The course offerings and requirements of the University of Tennessee are continually under examination and revision. This student guide presents the offerings and requirements in effect at the time of publication, but there is no guarantee that they will not be changed or revoked. Current information may be obtained from the following sources.

**Admission Requirements** – *Contact the Director of Admissions.*

**Course Offerings** – *Contact the Department offering the course.*

**Degree Requirements** – *Contact the Office of the University Registrar, faculty advisor, head of major department, College Advising Center, or Dean of college/school.*

*Refer to the Engineering and Campus Resources section of this booklet for a more comprehensive list of resources and contact information at the University of Tennessee.*

CREDITS: Kim Cowart, Randall Brown, Mitchell Williamson, College of Engineering Communications Office

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**EEO/TITLE IX/AA/SECTION 504 STATEMENT**

The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA institution in the provision of its education and employment programs and services. All qualified applicants will receive equal consideration for employment without regard to race, color, national origin, religion, sex, pregnancy, marital status, sexual orientation, gender identity, age, physical or mental disability, or covered veteran status.

PAN: E01-1399-028-16  DOP: 5/16
## ADMINISTRATIVE CONTACTS

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Email</th>
<th>Phone</th>
<th>Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate Dean for Academic and Student Affairs</td>
<td>Dr. Masood Parang</td>
<td><a href="mailto:mparang@utk.edu">mparang@utk.edu</a></td>
<td>865-974-2454</td>
<td>101 Perkins Hall</td>
</tr>
<tr>
<td>Engineering Advising Services</td>
<td>Margie Russell</td>
<td><a href="mailto:engradvising@utk.edu">engradvising@utk.edu</a></td>
<td>865-974-4008</td>
<td>316A Perkins Hall</td>
</tr>
<tr>
<td>Engineering Fundamentals Division</td>
<td>Dr. Richard Bennett</td>
<td><a href="mailto:rbennet2@utk.edu">rbennet2@utk.edu</a></td>
<td>865-974-9810</td>
<td>207 Perkins Hall</td>
</tr>
<tr>
<td>Engineering Honors</td>
<td>Dr. Kevin Kit</td>
<td><a href="mailto:kkit@utk.edu">kkit@utk.edu</a></td>
<td>865-974-9810</td>
<td>322 Perkins Hall</td>
</tr>
<tr>
<td>Engineering Outreach</td>
<td>Dr. Roger Parsons</td>
<td><a href="mailto:jparsons@utk.edu">jparsons@utk.edu</a></td>
<td>865-974-9810</td>
<td>308 Perkins Hall</td>
</tr>
<tr>
<td>Engineering Professional Practice</td>
<td>Mr. Todd Reeves</td>
<td><a href="mailto:coop@utk.edu">coop@utk.edu</a></td>
<td>865-974-5323</td>
<td>110 Perkins Hall</td>
</tr>
</tbody>
</table>

## ACADEMIC DEPARTMENTS

<table>
<thead>
<tr>
<th>Department</th>
<th>Chair</th>
<th>Email</th>
<th>Phone</th>
<th>Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biosystems Engineering &amp; Soil Science</td>
<td>Dr. Eric Drumm</td>
<td><a href="mailto:bess@utk.edu">bess@utk.edu</a></td>
<td>865-974-7266</td>
<td>101 Biosystems Engr &amp; Env Science Bldg</td>
</tr>
<tr>
<td>Chemical &amp; Biomolecular Engineering</td>
<td>Dr. Bamin Khomami</td>
<td><a href="mailto:cbe@utk.edu">cbe@utk.edu</a></td>
<td>865-974-2421</td>
<td>419 Dougherty Bldg</td>
</tr>
<tr>
<td>Civil &amp; Environmental Engineering</td>
<td>Dr. Chris Cox</td>
<td><a href="mailto:cee@utk.edu">cee@utk.edu</a></td>
<td>865-974-2503</td>
<td>325 John D. Tickle Engineering Building</td>
</tr>
<tr>
<td>Electrical Engineering &amp; Computer Science</td>
<td>Dr. Leon Tolbert</td>
<td><a href="mailto:deptinfo@eecs.utk.edu">deptinfo@eecs.utk.edu</a></td>
<td>865-974-3461</td>
<td>401 Min H. Kao Building</td>
</tr>
<tr>
<td>Industrial and Systems Engineering</td>
<td>Dr. John Kobza</td>
<td><a href="mailto:iie@utk.edu">iie@utk.edu</a></td>
<td>865-974-3333</td>
<td>525 John D. Tickle Engineering Building</td>
</tr>
<tr>
<td>Materials Science &amp; Engineering</td>
<td>Dr. Veerle Keppens</td>
<td><a href="mailto:mse@utk.edu">mse@utk.edu</a></td>
<td>865-974-5336</td>
<td>414 Ferris Hall</td>
</tr>
<tr>
<td>Mechanical, Aerospace, and Biomedical Engineering</td>
<td>Dr. Matthew Mench</td>
<td><a href="mailto:mabeinfo@utk.edu">mabeinfo@utk.edu</a></td>
<td>865-974-5115</td>
<td>443 Dougherty Bldg.</td>
</tr>
<tr>
<td>Nuclear Engineering</td>
<td>Dr. J. Wesley Hines</td>
<td><a href="mailto:utne@utk.edu">utne@utk.edu</a></td>
<td>865-974-2525</td>
<td>315 Pasqua Bldg.</td>
</tr>
</tbody>
</table>
Resources

Tutoring

Chemistry Help Sessions
513 Buehler Hall
865-974-3413

Disability Services
100 Dunford Hall
865-974-6087

Educational Advancement Program
Greve Hall Room 302
821 Volunteer Blvd.
865-974-7900

Engineering Fundamentals Help Sessions
207 Perkins Hall
865-974-9810

Math Tutorial Center
G012 Ayres Hall
865-974-4266

Office of Multicultural Student Life
1800 Melrose Ave. Black Cultural Ctr.
865-974-6861

Writing Center
212 Humanities & Social Sciences Bldg.
865-974-2611

Student Success Center
Greve Hall Room 324
821 Volunteer Boulevard
865-974-6641

Additional Resources

Campus Information
865-974-1000

Center for International Education / Study Abroad
1620 Melrose Avenue
865-974-3177

Computer and Laptop Help
The Commons
2nd Floor Hodges Library
865-974-4351

Engineering Diversity Programs
301 Perkins Hall
865-974-1931

Financial Aid and Scholarships
Hodges Library Ground Floor
865-974-1111

International House
1623 Melrose Avenue
865-974-4453

Office of National Scholarships and Fellowships
Room 130, Howard Baker Center
865-974-3518

Office of Undergraduate Research
1534 White Avenue
865-974-8560

One Stop Shop
Financial Aid, Scholarships, Transcripts, Grades, General Questions
Hodges Library Ground Floor
865-974-1111

Parking Services
2121 Stephenson Drive
865-974-6031

Registrar Office
Hodges Library Ground Floor
865-974-1111

Student Counseling Center
1800 Volunteer Boulevard
865-974-2196

Student Government Association
sga.utk.edu

Student Health Services Clinic
1800 Volunteer Boulevard
865-974-3135

Student Judicial Affairs
409 Student Services Building
865-974-3171

Team VOLS Volunteer Center
865-974-5455

UC Computer Store
865-974-2930

University Honors Program
130 Howard Baker Center
865-974-7875

University Housing
405 Student Services Building
865-974-2571

Veterans Benefits
209 Student Services Building
865-974-1500

VolCard (UT ID) Office
472 South Stadium Hall Gate 12-13
865-974-3430
The College of Engineering is committed to the belief that academic advising engages students by teaching them how to become members of the higher education community, to think critically about their role and responsibilities as engineers, and to prepare them to be educated members of a global community.

**New Students**

New freshman students are assigned to Engineering Advising Services for academic advising until they have completed the freshman curriculum. Freshman students admitted to the College of Engineering are required to designate a field of study by the end of their freshman year. Upon completion of Engineering Fundamentals 152 (or equivalent), the students are assigned faculty advisors in their selected departments.

The Engineering Advising Office delivers academic advising on an appointment basis. To make an appointment, use the e-mail link sent to you to schedule using Grades First. Advising for students start with honors, then EF 152/Physic 136, then EF 151/Physic 135 and Math 130. Advising appointments are normally offered on thirty-minute individual intervals. Hours of operation are from 8:00 a.m. to 5:00 p.m. (Eastern), Monday through Friday.

**Academic Standing**

The University of Tennessee, Knoxville, expects all students who enter to make progress toward graduation. To graduate from UT Knoxville, a student must earn a minimum cumulative grade point average (GPA) of 2.00. The university reviews students’ academic records at the end of each term to determine academic standing. The catalog contains additional requirements for specific programs.

**Good Academic Standing**

A student is in good academic standing when both the student’s term and cumulative GPAs are 2.00 or higher or, if after two consecutive terms, the student’s cumulative GPA is 2.00 or higher and at least one term GPA is also 2.00 or higher.

**Academic Probation**

A student will be placed on Academic Probation when (1) his/her cumulative GPA falls below the minimum acceptable level of 2.00 for one semester or (2) the semester GPA falls below the minimum acceptable level of 2.00 two consecutive terms of enrollment. During the semester that a student is placed on Academic Probation, and any other semesters in Academic Probation, a student must participate in a special directive advising program to help the student address concerns that are impacting his/her academic performance and to outline a plan for achieving academic success. This model of early intervention is designed to help students regroup and position themselves for academic success. Students on Academic Probation status during a term will automatically be dismissed at the end of that term if both:

- The cumulative GPA is below a 2.00, and
- The term GPA is below a 2.00

A student will no longer be on academic probation when his or her cumulative grade point average is 2.00 or higher and the term grade point average is 2.00 or higher. This policy is in place in recognition of the University of Tennessee, Knoxville’s minimum grade point average of 2.00 for graduation.
Advising Mission:
The University of Tennessee, Knoxville places academic advising within the teaching/learning mission of the institution and recognizes it to be a critical component of students’ educational experience and undergraduate success. Faculty, administrators, and professional staff promote academic advising as a shared responsibility with students. Academic advising serves to develop and enrich students’ educational plans in ways that are consistent with their personal values, goals, and career plans, preparing them for a life of learning in a global society.

I. STUDENT LEARNING OUTCOMES:
Students will demonstrate they know
• Curricular requirements, progression standards, UTrack requirements, and course sequencing related to a chosen/ intended academic program in order to graduate in a timely fashion
• The career and professional development opportunities available as well as on-campus support for identification and exploration of career paths(Career Development Office, Engineering Professional Practice Office)
• Academic policies and procedures (Undergraduate Catalog)
• Campus resources and support systems that promote academic success (Student Success Center)

Students will demonstrate they can
• Develop an academic plan and assess degree progress through graduation (Banner DARS, Undergraduate catalog)
• Critically reflect upon academic and career goals
• Develop skills and strategies for academic success that include accessing and using institutional resources, policies, and procedures
• Take responsibility for making decisions regarding their academic success

Students will demonstrate they value/appreciate
• The importance of academic planning and their role in the process
• The importance of enhancing their degree with cocurricular/extracurricular and inter/intracultural experiences
• Their responsibilities as educated citizens of UT and of a democratic, diverse, and global society
• The educational process and learning across the lifespan

II. ADVISING POLICY:
Prior to advanced registration, all students who have earned fewer than 30 hours at UT Knoxville or are on Academic Probation, or have not declared a major within a specific college (undeclared, pre-major, interest, undeclared) or are flagged as Off Track by UTrack system are required to meet with an advisor during each main term of the academic year (i.e., during fall and spring). All other students are required to consult with an advisor for a substantial conference during a designated term each year. Students whose ID numbers end in an odd digit are required to meet with an advisor during fall semester. Students whose ID numbers end in an even digit are required to meet with an advisor during spring semester. However, Engineering students are encouraged to consult regularly with their major advisor during each semester of the academic year, especially if they plan to participate in internship or co-op positions that might affect class scheduling.

