must be approved for MSF status by your major department. If you change majors, you must also be approved for MSF status by your new department.

To remain in the MSF program, you must maintain a 3.5 or greater Missouri S&T GPA, and you must be making reasonable progress toward your undergraduate and master's degrees. You can combine an MSF program with departmental honors and OURE programs. For departmental specifics, contact your MSF program coordinator.

5.4 Cooperative Education Program

Third Floor Norwood Hall, 341-4343, career@mst.edu

Missouri S&T has an excellent co-op program. This program allows you to attend school and work for a company of your choice in alternating semesters. While this increases the time required to earn your degree, it is often well worth the extra effort. Co-op assignments give you a break from school, let you see how course work can be applied to real-world problems, and can help you more easily make the transition from school to full-time employment after graduation. Many employers recognize the benefit of co-op, and often ask graduating seniors if they have any CpE experience outside of their course work.

You should consider applying for a co-op position after one-to-two years of study. You typically do not receive academic credit for your co-op experience. However, it is possible to earn 1 credit for co-op by signing up for CpE 3002 (refer to section 4.4.4). It is possible to seek up to 3 credits for extended co-op assignments (refer to section 4.4.4). The co-op office can also arrange internships, a slightly less formal form of co-op. For more information on co-op opportunities available at Missouri S&T, contact the co-op office or check out their website at <http://career.mst.edu/cooperativeeducation/description.html>.

5.5 Career Opportunities and Employer Relations (COER)

Director of Career Opportunities and Employer Relations

Dr. Edna Grover-Bisker 303C Norwood Hall, 341-6170, egroverb@mst.edu

It is not always easy to find your first engineering position. The career opportunities and employer relations center will help you locate potential employers. They can also help you develop an effective resume and interviewing skills. Many employers send representatives to campus to interview students. The career opportunities center coordinates these interviews. You should contact this center approximately one year before you plan to graduate. Check out their website at <http://career.mst.edu/>.

Chapter 6

Financial Assistance

6.1 Financial-Aid Office

G1 Parker Hall, 341-4282, sfa@mst.edu

You may apply for a variety of financial aid. The student-financial-aid office will assist you in determining programs for which you may qualify and supply the appropriate application forms. You may wish to visit their website at <http://sfa.mst.edu/> before contacting the office directly. You are also urged to contact the ECE scholarship coordinator.

6.2 Department Scholarships

Dr. Minsu Choi, Coordinator, 134 EECH, 341-4524, choim@mst.edu

The ECE department awards a number of scholarships to undergraduate students. You are eligible for departmental scholarships once you officially enter the B.S. CpE program. Departmental scholarships are currently given out by the recommendation of the ECE faculty. If you are interested in these scholarships, please contact the ECE scholarship coordinator.

There are also a number of scholarships that are available to all Missouri S&T students. More information about these scholarships is available from the Student Financial Assistance Office at <http://sfa.mst.edu/>.

6.3 Financial Aid for Graduate Study

Although the focus in this chapter is on undergraduate financial aid, several scholarships, like the Rhodes scholarship, apply only to students pursuing advanced degrees, such as an M.S. or Ph.D. degree. Please be aware that there are numerous opportunities for financial aid in an engineering graduate school. The opportunities include various assistantships (both teaching and research), fellowships and grants from a variety of state, federal and private sources. Please see the graduate coordinator or the graduate handbook for details.

Chapter 7 Professional Societies and Organizations

Information about professional societies and organizations for student participation can be found at <http://ece.mst.edu/currentstudents/prohonsocieties/>.

7.1 Institute of Electrical and Electronics Engineers Inc. (IEEE)

Dr. Minsu Choi, Faculty Advisor, 341-6775, 134 EECH, choim@mst.edu

All ECE students are welcome to join the student branch of IEEE. This is the largest professional society in the world. Joining this organization gives you access to the technical publications and opportunities that IEEE offers at a fraction of the full membership rate. For more information see <https://ieee.mst.edu/>, contact the faculty advisor, or get a student-membership application at <http://www.ieee.org/>.

7.2 Association for Computing Machinery (ACM)

341-4492, 325 Computer Science Bldg, csdept@mst.edu

ACM is the oldest professional society that services the computer industry, and the Missouri S&T student chapter, organized in 1962, is the second oldest in the USA. Its focus is much more software oriented than the IEEE computer society. Many computer engineers belong to both organizations. See <https://cs.mst.edu/undergraduate-degree/student-organizations/> for a variety of participation options and additional information.