Once students in the College of Engineering finish the first year coursework, they progress to their major and are assigned to a faculty advisor in their department. This is typically after students complete Math 141-142 (Honors 147-148) and EF 151-152 (Honors 157-158). For Computer Science, these progression courses are Physics 135-136 (Honors 137-138) and Computer Science 102 and 130. In all cases progression to the major includes being in Good Academic Standing (2.00 or better cumulative GPA). For most students this will be at the end of freshmen year, but for some it might be the following year in December if they finish these courses in the Fall semester.

III. STUDENT EXPECTATIONS:
• Schedule an advising appointment early each semester.
• Keep any advising appointments you make. If you are more than ten minutes late to your scheduled appointment, you will be required to reschedule at another time.
• Cancel any advising appointments that you are unable to attend, as these appointments will be used by other students.
• Review your curriculum in the Undergraduate Catalog and the Engineering Student Guidebook
• Ensure you are on track to meet progression standards or UTrack milestone requirements (if required for your major, including GPA or course requirements) by reviewing your DARS report and UTrack report.
• Write down your current schedule and a tentative plan for next semester.
• Write down any questions you have for your advisor.
• Consult with your advisor and the One Stop Shop before making drastic changes to an agreed-upon schedule.
• Consult with your advisor and the One Stop Shop on issues related to academic progress, a change in program, registration for study abroad, internships and co-ops, courses to be taken at another institution, withdrawal from courses, or withdrawal from the university.
• Make final decisions and take responsibility for your academic career.
• Pay attention to semester deadlines.
• Read any e-mails or letters that are sent to you by your advisor, advising center, or academic college.
• Bring ROTC academic plans to your advisor early enough so that those forms may be filled out before they are due.

(continued on next page)
IV. ADVISOR EXPECTATIONS:
• Be accessible to you during reasonable hours.
• Provide a means through which you can schedule appointments.
• Understand the curriculum, graduation requirements, and university policies.
• Understand the progression requirements and UTrack requirements for the different majors in their college.
• Provide accurate information.
• Discuss specific university, college, and departmental requirements, procedures, and deadlines.
• Help you define and develop realistic goals and discuss the linkage between academic preparation and career opportunities.
• Assist you in planning programs of study, both short-term and long-term, that are consistent with your abilities and interests; such as course load, academic background, program demands, and employment or personal commitments.
• Refer you to other services, departments, and specific individuals as special needs are identified.
• Monitor your progress toward educational goals and keep accurate, up-to-date records of academic progress.
• Help you identify special needs and acquaint you with services and programs provided by the college and the university.
• Respect your right to privacy of educational records and discuss confidential information only with appropriate individuals and for the purpose of serving your best interests.
• Help you assume responsibility for your decisions and actions.

V. IMPORTANT DATES IN THE ACADEMIC CALENDAR

FALL/SPRING:
August:
• Be aware of drop/add dates and other deadlines especially financial deadlines

September–November:
• Schedule appointment with advisor to plan for Spring
• Attend Study Abroad Fair hosted by Programs Abroad Office
• Attend Fall Job Fair hosted by Career Development (September)
• Attend Co-Op Fair hosted by Engineering Professional Practice (September)

October–November:
• Register for classes once eligible

December:
• Final exams

January:
• Be aware of drop/add dates and other deadlines especially financial
• Attend Study Abroad Fair

February–March:
• Schedule an appointment to meet with your advisor to plan Summer/Fall
• Attend Spring Job Fair hosted by Career Development (March)
• Attend Co-Op Fair hosted by Engineering Professional Practice (March)

March – April:
• Register for classes once eligible (summer and fall)

May:
• Final exams

VI. ADVISING RESOURCES:
• Academic Calendar: registrar.tennessee.edu/academic_calendar/index.shtml
• Banner DARS—look in UT Student Academic Links in myutk.utk.edu
• Career Development Center: career.utk.edu
• Undergraduate Catalog: catalog.utk.edu
• MyUTK: myutk.utk.edu
• Student Success Center: studentsuccess.utk.edu
• Study Abroad Office: studyabroad.utk.edu
• Engineering Professional Practice: www.coop.utk.edu/index.html

Contact information for individual colleges:

Agricultural Sciences & Natural Resources
125 Morgan Hall
Phone: 865-974-7303

Architecture & Design
224 Art & Architecture Building
Phone: 865-974-3232

Arts & Sciences
313 Ayres Hall
Phone: 865-974-4481

Business
342 Haslam Business Building
Phone: 865-974-5096

Communication & Information
202 Communications Building
Phone: 865-974-3603

Education, Health, & Human Sciences
332 Bailey Education Complex
Phone: 865-974-8194

Engineering
316A, Perkins Hall
Phone: 865-974-4008

Nursing
203 Nursing Building
Phone: 865-974-7606

Social Work
303 Henson Hall
Phone: 865-974-3351
Research and Instructional Strategies For Engineering Retention — RISER

The RISER Program is sponsored by NSF STEP grant. The RISER program offers two main areas of emphasis. First, it is designed for students admitted into the College of Engineering that will begin in Math 130 (Pre-calculus) Fall semester. The program offers the Math 130 students the opportunity to take Pre-calculus together with the same instructor. This will allow the students to form study groups and community.

Secondly, RISER students also have the opportunity to live together on campus in the RISER Living Learning Community. Research opportunities are available to Honors women to illustrate how their chosen majors can be intellectually challenging, personally satisfying, and beneficial to society and to continue on with engineering as a major.

For more RISER program information, contact:
Elizabeth Ferguson
865-974-9245
ferguson@utk.edu
514 East Stadium Hall

RISER Learning Community

RISER Living and Learning Community assists engineering students to develop a strong foundation in math skills to enhance their success in the College of Engineering.

RISER Living and Learning Community is open to students admitted to the College of Engineering. Participants in RISER must be eligible to take Math 130 during their first semester at UT and have an ACT math score of 25, 26 or 27, or SAT math score of 570-620.

Placement requirements can be found at Math Placement (www.math.utk.edu/ugrad/placement.html).

Residents of this community will share study sessions and social activities in addition to RISER math class sections.

Restrictions:
- All men and women living in RISER must be admitted to the College of Engineering.

For RISER Learning Community information, contact:
Brian Samble, University Housing Office
865-974-1974
bsamble@utk.edu

Support:
The Research and Instructional Strategies for Engineering Retention (RISER) at the University of Tennessee, Knoxville is funded by the National Science Foundation (NSF) through the Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) award number 1068103.
## Barriers to Academic Performance and Choices

*Life happens to all of us.*

*Less successful students often believe that other students are successful only because those other students do not have bad things happen to them. Whether we are successful or not depends more on the CHOICES we make when faced with the circumstances that life deals us.*

<table>
<thead>
<tr>
<th>Presenting Issue</th>
<th>Choice of the Successful Student</th>
<th>Choice of the Less Successful Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>I don’t know how to manage my time.</td>
<td>Recognizes that work outside of class is important to success.</td>
<td>Not sure how much time he/she should spend on work outside of class.</td>
</tr>
<tr>
<td></td>
<td>Uses weekly time schedule, semester calendars, and planners/to do lists to keep organized.</td>
<td>No plan.</td>
</tr>
<tr>
<td></td>
<td>Makes good use of daytime hours.</td>
<td>Likes to “go with the flow.”</td>
</tr>
<tr>
<td>My high school didn’t cover this subject/didn’t prepare me very well.</td>
<td>Talks to professor when first struggle appears.</td>
<td>Gets angry that high school didn’t prepare well-enough.</td>
</tr>
<tr>
<td></td>
<td>Talks to academic advisor.</td>
<td>Concludes that college is too hard.</td>
</tr>
<tr>
<td></td>
<td>Visits Student Success Center to find out about types of academic assistance.</td>
<td>Concludes that it is unfair to be in this situation and UT shouldn’t expect this of me.</td>
</tr>
<tr>
<td>I got A’s in high school and didn’t have to study much</td>
<td>Recognizes that college learning requires different skills than high school.</td>
<td>“I did okay in high school, so I’m sure I’ll do fine here.”</td>
</tr>
<tr>
<td></td>
<td>Follows suggestions provided in FYS 101.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visits Student Success Center for assistance in developing better study skills.</td>
<td></td>
</tr>
<tr>
<td>I had personal and family issues.</td>
<td>Recognizes that he/she needs some support to work through the difficult times.</td>
<td>Withdrawn, depressed, feels alone, skips classes.</td>
</tr>
<tr>
<td>• Relationships with friends, significant others</td>
<td>Seeks counseling at the Counseling Center.</td>
<td></td>
</tr>
<tr>
<td>• Death/Illness in Family or Friends</td>
<td>Decides to withdraw for the semester to work through the issues.</td>
<td></td>
</tr>
<tr>
<td>• Divorce</td>
<td>Develops better coping skills.</td>
<td></td>
</tr>
<tr>
<td>• Personal Illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I don’t have a major or I’m not sure where I’m going with the major I’m in.</td>
<td>Recognizes that this current plan may not be the best fit.</td>
<td>Continues to pursue major even though he/she dislikes it and struggles with the courses.</td>
</tr>
<tr>
<td></td>
<td>Is undecided but recognizes the importance of getting a college degree.</td>
<td>Is frustrated that he/she doesn’t know what to major in.</td>
</tr>
<tr>
<td></td>
<td>Visits Career Services to seek assistance with finding a (new) major.</td>
<td></td>
</tr>
<tr>
<td>I think I might have (or I have been diagnosed with) learning (or other) disability.</td>
<td>Seeks evaluation and assessment of disability.</td>
<td>Wants to try things on his/her own.</td>
</tr>
<tr>
<td></td>
<td>Registers with Office of Disability Services.</td>
<td>Does not seek assistance on campus.</td>
</tr>
<tr>
<td></td>
<td>Uses accommodations at Office of Disability Services.</td>
<td></td>
</tr>
<tr>
<td>I am more motivated by social life and free time than academics.</td>
<td>Learns to say “no” and “bargain” on social invitations.</td>
<td>Wants to do it all.</td>
</tr>
<tr>
<td></td>
<td>Limits Facebook time until academic work is complete.</td>
<td>Spends lots of time on Facebook.</td>
</tr>
<tr>
<td></td>
<td>Limits TV shows to only those most desired.</td>
<td>Loved pledging.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watches lots of TV.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loves X-Box, Wii or online gaming.</td>
</tr>
</tbody>
</table>
Scholarships, Student Organizations, Technology & Student Privacy

UT College of Engineering Undergraduate Scholarships

The College of Engineering annually awards an average of nearly $1,000,000 in scholarships to qualified undergraduate students. Students must be accepted into the University of Tennessee and the College of Engineering to apply for engineering scholarships. Students need not apply for specific scholarships as the Scholarship Committee will match qualified students with available awards. Please contact the One Stop Shop for the complete list of application requirements and deadlines.

Hodges Library Ground Floor, 865-974-1111, onestop.utk.edu/your-money.

The returning/transfer student scholarship application is on MyUTK. Application deadline is February 1.

Scholarships are awarded each academic year in the spring for the upcoming fall semester. For more information contact the College of Engineering Academic and Student Affairs Office at 865-974-2454 or stop by 101 Perkins Hall.

Student Organizations and Honor Societies

www.engr.utk.edu/currentstudents/orgs.html

Student Organizations

• American Institute of Aeronautics and Astronautics
• American Institute of Chemical Engineers
• American Nuclear Society
• American Society of Agricultural and Biological Engineers
• American Society of Civil Engineers
• American Society of Mechanical Engineers
• Association of Computing Machinery
• College of Engineering Ambassadors
• Institute of Electrical and Electronics Engineers
• Institute of Industrial Engineers
• Institute of Transportation Engineers

• Material Advantage
• National Society of Black Engineers
• Society of Automotive Engineers
• Society of Plastics Engineers
• Society of Women Engineers

Honor Societies

• Chi Epsilon, Civil Engineering Honor Society
• Eta Kapp Nu, Electrical Engineering Honor Society
• Pi Tau Sigma, National Mechanical Engineering Honor Society
• Tau Beta Pi, National Engineering Honor Society

Technology

www.engr.utk.edu/futurestudents/computers.html

Laptops will be required for all students, incoming freshmen included. A computer store is located on campus in the Student Union. The website is shop.utk.edu/c-276-technology.aspx. They often have special deals for UT students on Apple and PC products.

FERPA STATEMENT

Family Education Rights and Privacy Act (FERPA)

The method with which the University of Tennessee governs the distribution of student information is based on the Family Educational Rights and Privacy Act of 1974 or FERPA. This Act, as amended, established the requirements governing the privacy of student educational records in regards to the release of those records and access to those records. This Act is also known as the Buckley Amendment.

The Act gives four basic rights to students:

• the right to review their education records;
• the right to seek to amend their education records;
• the right to limit disclosure of personally identifiable information (directory information);
• and the right to notify the Department of Education concerning an academic institution’s failure to comply with FERPA regulations.

FERPA provides for confidentiality of student records; however, it also provides for basic identification of people at the University of Tennessee without the consent of the individual. Release of information to third parties includes directory information, such as contained in the campus telephone book, in the online web-based people directory and in sports brochures. Students are notified of their FERPA rights and the procedures for limiting disclosure of directory information in Hilltopics, at Orientation for new students, and on the Web site of the University Registrar, registrar.tennessee.edu.
Diversity Programs

Office of Diversity Programs
Mr. Travis Griffin, Director
301 Perkins Hall, Knoxville, TN 37996-2360
Telephone: 865-974-1931
www.engr.utk.edu/diversity

Tennessee Louis Stokes Alliance for Minority Participation (TLSAMP)

Tennessee State University, LeMoyne-Owen College, Middle Tennessee State University, University of Memphis, University of Tennessee and Vanderbilt University partnered to form the Tennessee Louis Stokes Alliance for Minority Participation (TLSAMP). The goal of the TLSAMP program is to increase the number of under-represented minority students studying and graduating in Science, Technology, Engineering and Math (STEM).

The objectives to support the goal of the alliance are to:

• Recruit under-represented minority students to pursue science or engineering as a career;
• Improve the quality of the learning environment for under-represented minority science and engineering students at all schools; and
• Ensure that a large number of undergraduate students are prepared to enter graduate school.

Programs/Services

• TLSAMP Seminars
• Collaborative Learning
• Drop-In Center
• Graduate School Preparations

Retention Efforts

• Financial Assistance
• Tutorial Programs/Services
• Strategies for Basic Skills Courses

National GEM Consortium

The University of Tennessee is a proud member of the National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (GEM). The mission of GEM is to attract a pool of African American, Hispanic American and American Indian talent to careers in the fields of Science, Technology, Engineering and Mathematics (STEM) by promoting the attainment of advanced degrees.

Each year, GEM identifies and recruits more than 1,000 undergraduate students, graduate students and working professionals from these underrepresented groups for admission to advanced degree programs at the nation’s top universities. GEM provides graduate students with much-needed financial support that is often the deciding factor in pursuing graduate education through three graduate fellowship tracks:

• Master of Science in Engineering
• PhD in Science
• PhD in Engineering
Cooperative Education / Career Development

Engineering Professional Practice
Todd Reeves, Director
110 Perkins Hall, Knoxville TN 37996-2030
Telephone: 865-974-5323
www.coop.utk.edu

Cooperative Education (Co-op) Program
Students have the opportunity to gain real world experience in their engineering field of study by working at least three semesters with the same employer before they graduate.

Typically a co-op student will alternate between semesters of work and school during their sophomore and junior years. The exact co-op rotation plan is created by the student in coordination with the Engineering Professional Practice office and the needs of their particular co-op employer.

Most students find that co-op adds no more than three to six months of calendar time to their total undergraduate experience.

Internship Program and Benefits
The internship program differs from co-op in that the students will only work one or two assignments typically with different employers. The work terms are usually in the summer. While students can still gain valuable engineering experience with multiple employers, the internships typically provide a sub-set of the total experience students obtain in the co-op program.

Co-op and Internship Program Requirements
To participate fully in the Engineering Professional Practice program, students should register with our office during the first semester of their freshman year. They will then have an opportunity to go through an in-depth advisement process, learn the steps to a successful job search, and be prepared to participate in our Engineering Fairs for co-op and internship opportunities.

Before students go on their first assignment, they must complete 30 hours of course work and be in good academic standing though the specific GPA requirements will vary depending on the needs of the employers.

Center for Career Development
located on the top floor of the Student Union, is a university-wide department designed to help students explore majors and related career fields, plan and implement career goals, prepare for a job search, conduct on-campus interviews, and identify additional employment opportunities and resources.

Services for Engineering students include:

Career Planning
• Research majors and careers on the Career Development website and in the Career Development Resource Center
• Find out “What I Can Do With This Major” – information on majors and careers throughout the college
• Take career assessments to assist with career exploration and career planning
• Meet with a Career Counselor to discuss your options or register for Exploring Majors and Careers, a one-credit course with a focus on choosing a major and learning about what’s available at UT

Career Resources
• Career Resource Center: review a collection of career books, periodicals, pamphlets, and videotapes with information on careers, job search skills, employment opportunities, and salary ranges
• Career Website: a variety of valuable career articles, resume and cover letter samples and links to hundreds of other career-related Internet resources
• Workshops: held each semester on resume writing, cover letters, job fair success, interviewing, etiquette, company visit/second interview, graduate school, and other career topics
• Resume Critiques: resumes can be dropped off for overnight critiques at the Career Development offices or students can drop-by for a personalized review Monday-Thursday from 3 p.m.-5 p.m. during Fall and Spring Semester
• Part-Time Employment Listings/Consultant: information on part-time positions for students
• Disability Careers Office: assists students with disabilities with career planning services and guidance
• HIRE-A-VOL at career.utk.edu: online job and resume database listing employment opportunities for part-time, summer, internships, and full-time for UT students and alumni
• EF 301: Engineering Career Planning Placement—a one-hour Pass/Fail course designed to equip Juniors and Seniors with the right tools to land a great full-time job after graduation

Career Events
• Annual Job Fairs: career fair opportunities to speak informally with representatives from hundreds of organizations about part-time and summer jobs, internships, and full-time positions
• On-Campus Recruiting/Interviewing: approximately 300 organizations conduct over 6,000 interviews annually at UT through Career Development
• Information Sessions: conducted by employers throughout the year on opportunities within their organizations
• Special Engineering Career Events: Watch for these each semester!

www.career.utk.edu

College of Engineering Career Consultant: Schedule an appointment with April Gonzalez or Kertesha Riley, who work directly with engineering students, faculty and employers, by calling 865-974-5435 or e-mailing agonza16@utk.edu or kriley6@utk.edu. Students are encouraged to visit with Career Development by the end of their junior year to be ready for employment recruiting opportunities in their senior year.
The University of Tennessee has embarked on an ambitious plan to help students gain the international and intercultural knowledge they need to succeed in today’s world. Engineering, like all professions, is becoming very globally oriented. It is important for you to take advantage of opportunities while you are a student in order to be Ready for the World. Apply for your passport now—the world awaits!

**UT Programs Abroad Office (PAO)**

**Contact:**
Center for International Education Programs Abroad Office  
1620 Melrose Avenue, Knoxville, TN 37996-3531  
Phone: 865-974-3177  
Fax: 865-974-2985  
Email: studyabroad@utk.edu

The “PAO” provides students with information about their options for overseas study, research, work, volunteer projects, and travel. The PAO administers most of UTs international one-for-one student exchange programs, including ISEP. Attend an information session at the Programs Abroad Office (1620 Melrose Hall). Information sessions are held at 2:00 pm every Monday-Friday during the academic year. During the general information session, we discuss the programs available to you, what to look for in a program, how to use the resource center, using financial aid, transferring credits, programs requirements, and will answer your questions. If you are unable to attend an information session due to a conflict at 2:00 pm, please contact our office and we will be glad to schedule an appointment for you (865-974-3177 or studyabroad@utk.edu).

**Study Abroad for Engineering Students**

Engineering study abroad programs allow you to stay one semester or shorter in an English speaking or foreign language-based schools throughout the world. You can choose between individual trips or pre-arranged trips, where you would live and travel with a small group of UT students. Prior to applying for an Engineering Study Abroad Program, you should schedule an advising session at the College of Engineering Advising Office. You are eligible to apply for the Study Abroad Program after freshman year or after the first semester at UT, if you are a transfer student. Most programs require a minimum 2.5 to 2.75 GPA. For non-English language programs, it is required that you have minimum 4 semesters of equivalent foreign language (faculty-led programs are exceptions).

UT Study Abroad programs include 5 types of programs: UT faculty-led, Exchange, Direct, Third Party, and Academic Internships.

**Engineering Study Abroad Fellowship**

The College of Engineering offers competitive fellowships for students studying abroad. Students may apply for these competitive fellowships in the Engineering Outreach Office, located in 308 Perkins Hall.

**Engineering Outreach Office**

The Office of Engineering Outreach’s mission is to work with organizations across campus, throughout the community, and around the world to develop these “powerful learning opportunities” for engineering students. Through specialized coursework, opportunities to teach younger students, opportunities to be mentored by professionals, and study abroad, the outreach office seeks the continual development of our students’ sense of “engineering in the world.”

Emphasis is also placed on student interaction with the next generation of potential engineering students, promoting their abilities as problem solvers and involved citizens.

**Contact:**
Judith Mallory, International Coordinator  
Engineering Academic and Student Affairs  
59 Perkins Hall  
Phone: 865-974-9234  
E-mail: jmallory@utk.edu  
Web: www.engr.utk.edu/global

**Global Engineering Initiatives**

The College of Engineering offers the opportunity for insight-abroad experiences for students for periods of a week to ten days, scheduled during school breaks. This enables the engineering major to have a short abroad experience without interrupting classes or delaying graduation.

The flagship program for this initiative is the Engineering Alternative Spring Break, an annual trip to a foreign location to participate in an engineering project of local impact. On trips during other times of the year, engineering students may participate in a field-relevant service project in a foreign location, see engineers at work outside of the United States, or observe engineering applications and methods employed abroad. This may happen through a visit to an engineering university, lectures on specific engineering challenges, tour of a plant or manufacturing facility, or observations of pertinent engineering developments in locations overseas. Students will also visit sites of cultural and historic significance.

Although these programs are not credit-bearing, they satisfy the Honors’ “Ready for the World” requirement and are a significant addition to a resume. A limited number of scholarships are offered to defray travel costs.