7.3 Eta Kappa Nu (HKN)

Dr. Sahra Sedighsarvestani, Faculty Advisor, 341-7505, 135 EECH, sedighs@mst.edu

Dr. Theresa Swift, Faculty Advisor, 341-4540, 217 EECH, thswift@mst.edu

Dr. Steve Watkins, Faculty Advisor, 341-6321, 121 EECH, watkins@mst.edu

HKN is an international honorary society for electrical engineers and admission is primarily based on scholastic performance. Visit their website at <http://ece.mst.edu/currentstudents/prohonsocieties/> or contact the faculty advisors. This society can often help supply tutors for CpE students.

7.4 Tau Beta Pi

Dr. Steve Watkins, Faculty Advisor, 341-6321, 121 EECH, watkins@mst.edu

Tau Beta Pi is an honorary society for all engineering. Questions concerning this society may be directed to the local Tau Beta Pi faculty advisor, or visit the web site at <https://ece.mst.edu/student-opportunities/>.

A complete listing of campus societies and organizations can be found at the website http://studentlife.mst.edu/volunteer/student_organizations.html.

Chapter 8

Miscellaneous

8.1 Required Calculators

Electrical engineering and math instructors may require you to have a specific calculator during an examination. Check with your electrical engineering and math instructors to see if a specific calculator is required. Beyond the specific calculator, instructors cannot insist that students have access to any other computing device unless provided by the university.

8.2 Student Paper and Presentation Competitions

A number of technical societies organize paper and presentation competitions that are open to undergraduate students. You are encouraged to participate in these competitions. If in the honors or OURE program, you may wish to use your project as a basis for your papers and presentations. In addition to the recognition associated with winning a competition, many have significant cash awards.

Competitions are currently conducted by the OURE program, Sigma Xi (a scientific honor society), the Missouri Academy of Science, and IEEE to name a few. Be sure to check with the ECE departmental OURE coordinator, the IEEE faculty advisor or the CpE coordinator for undergraduate studies.

Chapter 9

When Things Are Not Going Well

9.1 Problems in Several Courses

If you are having difficulty in several courses, contact your faculty advisor. Your advisor can discuss ways to lighten your academic load and how this will impact the time required to earn your degree.

You may also wish to visit:

Student Well Being and Academic Support Services
105 Norwood Hall, 573-341-7276, learn@mst.edu .

Student Well Being Services

204 Norwood Hall, 573-341-4211, wellbeing@mst.edu

Student Well-Being provides counseling services, health promotion initiatives, and prevention programs to empower the S&T community to thrive and enhance personal, academic, and professional success. Available services can be found at <https://wellbeing.mst.edu/>.

Academic Support Services

Advising

Suite G6, 400 W 14th Street, Rolla, MO, 65409
573-341-4424, advising@mst.edu

Academic Support can also direct you to a number of support groups in these areas. Information about these programs can be found at <https://advising.mst.edu/handbook/academicsupportservices/>, including:

- Early Alert System
- **LEAD** (LEARNING ENHANCEMENT ACROSS DISCIPLINES)
- Writing and Communication Center
- Math Help
- Academic Consultation
- ON-TRACK

These resources are in place to help you overcome difficulty in your courses through learning communities, tutoring with the LEAD program (<http://lead.mst.edu/>), and many others. Your advisor and the Academic Support Center can help you find the program that is best for you.

9.2 Problems with One Particular Course or Instructor

Do not hesitate to contact your instructor for the course to discuss your problems with the course.

Make sure enough time is allowed to study for the course. The rule of thumb for undergraduate courses is that approximately 2-to-3 hours a week is spent studying course material for every hour spent in class. A 3 credit-hour course should require 6-to-9 hours of study time a week outside of class and all prerequisite courses need to be completed.

If you believe an instructor is behaving in an unreasonable or unprofessional manner, contact the instructor's supervisor. If the instructor is a laboratory GTA, contact the ECE Coordinator for Laboratory Development. If the instructor is a faculty member, contact the ECE Department Chair.

Please make every attempt to resolve problems with the instructor before going to their supervisor. If the problems seem significant, it may still be necessary to contact the instructor's superior.

9.3 In Danger of Failing a Course

If you are in danger of failing a course, discuss the following options with your advisor and instructor:

- Reducing extracurricular activities
- Dropping the course
- Dropping other courses to free up additional study time
- Changing to hearer status

Each of the last three actions listed have significant restrictions and consequences associated with them. Thoroughly review the appropriate sections in Chapter 4 before selecting any of these options and discuss any plans with your advisor.

9.4 Scholastic Probation

If a student's semester GPA is below 2.00, the student is placed on scholastic probation. A NOTIFICATION OF SCHOLASTIC ACTION form will be mailed directly to the student indicating what action will be taken to continue enrollment. If placed on scholastic probation, the student should contact their faculty advisor and re-examine the student's schedule for the next semester.

In addition, the student should review the university policies for being placed on and to be removed from probation. See the student academic regulations at <http://registrar.mst.edu/academicregs/index.html>. In general, students may not hold an office in any student organization and may not take more than 13 credit hours of classes. It is important that students on probation make every attempt to raise their GPA in subsequent semesters. Students that do not take academic probation seriously often fail to graduate.