**Contact:**
Judith Mallory, International Coordinator  
Engineering Academic and Student Affairs  
59 Perkins Hall  
Phone: 865-974-9234  
E-mail: jmallory@utk.edu  
Web: www.engr.utk.edu/global
Grades, Credit Hours, and Grade Point Average

The basic unit of credit at UT Knoxville is the semester hour. This normally represents one hour of lecture or recitation or two hours of laboratory work per week. Each course at the university carries a number of credit hours specified in the course description. At the completion of each course, a student will be assigned a grade reflecting the student’s performance in the course. Passing grades carry a certain number of quality points per credit hour in the course. A student's grade point average is obtained by dividing the number of quality points the student has accumulated at UT Knoxville by the number of hours the student has attempted at UT Knoxville, not including hours for which grades of I, NC, NR, P, S and W have been received.

Undergraduate Grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Performance Level</th>
<th>Quality Points Per Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Superior</td>
<td>4.00</td>
</tr>
<tr>
<td>A-</td>
<td>Intermediate Grade</td>
<td>3.70</td>
</tr>
<tr>
<td>B+</td>
<td>Very Good</td>
<td>3.30</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
<td>3.00</td>
</tr>
<tr>
<td>B-</td>
<td>Intermediate Grade</td>
<td>2.70</td>
</tr>
<tr>
<td>C+</td>
<td>Fair</td>
<td>2.30</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
<td>2.00</td>
</tr>
<tr>
<td>C-</td>
<td>Unsatisfactory</td>
<td>1.70</td>
</tr>
<tr>
<td>D+</td>
<td>Unsatisfactory</td>
<td>1.30</td>
</tr>
<tr>
<td>D</td>
<td>Unsatisfactory</td>
<td>1.00</td>
</tr>
<tr>
<td>D-</td>
<td>Unsatisfactory</td>
<td>.70</td>
</tr>
<tr>
<td>F</td>
<td>Failure</td>
<td>0.00</td>
</tr>
</tbody>
</table>

First Year Composition


International Students

Entering international students whose native language is not English are placed in English courses based on TOEFL scores. Advisors will assist students with English class placement.

ABC/No Credit Grading Scheme

This grading system does not include a grade for failure; instead, you receive an A, B, C, or NC (for “no credit”), depending on your performance in the course. The NC grade does not affect your GPA; it merely indicates that you need to re-enroll in the course for continued practice before moving to the next level.

Changes in Registration

Undergraduate students may add courses through the tenth calendar day counted from the beginning of classes fall and spring terms. Because of the nature of some courses, permission of the department head may be required to add a course after classes begin. Students may also, as departmental policies permit, change a section of a course through the add deadline.

Students may drop courses until the tenth calendar day from the start of classes with no notation on the academic record for full term courses in fall and spring.

From the eleventh day until the eighty-fourth calendar day, students may drop courses and will receive the notation of W (Withdrawn) for full term courses in fall and spring. Following are additional regulations related to dropping classes after the tenth day:

- Students are allowed four drops during their academic career (until a bachelor’s degree is earned).
- Students holding a bachelor’s degree who return to pursue a second bachelor’s degree are allowed four additional drops.
- Students pursuing more than one major or degree simultaneously are not allowed additional drops.
- The W grade is not computed in the grade point average.
- After the 84th day, no drops are permitted.
- Courses may be dropped on the web (myutk.utk.edu).

Failure to attend a course is not an official withdrawal and will result in the assignment of an F grade.

The periods for add, drop, change of grading for sessions within the full term, summer, and mini term are determined based on a percentage of the equivalent deadline for the full term. See Timetable of Classes each term for exact dates on the MyUTK website at myutk.utk.edu. Deadline dates may be adjusted if the deadline falls on a holiday, weekend day or spring recess.

\[
W = \bar{r} \cdot \bar{v} \\
P = \bar{r} \cdot \bar{w} \\
KE = \frac{1}{2} I \omega^2
\]
Grades that do not Influence Grade Point Average

The following grades carry no quality points and hours for which these grades are earned are not counted in computing a student’s grade point average.

- **NC** (No Credit) indicates failure to complete a course satisfactorily when taken on an S/NC basis.
- **S** (Satisfactory) is assigned for C or better work when a course is taken on an S/NC grading basis.
- **W** (Withdrawal) is assigned in courses when a student has officially withdrawn from the university. W is also assigned in courses when a student withdraws from a course between the 11th and 84th calendar day of classes. Regulations concerning withdrawal from courses or from the university appear under Changes in Registration.

Satisfactory/No Credit Grading System

The purpose of this system is to encourage the student to venture beyond the limits of those courses in which the student usually does well and, motivated by intellectual curiosity, explore subject matter in which performance may be somewhat less outstanding than work in other subjects. To this end, Satisfactory/No Credit (S/NC) grading has been developed for undergraduate courses (100-, 200-, 300 and 400-level courses).

- Neither grade is counted in a student’s grade point average, but, like all other grades, is entered on the permanent record.
- S is given for C or better work on the traditional grading scale and NC is given for grades of C-, D+, D, D- and F.
- The student only receives credit in the course if an S is received.
- A student may not repeat a course for S/NC if the student received a conventional grade (A, A-, B+, B, B-, C+, C, C-, D+, D, D- and F).
- If the student elects non-conventional grading, grades of A-, B+, B, B-, C+, C, C-, D+, D, D- or F as NC.
- The grade of I for incomplete work will be recorded as an SI, which will not be computed in the average.
- A student is permitted to change the system of grading in a course through the add deadline.
- The changing of an S/NC grade to a conventional letter grade or vice versa is not permitted unless an error is determined by the Office of the University Registrar.

Repeating Courses

General Repeat Policy

Students who are struggling with a class should talk with their advisor before deciding whether to withdraw from and/or plan to repeat a class.

- Courses may be repeated twice, for a total of three attempts per course.
- A grade of W does not count as one of the three attempts.
- Grades of C-, D+, D, D-, F, Incomplete, and NC are counted as one of the three attempts.
- No course may be repeated if a grade of C or better has already been earned.
- Each repeated course is counted only once in determining credit hours presented for graduation.
- With limited exceptions (see Grade Replacement Policy), all grades earned in repeated courses will count in calculating the GPA.
- Exceptions to the number of times a course may be repeated will be allowed only with prior written permission from the head of the department where the course is being offered and the student’s college dean or designee.

Grade Replacement Policy for Three Lower Division (100-200 Level) Courses

- The first three lower-division (100-200 level) course grades may be replaced when a course is repeated. All other grades will be included in computing the cumulative grade point average.
- If the same course is repeated more than once, the additional repeat(s) will count toward the grade replacement total.
- Repeating a course in which an NC or a W grade has been earned does not count as one of the three grade replacements.
- The grade earned during the final attempt will be used in computing the cumulative GPA.
- All grades for all courses remain on the transcript.
- Transfer course grades cannot be replaced (see Transfer Admission policy).

One Stop Shop

Hodges Library Ground Floor
Knoxville, TN 37996-0200
Phone 865-974-1111
onestop@utk.edu
Aerospace Engineering  
mabe.utk.edu

What is Aerospace Engineering?
Aerospace engineering uses the basic sciences and mathematics to develop the foundation for the design, development, production, testing and applied research associated with aerospace vehicles. These vehicles include aircraft, spacecraft and missiles. Auxiliary and propulsion systems are also an integral part of this education. These include guidance, control, environmental, ramjet, rocket, turbojet, turbo-fan and piston engine/propeller systems. The educational objectives of the aerospace engineering program are:

- to provide an education that includes in-depth fundamental instruction in aerodynamics, structures, flight mechanics, orbital mechanics, flight propulsion and the design of aerospace systems;
- to prepare students for professional careers in aerospace engineering by developing the skills pertinent to problem solving, analysis, design and those personal skills required for teamwork and effective communication;

Biomedical Engineering  
mabe.utk.edu

What is Biomedical Engineering?
Biomedical engineering is the application of engineering principles and methods to the solution of problems in the life sciences. This broad field spans applications at the molecular level (genetic engineering); at the cellular level (e.g., cell and tissue engineering); and in intact organisms, including humans in particular. Mature practice areas include the design of biomedical measurement systems (e.g., intensive care monitoring stations); orthopedic devices (e.g., artificial joints); and artificial organs (e.g., artificial kidneys). Currently, there is much attention being given to computational biosciences, advanced medical imaging systems and advanced artificial organs (e.g., heart-assist and total artificial heart blood pumps, artificial livers). Among the most exciting new areas of biomedical engineering research is the newly defined discipline of cell and tissue engineering, which involves the modification of living cells and tissues to meet specific clinical needs (e.g., artificial skin).

In their professional roles, biomedical engineers must be knowledgeable in both the life sciences and the engineering sciences. In many career roles, biomedical engineers serve an intermediary role in bridging the gap between classically trained engineers and medical practitioners. Basic life science preparation includes the study of cell biology and human anatomy and physiology. The engineering preparation includes basic mechanics, electrical and electronic circuits, materials science, thermodynamics and fluid mechanics. Required mathematics include calculus, differential equations, matrix methods and statistics. The educational objectives of the biomedical engineering program are:

- to provide students with a solid foundation in mathematics, the basic and engineering sciences and engineering design methods;
- to provide students with a comprehensive integration of engineering methods of problem-solving and design with the biological sciences;
- to develop the skills needed for work in the medical device industry, including a thorough coverage of engineering materials, biomaterials, biomechanics, medical device design and work in interdisciplinary teams;
- to provide essential laboratory experience with commonly used biomedical devices and systems and to provide coverage of methods for the design of experiments in medical and life science applications.

The university’s engineering programs are fully accredited by the ABET Engineering Accreditation Program.

Career Opportunities in Aerospace Engineering
The demand for air transportation is projected to increase many-fold early this century. Our renewed quest in space will accelerate as full realization is made of spin-off benefits to society. These endeavors will increase employment opportunities for aerospace engineers in the future. Graduates at UT are actively sought by industry and government aerospace organizations nationwide. Major employers such as Boeing, Pratt and Whitney, NASA, General Electric, Honeywell, Lockheed-Martin, ATK and Arnold Engineering Development Center (which houses the largest wind tunnel test facilities in the world, located in Tullahoma, Tennessee) actively recruit our students. Many of our B.S. students chose to continue their education at graduate school.

Career Opportunities in Biomedical Engineering
Biomedical engineers work in a variety of settings including the biomedical product manufacturing industry, biomedical research and development organizations, hospitals (as clinical engineers), for governmental agencies (e.g., FDA, NASA, DOD), and in biomedical product technical sales. Work in many of the more challenging technical areas (e.g., cell and tissue engineering) requires an advanced degree.
Chemical and Biomolecular Engineering

www.engr.utk.edu/cbe

What is Chemical and Biomolecular Engineering?

Chemical and Biomolecular engineering deals with developing industrial processes and systems used to manufacture products that require chemicals. Chemical and Biomolecular engineers play a very important role in the production of items we use every day such as foods, medicines, fuels and clothing. Some examples of chemical engineering include developing improved food processing techniques, producing medicines more affordably in large quantities, finding more efficient ways to refine petroleum, and constructing fibers that make clothing more comfortable and resistant to stains.

As a chemical and biomolecular engineering student at UT, you will learn how to design processes and equipment for reacting chemicals that will improve the way many items critical to today’s modern society are created. You will study the concepts of heat transfer, mass transfer, kinetics, and fluid flow to solve problems that may lead to the development of new medications, computing devices, fuels, plastics, and polymers vital to enhancing the quality of life around the globe.

The objectives of the chemical and biomolecular engineering degree program are:

• Graduates of the UT chemical and biomolecular engineering program who enter professional practice will demonstrate a high level of technical competence, along with career progression toward positions of technical or managerial leadership.

• Graduates of the UT chemical and biomolecular engineering program who pursue full-time graduate or advanced professional study will complete their programs of study successfully.

• Graduates of the UT chemical and biomolecular engineering program will continue their professional growth through lifelong learning.

The university’s engineering programs are fully accredited by the ABET Engineering Accreditation Program.

Career Opportunities in Chemical and Biomolecular Engineering

As a graduate of the chemical and biomolecular engineering program, you will be able to pursue a career in many different areas such as pharmaceuticals, textiles, electronics, energy and biotechnology. Chemical and biomolecular engineers can be found anywhere, from large manufacturing plants to small medical research laboratories. Many of our students also choose to continue their education at graduate or medical school.
Civil and Environmental Engineering

What is Civil and Environmental Engineering?

Civil engineering is about the basic infrastructure of society and community service, development and improvement—the planning, design, construction, and operation of facilities essential to modern life and economic vitality.

An established department at the University of Tennessee, Knoxville, Civil and Environmental Engineering dates back to the mid-1800s, making it one of the oldest programs in the Southeast.

The Civil and Environmental Engineering Department (CEE) offers proficiency in environmental and water resources engineering, geotechnical and structural engineering, construction, and transportation engineering leading to a Bachelor of Science in Civil Engineering. In addition, the College of Engineering offers an undergraduate minor in environmental engineering.

Academic units and areas of research include the following: transportation systems planning and design; transportation safety; traffic operations; transportation air quality; investment and financial analysis; bridge testing and evaluation; testing of masonry in-fills; lateral load test of driven piles; testing, behavior and modeling of highway materials; stability of slopes, embankments and tunnels; non-destructive evaluation of pavement systems; railroad engineering; risk assessment; automated highway systems; intelligent vehicle systems; GPS/GIS applications; air pollution control technologies; air pollution dispersion modeling; climate change and environment and associated impact on infrastructure; water and waste water treatment; hazardous waste management; environmental restoration; mixed and radioactive waste management; bioremediation; aquatic chemistry; fate and transport of contaminants; surface and ground water hydrology; erosion and sediment transport; soil and geosynthetic hydraulic barriers; remediation of mines and characteristic of fractures in soil and rock.

Consistent with the mission of the Department of Civil and Environmental Engineering at The University of Tennessee, graduates of the program will have:

1. Technical competency to conduct engineering projects and to advance with increasing responsibility.

2. Professional competency to continually increase engineering proficiency, proceed on a track to attain professional licensure, and contribute to the profession and community.

The university's engineering programs are fully accredited by the ABET Engineering Accreditation Program.

Career Opportunities in Civil and Environmental Engineering

Civil engineers are found throughout the workplace in a variety of functions. Aside from private engineering firms that are responsible for contracted projects from start to finish, civil engineers work for utility companies, telecommunications businesses, consulting firms and even toy and athletic equipment manufacturers. There are a large number of civil engineers who work in federal, state and local governments, working each day to serve the public in thousands of projects nationwide. Civil engineers also work in academic fields through teaching, research, evaluation and publishing, generating much of the current information available today.

In their first job, most civil engineers are teamed with a senior engineer. They are guided through a variety of assignments, depending on the civil engineering specialty area. Later, job responsibility increases with continuing education and experience. During this process many engineers seek professional licensure that requires a depth of knowledge and skills essential to success in the field.

Civil engineers usually work for one of the following employer types (in approximate order of employed engineers): government (every city, county, state and federal operation); consulting firms (all sizes); construction companies; industry (e.g., petroleum, utilities, aircraft, chemical, paper, shipbuilding); international firms (may involve the categories above).
Career Information
What can I do with this engineering major?

Computer Engineering
www.eecs.utk.edu

What is Computer Engineering?
Computer engineering deals with the electronic hardware side of electrical engineering and the programming side of computer science. Often, a student can study electrical engineering to cultivate a background in computer engineering. However, with the increasing needs of both industry and technology that drive our future, computer engineering has now become a discipline by itself. Typically, a computer engineering curriculum provides a background in three broad areas—hardware, software, and hardware-software integration. Students will also have the opportunity to explore fundamental topics such as microprocessors, computer architecture, digital signal processing, operating systems, data communications, and other related material. In addition, the program includes core engineering subjects that are common to all engineering disciplines.

The program educational objectives of the computer engineering program include:

• Will apply the knowledge of the fundamentals of engineering, science and mathematics in the practice of electrical/computer engineering or in advanced professional studies; will identify, formulate and solve electrical/computer engineering problems.

• Will analyze and design complex devices and systems containing hardware and software components with consideration of economic, ethical, safety, environmental, and social issues; will be able to use modern engineering techniques, skills and tools.

• Will communicate effectively, function on multi-disciplinary teams, and engage in lifelong learning.

The university’s engineering programs are fully accredited by the ABET Engineering Accreditation Program.

Career Opportunities in Computer Engineering
Computer hardware engineers are expected to have favorable job opportunities. Employment of computer hardware engineers is projected to increase faster than the average for all occupations, reflecting rapid employment growth in the computer and office equipment industry, which employs the greatest number of computer engineers. Consulting opportunities for computer hardware engineers should grow as businesses need help managing, upgrading and customizing increasingly complex systems. Growth in embedded systems, a technology that uses computers to control other devices such as appliances or cell phones, also will increase the demand for computer hardware engineers.

Computer Science
www.eecs.utk.edu

What is Computer Science?
At one pole is computer science, primarily concerned with theory, design, and implementation of software. It is a true engineering discipline, even though the product is as intangible as a computer program. At the other pole is computer engineering, primarily concerned with firmware (the microcode that controls processors) and hardware (the processors themselves, as well as entire computers). It is not possible to draw a clear line between the two disciplines; many practitioners function to at least some extent as both computer engineers and computer scientists.

Computer Science is the study of software and hardware systems, and theory of computation. Students must be able to integrate material and concepts from these areas. So, for example, students use analysis of algorithms to select or design software to solve a problem on a computer with parallel architecture. Another example would be selecting or writing the software for a network router, combining optimization theory, graph algorithms, networking, knowledge of the hardware and professional software methods. The emphasis is on foundations and the ability to learn new developments in the field.

Career Opportunities in Computer Science
Career Opportunities in many fields exist for our graduates. Most generally, they are prepared to work in laboratories that develop software intensive products. These include, for example, automotive components, financial systems, consumer appliances (cell phones, personal computers), communication infrastructure devices (routers, switches), scientific research facilities (space stations, telescopes, reactors) and weapon systems.
Electrical Engineering

www.eecs.utk.edu

What is Electrical Engineering?

Electrical engineering deals with the application of the physical laws governing charged particles. From miniature integrated circuits that contain millions of microelectronic devices, to high-speed fiber-optic communication systems that span international boundaries, electrical engineering impacts every aspect of modern-day living. Electrical engineering is unique among the engineering disciplines because of its wide range of applications. Subject areas within electrical engineering are so diverse that it is not always apparent that there is an underlying connection. The range of subjects is not only broad but is also expanding.

The program educational objectives of the electrical engineering program include:
• Will apply the knowledge of the fundamentals of engineering, science and mathematics in the practice of electrical/computer engineering or in advanced professional studies; will identify, formulate and solve electrical/computer engineering problems.
• Electrical engineering deals with the application of the physical laws governing charged particles. From miniature integrated circuits that contain millions of microelectronic devices, to high-speed fiber-optic communication systems that span international boundaries, electrical engineering impacts every aspect of modern-day living. Electrical engineering is unique among the engineering disciplines because of its wide range of applications. Subject areas within electrical engineering are so diverse that it is not always apparent that there is an underlying connection. The range of subjects is not only broad but is also expanding.

Industrial Engineering

ise.utk.edu

What is Industrial Engineering?

Originally, the industrial engineering profession focused on manufacturing. Today’s industrial engineer is involved in the design of systems and processes to produce and deliver goods and services not only in manufacturing, but also in the service industries and government sectors of the economy. Industrial engineers are concerned with the design of integrated systems involving people, materials, facilities, finances, equipment, and energy to ensure the overall system functions efficiently and human needs are adequately met. Industrial engineering is distinctive in two respects: The industrial engineer typically works on problems or systems which include human beings as a major variable; and the industrial engineer is by definition a systems engineer, whose unique combination of skills can be applied to many working environments.

It is this emphasis on people, science and technology that distinguishes industrial engineering from the other engineering disciplines. The industrial engineer’s objective is to achieve the best possible results for the benefit of humankind, in terms of safety, quality and productivity. Industrial engineers create value through a total systems approach, scientific method, engineering design, and integration of new technologies. In common with all engineering disciplines, industrial engineering is based on mathematics and the physical sciences. However, industrial engineering also emphasizes the life sciences and social sciences. This concern for the human element leads to system designs that enhance the quality of life for all people, both as producers and consumers of products and services.

Students in the Industrial Engineering program can also gain hands-on experience and forge beneficial relationships with industry, business, and agencies through the College’s cooperative engineering program or internships. The department’s faculty is also very active in research and offers opportunities for students to get involved working with various research centers on campus.

The educational objectives of the Industrial Engineering Program are to prepare our students to:
• have successful professional careers that employ industrial and systems engineering concepts and principles,
• pursue life-long learning,
• achieve positions of leadership.

The university’s engineering programs are fully accredited by the ABET Engineering Accreditation Program.

Career Opportunities in Industrial Engineering

Industrial engineers have an almost unlimited range of career fields available, including retail distribution, banking, health-care delivery, corporate management, consulting firms, aerospace systems, research groups, government and military agencies as well as manufacturing. In all areas of manufacturing, service and government, there is increasing emphasis on the goal of improving quality and productivity. Industrial engineers work closely with the top management in these sectors to achieve this goal. IE’s command very competitive salaries in a strong market that is expected to grow by 20% over the next decade – the third strongest growth of the fifteen engineering disciplines. IE’s also rank very high in job satisfaction surveys.
Career Information
What can I do with this engineering major?

Materials Science & Engineering
www.engr.utk.edu/mse

What is Materials Science and Engineering?
Materials Science and Engineering (MSE) is a discipline that is on the leading edge of technology through the development of new materials and the improvement of existing materials for applications in all engineering fields. It is at the forefront of modern technological advances and its graduates are in great demand.

Materials engineers can be found working in all technological fields, usually as part of a multidisciplinary team. For this reason, materials engineers receive a broad engineering education that includes design, mechanics, chemistry, physics, mathematics and electronics. The processing and testing of materials are core subjects in the MSE curriculum that stresses “hands-on” learning through laboratory classes that introduce students to modern processing and characterization techniques.

Modern engineering materials are used in a broad spectrum of products, including automobiles, aircraft and spacecraft, jet and rocket engines, surgical implant devices, computers, cell phones, optical displays, textiles and sports equipment. The types of engineering materials include metals and alloys, polymers and plastics, ceramics, semiconductors, and composites.

The department has one of the lowest student-faculty ratios (about 4:1) in the College of Engineering. This allows MSE students to receive a great deal of individual interaction with the faculty, especially in laboratory courses. The educational objectives of the program for the degree of B.S. in Materials Science and Engineering are:

• to provide students with a knowledge of the fundamentals of appropriate physical and chemical sciences, mathematics and engineering sciences; and to demonstrate the applications of these principles to solve engineering problems with emphases on materials processing, structure, properties and performance. This knowledge base includes the development of analytical and experimental skills.

• to provide students with experiences in design and materials selection such that they can design components, systems or processes with consideration of economic, safety, environmental and social issues.