9.5 Scholastic Deficiency

If placed on academic probation a second time, the student is considered scholastically deficient. This is a very serious problem, since the student is dropped from the CpE program. The student will have to apply to be readmitted into CpE. There is no guarantee that this application will be accepted. If the student is scholastically deficient, contact their faculty advisor immediately and review the rules for scholastic deficiency. These are available at <http://registrar.mst.edu/academicregs/index.html>. If denied admission to the CpE program, the student may also appeal to the provost for admission to the school through other means.

9.6 Withdrawing from School

A student who is unable to continue studies needs to withdraw from school. Use the following procedures as stated in the student academic regulations. Review this information online by accessing <http://registrar.mst.edu/academicregs/index.html>.

- **Do Not Just Walk Away From School:** The student will still be enrolled in the courses and receive an "F" grade unless officially withdrawing from school.

- **Permission Required:** To withdraw from school fill out a REQUEST TO WITHDRAW FROM SCHOOL form available from the registrar's office or at <http://registrar.mst.edu/forms/>. Withdrawals from school must be completed 3 weeks (15 class days) prior to the last day of class.
- **Before Two 2 Weeks Past Mid-Semester:** If a student withdraws from school with permission prior to 2 weeks past mid-semester (1 week during summer session), they shall receive no grade in any class scheduled for that semester.
- **After Two 2 Weeks Past Mid-Semester but Prior to 3 Weeks Before the End of Classes:** If a student withdraws during this interval, they may receive credit for courses that they have actually completed at the time of withdrawal. In other courses, no grades shall be recorded.
- **Academic Status:** Academic status if a student withdraws will be the same as their status at the beginning of the semester in which they withdrew. **Reapply for admission if placed on academic deficiency.**

9.7 ECE Department Academic Dishonesty Policy

As a faculty, we believe that membership in the engineering profession requires the utmost in honesty and ethical conduct. For this reason, we have established the following departmental guideline on academic dishonesty by students:

- **First Offense:** Cheating in a course will be punished by a grade of F for the corresponding work. The student will be notified in writing that a second incidence of cheating will result not only in an F grade in the course, but in automatic expulsion from the department. In addition, a copy of this reprimand will be placed in the student's file at the department level. This letter will be destroyed upon graduation if no further infractions occur.
- **Second Offense:** A second incidence of academic dishonesty is cause for automatic expulsion from the department. Students so expelled will be readmitted to the department only with a vote of two-thirds of the active tenured faculty.

These guidelines do not preclude further disciplinary action at the school of engineering, campus or university level.

9.8 Personal Problems and Emergencies

CpE students who experience serious health or personal problems should contact the CpE Coordinator for Undergraduate Studies and the Vice Provost for Academic Affairs, 102 Parker Hall, 341-4138, provost@mst.edu. **Never simply walk away from school.** Discuss the details of the situation and investigate all of the options before terminating studies.

Chapter 10 Preparing for Graduation

The Semester Prior To Your Graduating Semester

- Make sure to register for the Fundamentals of Engineering Exam. See section 3.2.15.

Your Graduating Semester

The following checklist, paraphrased from the registrar's website, lists the steps for students to follow in preparation for graduation:

- You must submit to the registrar's office a completed APPLICATION FOR GRADUATION form, available at <http://registrar.mst.edu/forms/> **within the first-four weeks** of your graduating semester. Submitting this form a few weeks after pre-registering for the final semester is even better.
- After the fifth-or-sixth week of classes, you will receive a preliminary degree check with the analysis mailed to your local address. This analysis consists of a degree audit report and a cover letter stating any deficiencies or if all of your degree requirements will have been met with in-progress course work. Your degree audit report may be obtained from [Joe'SS](http://joess.mst.edu) (<http://joess.mst.edu>) at any time.

NOTE: It is your responsibility to make sure all discrepancies have been resolved before commencement. If you have any problems, you need to see your advisor.

- You can check the Assessment Office link (<http://ira.mst.edu/assessment.html>) to see what your senior assessment requirement is. If you have questions concerning your senior assessment requirements and why the senior assessment does not show up on your degree audit, please see the ECE Undergraduate Secretary.
- You must complete all transfer credit and correspondence course work prior to commencement. Transcripts for correspondence-and-transfer credit must be received within 30 days after commencement. In addition, grade changes or incomplete-grade replacements must be submitted to the registrar's office within 30 days after commencement in order to meet graduation requirements.
- **ALL STUDENTS:** If you fail to meet graduation requirements in the term you specified, you must **reapply** for the term in which you next expect to complete all requirements. Final degree audits are only provided for the terms specified.