• to develop professional skills in such areas as written and oral communications, problem solving and working in diverse teams, that prepare graduates to practice materials engineering in contemporary and global environments.

• to provide students with a general education component that complements the technical content, encourages the appreciation of cultural and social values, exhibits the impact of engineering solutions on society, and enhances personal development.

The university’s engineering programs are fully accredited by the ABET Engineering Accreditation Program. Career Opportunities in Materials Science and Engineering Graduates with a Bachelor of Science (B.S.) degree in Materials Science and Engineering receive employment offers from a wide range of industries both in Tennessee and nationwide. MSE graduates can be found working in many different capacities, including basic and applied research, product and process development, manufacturing, quality control, material selection and failure analysis. Materials science graduates frequently opt to continue their education through graduate school for Master of Science and Ph.D. degrees.

\[
U = N\left(\frac{1}{2}m\langle v^2\rangle\right) \\
U = \frac{3}{2} nRT \\
v_{mn} = \sqrt{\frac{3RT}{M}} = \sqrt{\frac{3kT}{m}}
\]
What is Mechanical Engineering?

Mechanical engineering is the application of the laws of solid and fluid mechanics and the thermal sciences to the analysis, design and/or manufacturing of systems and products. Mechanical engineers play a key role in national, state and local economies by bringing their expertise to the development of power generation systems (such as steam turbines, jet engines and internal combustion engines) that provide mechanical power to all segments of society. They also bring essential expertise to manufacturing processes, efficient production methods and automation vital to the well being of the national economy. Their expertise and involvement in the analysis, design and development of new products and materials for new devices and systems produce economic activity and provide employment opportunities which sustain high standards of living.

The mechanical engineering program at UT offers fundamental education in the engineering sciences and engineering design. The engineering science component educates students in the fundamental principles of engineering, while the engineering design component emphasizes design methodology, enhances creative skills and develops student ability to solve open-ended problems of the type common to industry.

The undergraduate experience is broad-based and includes, in the first two years, general education in mathematics, sciences and preliminary design courses that are common with curricula in other engineering programs. The discipline of a rigorous technical program along with education in the humanities and social sciences provides a good foundation for a rich and rewarding career in a dynamic marketplace.

The objectives of the mechanical engineering degree program are:

- to prepare students for professional careers by developing their skills in problem formulation, problem solving, analysis, computation, synthesis, teamwork and effective communication
- to teach students the underlying principles of mechanical and thermal systems and the application of these principles in the design process
- to instill in students an appreciation for the importance of lifelong learning, individual professionalism and ethical practice
- to prepare capable students for graduate study at major universities

Career Opportunities in Mechanical Engineering

Because of the broad-based education received in mechanical engineering, mechanical engineers play a vital role in a wide variety of industries (e.g., aerospace, automotive, electronics, power utilities, chemical, petroleum, textile, manufacturing); federal agencies (e.g., NASA, DOE, DOD, FAA); and consulting firms and national laboratories (e.g., ORNL, SANDIA). In these different sectors, mechanical engineers are involved in analysis and design of systems and products; manufacturing, automation and control of production and processes; heating, ventilation, and air conditioning systems; and research. Mechanical engineers are also found at every level of management.

Mechanical engineers have been and will continue to be in great demand in all of the areas listed above.
**Career Information**
**What can I do with this engineering major?**

**Nuclear Engineering**
www.engr.utk.edu/nuclear

**What is Nuclear Engineering?**

Nuclear engineering is the engineering discipline that focuses on the application of sub-atomic processes for the benefit of mankind and our environment. Radiological engineering is a special concentration within nuclear engineering that deals with the design and safe utilization of radiation in industry and medicine. Some examples of nuclear and radiological engineering are listed below:

- Production of electric power with essentially no air pollution
- Processes for the diagnosis and treatment of diseases such as cancer
- Activation analysis for identifying materials including environmental pollutants
- Radiography inspection of welds in bridges and boilers
- Food preservation and sterilization of medical supplies
- Radioisotope gauges for use in manufacturing processes
- Nuclear measurement techniques for oil well logging and airport security
- Radioactive tracer elements for use in medical research
- Generation of radioisotope power for deep space exploration

The educational objectives for the department are to:

- provide students with fundamental knowledge in mathematics, computer science, the basic sciences and the engineering sciences that are necessary to solve complex problems in nuclear and radiological engineering;
- provide students with a real-world design and analysis experience in nuclear and radiological engineering that includes environmental, societal, safety and economic considerations;
- provide students with appropriate skills in oral and written communication, teamwork, laboratory work, problem solving and the use of modern engineering tools that will prepare them to work productively in a contemporary and global environment;
- provide students with a diverse general education in the humanities, ethics and social sciences to compliment their technological education in order to understand and appreciate the importance of each in society and in personal development; and
- foster a genuine desire for life-long learning in students.

**Career Opportunities in Nuclear Engineering**

Nuclear engineering is actually a very broad and diverse engineering discipline with graduates employed in a wide variety of fields including the electric utility industry (e.g., TVA, Duke Energy, Southern Nuclear Co., Entergy), private industry (e.g., General Electric, Westinghouse, Honeywell, Emerson), and government laboratories (e.g., DOE’s Oak Ridge National Laboratory and NASA’s Johnson Space Flight Center). Nuclear engineering graduates also work as medical physicists and radiation safety officers at hospitals and other health related facilities. The current job market for nuclear engineers is excellent and is expected to improve in the future.

\[
\begin{align*}
v_2 &= v_1 + a\Delta t \\
s_2 &= s_1 + \left( \frac{v_1 + v_2}{2} \right)\Delta t \\
s_2 &= s_1 + v_1\Delta t + \frac{1}{2}a\Delta t^2 \\
s_2 &= s_1 + \frac{v_2^2 - v_1^2}{2a}
\end{align*}
\]
### Engineering Majors

**http://catalog.utk.edu**

#### Aerospace Engineering Catalog 2016

<table>
<thead>
<tr>
<th>Term</th>
<th>Courses</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td></td>
<td><strong>Math 141 or 147 (4) FA, SP, SU</strong></td>
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<td></td>
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<tr>
<td></td>
<td><strong>EF 151 or 157 (4) FA, SP</strong></td>
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<td><strong>Math 142 or 148 (4) FA, SP, SU</strong></td>
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<td></td>
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<td></td>
<td><strong>Coreq- Math 142 or 148</strong></td>
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<td><strong>ME 202 (2) FA, SP, SU</strong></td>
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<td></td>
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<tr>
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<td><strong>English 102 (3) FA, SP, SU</strong></td>
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<tbody>
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<td></td>
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<td></td>
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<td><strong>Prereq- EF 152 or 158 AND ME 202 with C or better</strong></td>
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<td><strong>Math 231 (3) FA, SP, SU</strong></td>
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<td><strong>Prereq- AE 341</strong></td>
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<td><strong>ECE 301 (3) FA, SP, M</strong></td>
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<td><strong>Prereq- Math 231</strong></td>
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<td><strong>ME 391 or 397 (3) FA, SP, SU</strong></td>
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<td><strong>and EF 230</strong></td>
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<td><strong>AE 363 (3) SP</strong></td>
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<td><strong>Prereq- ME 321</strong></td>
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<td><strong>ME 363 or 367 (3) FA, SP, SU</strong></td>
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<td><strong>Coreq- ME 336/367 &amp; ECE 301</strong></td>
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<td><strong>ME 344 (3) FA, SP, SU</strong></td>
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<td></td>
<td><strong>Prereq- ME 331 and 391 or 397 and AE 341 or 347</strong></td>
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<tr>
<td></td>
<td><strong>AE 351 (3) SP</strong></td>
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<tr>
<td></td>
<td><strong>Prereq- AE 341/347 and ME 331</strong></td>
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<tr>
<th>Term</th>
<th>Courses</th>
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<tbody>
<tr>
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<tr>
<td></td>
<td><strong>AE 422 (3) FA</strong></td>
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<td></td>
<td><strong>AE 425 (3) FA</strong></td>
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<td><strong>Prereq- AE 351</strong></td>
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<td><strong>AE 424 (3) FA</strong></td>
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<td><strong>Prereq- AE 351</strong></td>
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<td><strong>Coreq- ME 344</strong></td>
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<td></td>
<td><strong>AE 426 (3) FA</strong></td>
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<td><strong>Prereq- AE 351, 370/377, 363</strong></td>
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<td><strong>Coreq- ME 344</strong></td>
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<td><strong>Coreq- AE 426 and Senior</strong></td>
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<td></td>
<td><strong>ME courses below</strong></td>
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</table>

| Spring     | **15 hours**                                                            |
|            | **AE 459 (3) SP (WC)**                                                  |
|            | **Prereq- AE 345, 351, and 425**                                        |
|            | **Gen Ed (3) FA, SP, SU**                                               |
|            | **Cultures and Civilizations**                                          |
|            | **Gen Ed (3) FA, SP, SU**                                               |
|            | **Cultures & Civilizations**                                            |
|            | **AE 429 (3) SP**                                                       |
|            | **Prereq- AE 426, 422, and 425**                                        |
|            | **Departmental Elective (3)**                                           |
|            | **ME courses below**                                                   |

#### Departmental Electives

- Choose from: ME 315, 365, 366, 405, 451, 463, 466, 470, 472, 475 or 477, 476, 480. Other courses require prior approval by the department.

### Full Status Progression

A lower-division student may apply for progression to upper division after completing EF 152/158 CHEM 120/128, MATH 231, ME 202, ME 231 and ME 321 with a grade of C or better in each, and an overall GPA of at least 2.4. Students who have not satisfied the requirements for full status will be dropped from departmental class rolls in upper division courses.

### Provisional Status Progression

Students who have completed EF 152/158, CHEM 120/128, MATH 231, ME 202, ME 231 and ME 321 with a grade of C or better and have an overall GPA between 2.0 and 2.4 may apply for provisional status. The granting of provisional status is based on the availability of space in departmental programs after full status students have been accommodated. Provisional status students are required to demonstrate their ability to perform satisfactorily in upper-division by attaining a minimum GPA of 2.0 in the first 12 hours of 300-level required engineering courses. Award of upper-division full status is dependent upon this performance. Students with an overall GPA less than 2.0 will not be admitted to upper-division. Students who have not progressed to upper-division will be dropped from departmental class rolls.

### Transfer Students

Students transferring more than 26 hours from another institution are considered transfer students. Transfer students must meet the same criteria as non-transfer students, using transfer grades for acceptable substitutions. Transfer courses with grades below a C will not be accepted to fulfill any degree requirements.

### Departmental Academic Standing

The faculty of the Department of Mechanical, Aerospace and Biomedical Engineering expect all students who enter to make progress toward graduation. To graduate from the department, a student must earn a minimum grade point average of 2.0 in all departmental courses counted toward the degree. Students not meeting the required departmental GPA may be dropped from their major. In addition, the University Academic Good Standing Policies apply to all students.

### AE Graduation Requirements

A minimum GPA of 2.0 in all departmental courses counted toward the degree taken at the University of Tennessee, Knoxville, is required for graduation. No more than two departmental courses in which a C or lower is the highest grade earned may be counted toward graduation. This is in addition to the university’s graduation requirements.

Students also have opportunities for an Honors Concentration and/or a five year BS/MS program. See the Undergraduate Catalog for details and requirements.
Biomedical Engineering Catalog 2016

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
<th>Term 4</th>
<th>Term 5</th>
<th>Term 6 through 8</th>
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<tr>
<td><strong>Fall</strong></td>
<td><strong>16 hours</strong></td>
<td>Math 141 or 147 (4) FA, SP, SU</td>
<td>EF 151 or 157 (4) FA, SP</td>
<td>EF 105 (1) FA, SP</td>
<td>English 101 or 118 (3) FA, SP, SU</td>
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<tr>
<td></td>
<td></td>
<td>Prereq- Math 130 or Math ACT 28 or Math SAT 630</td>
<td>Coreq- EF 151 or 157</td>
<td>Coreq- EF 151 or 157</td>
<td>Math 130</td>
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<td><strong>Spring</strong></td>
<td><strong>17 hours</strong></td>
<td>Math 142 or 148 (4) FA, SP, SU</td>
<td>EF 152 or 158 (4) FA, SP</td>
<td>ME 202 (2) FA, SP, SU</td>
<td>English 102 (3) FA, SP, SU</td>
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<td>Prereq- Math 141 or 147</td>
<td>Prereq- EF 152 or 158 and Math 142 or 148</td>
<td>Coreq- English 101 or 118</td>
<td>Prereq- Chem 120 or 128</td>
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<td><strong>Fall</strong></td>
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<td>Math 231 (3) FA, SP, SU</td>
<td>ME 231 (3) FA, SP, SU</td>
<td>Stats 251 (3) FA, SP, SU</td>
<td>Math 200 (2) FA, SP</td>
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<td>Prereq- Math 142 or 148</td>
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<td><strong>Spring</strong></td>
<td><strong>16 hours</strong></td>
<td>Physics 231 (3) FA, SP, SU</td>
<td>ME 321 (3) FA, SP, SU</td>
<td>MSE 201 or 207 (3) FA, SP, SU</td>
<td>BME 271 (3) SP</td>
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<td>Coreq- Math 142 or 148</td>
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<td>Coreq- Chem 120 or 128</td>
<td>Prereq- EF 152/158 with C and Math 200</td>
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<tr>
<td><strong>Fall</strong></td>
<td><strong>15 hours</strong></td>
<td>BME 363 or 367 (3) FA, SP, SU</td>
<td>AE 341/347 (3) FA, SP, SU</td>
<td>BME 474 (3) FA</td>
<td>ECE 301 (3) FA, SP</td>
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<td>Prereq- BME 271, Math 231 and ME 231 with grades of C or better</td>
<td>Prereq- ME 231 with a grade of C of C or better and Math 241 or 247</td>
<td>Prereq- MSE 201</td>
<td>Prereq- Math 231</td>
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<tr>
<td><strong>Spring</strong></td>
<td><strong>16 hours</strong></td>
<td>BME 315 (3) SP</td>
<td>BME 345 (3) FA, SP, SU</td>
<td>BME 409 (3) SP</td>
<td>Physics 232 (4) FA, SP, SU</td>
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<td>Prereq- BME 271 &amp; 363 or 367</td>
<td>Prereq- AE 341/347</td>
<td>Prereq- BME 363 &amp; ECE 301</td>
<td>Prereq- BME 271</td>
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<td>Coreq- BME 455 and Senior</td>
<td>Coreq- BME 315 &amp; BME 345 and BME 408 &amp; English 102</td>
<td>Coreq- BME 455 and ECE 301</td>
<td>Coreq- Math 241 or 247</td>
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<tr>
<td><strong>Fall</strong></td>
<td><strong>18 hours</strong></td>
<td>BME 410 (2) FA (OC)</td>
<td>BME 430 (3) FA (WC)</td>
<td>BME 455 (3) FA</td>
<td>BME 473 or 477 (3) FA</td>
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<td>Coreq- BME 455 and Senior</td>
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<td></td>
<td>Coreq- BME 455 and Senior</td>
<td>Prereq- BME 315 &amp; BME 345 and BME 408 &amp; English 102</td>
<td>Coreq- BME 455</td>
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<td><strong>15 hours</strong></td>
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<td>Gen Ed (3) FA, SP, SU</td>
<td>BME 469 (3) SP</td>
<td>BME Elective (3) FA, SP, SU</td>
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<td>Cultures &amp; Civilizations</td>
<td>Cultures &amp; Civilizations</td>
<td>Prereq- BME 455</td>
<td>Technical Elective (3) FA, SP, SU</td>
</tr>
</tbody>
</table>

Technical Elective- Must be preapproved by faculty advisor.

Biomedical Engineering Elective- Restricted to any 300-500 biomedical engineering course not required for the degree or Chemistry 350 or 358 or 366.

Full Status Progression
A lower-division student may apply for progression to upper division after completing EF 152/158, CHEM 120/128, MATH 231, ME 202, ME 231, ME 321 and BME 271 with a grade of C or better in each, and an overall GPA of at least 2.4. Students who have not satisfied the requirements for full status will be dropped from departmental class rolls in upper division courses.

Provisional Status Progression
Students who have completed EF 152/158, CHEM 120/128, MATH 231, ME 202, ME 231, ME 321, and BME 271 with a grade of C or better and have an overall GPA between 2.0 and 2.4 may apply for provisional status. The granting of provisional status is based on the availability of space in departmental programs after full status students have been accommodated. Provisional status students are required to demonstrate their ability to perform satisfactorily in upper-division by attaining a minimum GPA of 2.0 in the first 12 hours of 300-level required engineering courses. Award of upper-division full status is dependent upon this performance. Students with an overall GPA less than 2.0 will not be admitted to upper-division. Students who have not progressed to upper-division will be dropped from departmental class rolls.

Transfer Students
Students transferring more than 26 hours from another institution are considered transfer students. Transfer students must meet the same criteria as non-transfer students, using transfer grades for acceptable substitutions. Transfer courses with grades below a C will not be accepted to fulfill any degree requirements.

Departmental Academic Standing
The faculty of the Department of Mechanical, Aerospace and Biomedical Engineering expect all students who enter to make progress toward graduation. To graduate from the department, a student must earn a minimum grade point average of 2.0 in all departmental courses counted toward the degree. Students not meeting the required departmental GPA may be dropped from their major. In addition, the University Academic Good Standing Policies apply to all students.
### BioSystems Engineering Catalog 2016

**Engineering Majors**

- **Fall**
  - Math 141 or 147 (4) FA, SP
  - EF 101 (1) FA, SP
  - Chem 120 or (32) FYA, SP

- **Spring**
  - Math 142 or 148 (4) FA, SP
  - English 102 (3) FA, SP

- **Fall**
  - Math 241 or 247 (4) FA, SP
  - AE 341 or 347 (3) FA, SP
  - BSE 401 (2) (OC) FA
  - Econ 201 or 207 (4) FA, SP

- **Spring**
  - Econ 202 or 207 (4) FA, SP
  - BSE 402 (6) SP

- **Fall**
  - Math 130 or higher or one SS

- **Spring**
  - Math 130 or higher or one SS

---

**Technical Electives**
- Note: Some electives have required prerequisites. See individual course descriptions for specific information.

**UTRACK Milestones**

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
<th>Term 4</th>
<th>Term 5</th>
<th>Term 6 through 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130 or higher or one SS</td>
<td>Math 130 or higher or one SS</td>
<td>Math 130 or higher or one SS</td>
<td>Math 130 or higher or one SS</td>
<td>Math 130 or higher or one SS</td>
<td>Math 130 or higher or one SS</td>
</tr>
</tbody>
</table>

**Graduation Requirements**
- Achieve at least a 2.0 GPA in all BSE courses.
- Only one BSE course with a grade of D+ or D may be used toward graduation.
- Achieve at least a 2.0 GPA in the required math courses.

**Honors Concentration**
- Students also have opportunities for an Honors Concentration. See the Undergraduate Catalog for details and requirements.

---

**Note:** Students have these opportunities by declaring a concentration. See the Undergraduate Catalog for details and requirements.
### Pre-Professional Concentration

**Fall**
- Math 141 or 147 (4) FA, SP, SU
- EF 101 (1) SP
- BSE 201 (11) FA
- ECE 301 (3) FA, SP, M
- Stats 251 (3) FA, SP, SU
- English 360 (3) (WC) FA, SP
- Math 200 (2) FA, SP

17 hours

**Spring**
- Math 231 (3) FA, SP, SU
- AE 341 or 347 (3) FA, SP, SU
- Biology 160 or 168 (3) FA, SP, SU
- Chem 350 or 358 (3) FA, SP, SU
- ME 321 (3) FA, SP, SU
- BSE 321 (3) SP

15 hours

**Fall**
- Econ 201 or 207 (4) FA, SP, SU
- Gen Ed (3) FA, SP, SU
- BSE 401 (2) (OC) FA
- BSE 404 (3) FA
- BSE 444 (3) FA

15 hours

**Spring**
- Gen Ed (3) FA, SP, SU
- Gen Ed (3) FA, SP, SU
- BSE 402 (6) SP

15 hours

### Graduation requirements:
- Achieve at least a 2.0 GPA in all BSE courses.
- Only one BSE course with a grade of D+ or D may be used toward graduation.
- No BSE course with a grade of D- may be used for graduation.
- Achieve at least a 2.0 GPA in the required math courses.

### UTRACK Milestones:

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
<th>Term 4</th>
<th>Term 5</th>
<th>Term 6 through 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130 or higher or one SS</td>
<td>Math 130 or higher or one SS</td>
<td>Pre-Math 141 or higher or one SS</td>
<td>Pre-Math 141 or higher or one SS</td>
<td>Pre-Math 141 or higher or one SS</td>
<td>Pre-Math 141 or higher or one SS</td>
</tr>
<tr>
<td>EF 151 or 157 or Physics 111/112</td>
<td>EF 151 or 157 or Physics 111/112</td>
<td>Pre-Math 141 or higher or one SS</td>
<td>Pre-Math 141 or higher or one SS</td>
<td>Pre-Math 141 or higher or one SS</td>
<td>Pre-Math 141 or higher or one SS</td>
</tr>
</tbody>
</table>

Students should consult the Engineering Majors catalog for additional requirements and opportunities.
### Engineering Majors

**Chemical and Biomolecular Engineering Catalog 2016**

#### Fall 2016

<table>
<thead>
<tr>
<th>Term</th>
<th>16 hours</th>
<th>Prereq.</th>
<th>Coreq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 141 or 147 (4) FA, SP, SU</td>
<td>Math 130 or Math ACT 28 or Math SAT 660</td>
<td>Math 130</td>
<td>EF 151 or 157 (4) FA, SP</td>
</tr>
<tr>
<td>English 101 or 118 (3) FA, SP, SU</td>
<td>EF 151 or 141 and EF 106</td>
<td>EF 105 (1) FA, SP</td>
<td></td>
</tr>
</tbody>
</table>

#### Spring 2016

<table>
<thead>
<tr>
<th>Term</th>
<th>16 hours</th>
<th>Prereq.</th>
<th>Coreq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 142 or 148 (4) FA, SP, SU</td>
<td>Math 141 or 147</td>
<td>Math 120 or 128</td>
<td>EF 152 or 158 (4) FA, SP</td>
</tr>
<tr>
<td>English 102 (3) FA, SP, SU</td>
<td>Pre-eng: English 101 or 118</td>
<td>EF 151 or 157</td>
<td></td>
</tr>
</tbody>
</table>

#### Fall 2016

<table>
<thead>
<tr>
<th>Term</th>
<th>15 hours</th>
<th>Prereq.</th>
<th>Coreq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 231 (3) FA, SP, SU</td>
<td>Math 142 or 148</td>
<td>EF 151/157 &amp; Chem 130/138</td>
<td>EF 152 (3) FA</td>
</tr>
<tr>
<td>CBE 201 (4) FA</td>
<td>Coreq: Math 231</td>
<td>EF 152 or 158 &amp; Chem 130/138</td>
<td>EF 152 or 158</td>
</tr>
<tr>
<td>CBE 235 (3) FA</td>
<td>Coreq: CBE 240 or 250</td>
<td>Coreq: Math 241 or 247</td>
<td>EF 152 or 158</td>
</tr>
</tbody>
</table>

#### Spring 2016

<table>
<thead>
<tr>
<th>Term</th>
<th>19 hours</th>
<th>Prereq.</th>
<th>Coreq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 310 (3) &amp; 319 (1) FA, SP</td>
<td>Chemistry 130 or 138</td>
<td>Physics 136 or 138</td>
<td>EF 152/158 or Chem 130/138</td>
</tr>
<tr>
<td>Math 241 or 247 (4) FA, SP, SU</td>
<td>Pre-eng: Math 142 or 148</td>
<td>EF 152/158 &amp; Chem 130/138</td>
<td>EF 152/158 &amp; Chem 130/138</td>
</tr>
<tr>
<td>CBE 240 (4) SP, SU</td>
<td>Coreq: Math 241 or 247</td>
<td>Coreq: Math 241 or 247</td>
<td>Gen Ed (3) FA, SP, SU</td>
</tr>
</tbody>
</table>

#### Fall 2016

<table>
<thead>
<tr>
<th>Term</th>
<th>15 hours</th>
<th>Prereq.</th>
<th>Coreq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 350 or 358 (3) FA, SP, SU</td>
<td>Pre-eng: Chemistry 130 or 138</td>
<td>Physics 231 (3) FA, SP, SU</td>
<td>EF 152/158 &amp; Chem 130/138</td>
</tr>
<tr>
<td>CBE 300 (3) FA</td>
<td>Coreq: Math 231</td>
<td>EF 152/158 &amp; Chem 130/138</td>
<td>EF 152/158 &amp; Chem 130/138</td>
</tr>
<tr>
<td>CBE 350 (3) FA</td>
<td>Coreq: Math 241 or 247</td>
<td>Coreq: Math 241 or 247</td>
<td>Coreq: Math 142 or 148</td>
</tr>
</tbody>
</table>

#### Spring 2016

<table>
<thead>
<tr>
<th>Term</th>
<th>19 hours</th>
<th>Prereq.</th>
<th>Coreq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBE 340 (3) FA, SP, SU</td>
<td>Pre-eng: CBE 240 and 250</td>
<td>Coreq: Math 241 or 247</td>
<td>EF 152/158 &amp; Chem 130/138</td>
</tr>
<tr>
<td>CBE 340 (3) SP, SU</td>
<td>Pre-eng: CBE 201 &amp; Chem 130/138</td>
<td>Pre-eng: Math 241 or 247</td>
<td>EF 152/158 &amp; Chem 130/138</td>
</tr>
<tr>
<td>CBE 360 (3) SP</td>
<td>Pre-eng: CBE 201 or 240</td>
<td>Pre-eng: Math 241 or 247</td>
<td>EF 152/158 &amp; Chem 130/138</td>
</tr>
<tr>
<td>CBE 380 (1) SP</td>
<td>Grading: Satisfactory/No Credit</td>
<td>Pre-eng: CBE 201 or 240</td>
<td>SF 230 or 231</td>
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</tbody>
</table>

#### Fall 2016

<table>
<thead>
<tr>
<th>Term</th>
<th>16 hours</th>
<th>Prereq.</th>
<th>Coreq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBE 445 (3) FA</td>
<td>Pre-eng: CBE 340 and 360</td>
<td>Coreq: Math 231</td>
<td>EF 152/158 &amp; Chem 130/138</td>
</tr>
<tr>
<td>CBE 450 (5) FA</td>
<td>Pre-eng: CBE 340 and 360</td>
<td>Coreq: Math 231</td>
<td>EF 152/158 &amp; Chem 130/138</td>
</tr>
<tr>
<td>CBE 450 (3) FA</td>
<td>Pre-eng: CBE 340 and 360</td>
<td>CBE 350 or 358</td>
<td>Gen Ed (3) FA, SP, SU</td>
</tr>
<tr>
<td>CBE 450 (3) FA</td>
<td>Pre-eng: CBE 340 and 360</td>
<td>Coreq: Math 231</td>
<td>Gen Ed (3) FA, SP, SU</td>
</tr>
</tbody>
</table>

#### Spring 2016

<table>
<thead>
<tr>
<th>Term</th>
<th>16 hours</th>
<th>Prereq.</th>
<th>Coreq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBE 451 (1) SP</td>
<td>Pre-eng: CBE 350, 445 or 480</td>
<td>Coreq: Math 231</td>
<td>Gen Ed (3) FA, SP, SU</td>
</tr>
<tr>
<td>CBE 451 (1) SP</td>
<td>Pre-eng: CBE 350, 445 or 480</td>
<td>Coreq: Math 231</td>
<td>Gen Ed (3) FA, SP, SU</td>
</tr>
<tr>
<td>CBE 451 (1) SP</td>
<td>Pre-eng: CBE 350, 445 or 480</td>
<td>Coreq: Math 231</td>
<td>Gen Ed (3) FA, SP, SU</td>
</tr>
</tbody>
</table>

---

**Chem Option I:** Any 200 level or above BCMB courses; any 200-level or above CHEM courses; Environmental Engineering SS 24, SS 340, MSE 360; any 200-level or above MIR courses.

**Biology Option I:** BCMB 230, BCMB 311, BCMB 321, BCMB 401, BCMB 412; BIOL 220/229, BIOL 240, BIOL 260/269; MICR 210, CBE 455

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**Restriction:** Any student with an overall GPA below 2.1 will not be admitted to upper-division chemical and biomolecular engineering courses. Students who have not been admitted to upper-division or provisional status will be dropped from upper-division departmental classes.

Students also have opportunities for an Honors Concentration. See the Undergraduate Catalog for details and requirements.

**UTRACK Milestones:**

<table>
<thead>
<tr>
<th>Term</th>
<th>Milestones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
<td>Math 130 or higher or one SS or one AH or one CC</td>
</tr>
<tr>
<td>Term 2</td>
<td>Math 130 or higher</td>
</tr>
<tr>
<td>Term 3</td>
<td>EF 151/157 or Physics 130/137</td>
</tr>
<tr>
<td>Term 4</td>
<td>EF 152/158 or Physics 136/138</td>
</tr>
<tr>
<td>Term 5</td>
<td>ME 202 or CS 102 or MSE 201 or CBE 201</td>
</tr>
<tr>
<td>Term 6 through 8</td>
<td>No Milestones</td>
</tr>
</tbody>
</table>
### Biomolecular Concentration

<table>
<thead>
<tr>
<th>Term</th>
<th>Fall Hours</th>
<th>Spring Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>15 hours</td>
<td>16 hours</td>
</tr>
<tr>
<td>Math 130 or higher or one SS of one AH or one CC</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>Chem 120 or 128 (4) FA, SP, SU</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>English 161 or 118 (3) FA, SP, SU</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<tr>
<td>Math 141 or 147 (4) FA, SP, SU</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>English 101 or 111 (4) FA, SP, SU</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>EF 105 (1) FA, SP</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<tr>
<td><strong>Spring</strong></td>
<td>15 hours</td>
<td>16 hours</td>
</tr>
<tr>
<td>Math 142 or 148 (4) FA, SP, SU</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>Chem 130 or 138 (4) FA, SP, SU</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<tr>
<td>English 102 (3) FA, SP, SU</td>
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<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<tr>
<td>EF 151 or 157 (4) FA, SP</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<tr>
<td><strong>Fall</strong></td>
<td>15 hours</td>
<td>16 hours</td>
</tr>
<tr>
<td>Math 231 (3) FA, SP, SU</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>CBE 201 (4) FA, SP</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<tr>
<td>Biology 160 or 168 (3) FA, SP, SU</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>EF 230 (2) FA, SP</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<tr>
<td><strong>Spring</strong></td>
<td>15 hours</td>
<td>16 hours</td>
</tr>
<tr>
<td>Chemistry 350 or 358 (3) FA, SP, SU</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>CBE 301 (3) FA, SP</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<tr>
<td>CBE 350 (3) FA, SP</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>Physics 231 (3) FA, SP, SU</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>Social Science</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<td><strong>Fall</strong></td>
<td>19 hours</td>
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<tr>
<td>CBE 240 (4) SP</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<td>CBE 245 (4) SP</td>
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<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<tr>
<td>Gen. Ed. (3) FA, SP, SU</td>
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<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>Biology 240 (4) FA, SP</td>
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<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>Arts and Humanities</td>
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<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<td><strong>Spring</strong></td>
<td>17 hours</td>
<td>16 hours</td>
</tr>
<tr>
<td>CBE 340 (5) FA, SP, SU</td>
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<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>CBE 345 (5) FA, SP, SU</td>
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<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>Cultures and Civilizations</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>Science Option</td>
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<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
<tr>
<td>CBE 475 (3) FA, SP</td>
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<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
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<tr>
<td>Social Science</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
<td>Affairs: Math 130 or Math ACT 23 or Math SAT 630</td>
</tr>
</tbody>
</table>
| *Biology Option I: Choose one BCME 230, 311, 321, 401, 412, Biology 220/229, Biology 360/369, CBE 455; Microbiology 210.

**Progression to Upper Division**

Progression of students in the Department of Chemical and Biomolecular Engineering to departmental courses numbered 310 and above is competitive and is based on capacity. Factors considered include overall grade point average, performance in selected lower-division courses, and evidence of satisfactory and orderly progress through the prescribed curriculum.

**Upper-Division Status**

An upper-division student must apply for progression to upper division status after completing CBE 301, CBE 305, CBE 340, and CBE 350 with a grade of C- or better in each course and an overall GPA of 2.3 or better. Grades of C- or better in these four courses are required for graduation.

** Provisional Status** Students who have completed CBE 201, CBE 235, CBE 240, and CBE 250 with an overall GPA of at least 2.3 may apply for provisional status. Any student granted provisional status must re-take the 200 level CBE course or courses in which a grade less than C- was earned and achieve a C- or better to be admitted to full upper-division status. Grades of C- or better in these four courses are required for graduation. The granting of provisional upper-division status is based on availability of space in the departmental programs after upper-division status students have been accommodated. Provisional students are required to demonstrate the ability to perform satisfactorily in upper-division courses by completing a minimum of six departmental courses with a grade of C- or better in each course (including the four required for upper-division status). Permission to continue with upper-division classes depends on this minimum level of performance.

Any student with an overall GPA below 2.1 will not be admitted to upper-division chemical and biomolecular engineering courses. Students who have not been admitted to upper-division or provisional status will be dropped from upper-division departmental classes.

Students also have opportunities for an Honors Concentration. See the Undergraduate Catalog for details and requirements.

**UTRACK Milestones**

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
<th>Term 4</th>
<th>Term 5</th>
<th>Term 6 through 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130 or higher or one SS of one AH or one CC</td>
<td>Math 130 or higher</td>
<td>EF 151/157 or Physics 135/137</td>
<td>EF 130/135 or Physics 135/138</td>
<td>ME 202 or CS 102 or MSE 201 or CBE 301</td>
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</tr>
</tbody>
</table>
## Civil Engineering Catalog 2016

### Fall

<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
</tr>
</thead>
</table>
| 16 | English 151 or 114 (3) \(\text{FA, SP, SU}\)  
Chem 125 or 128 (4) \(\text{FA, SP, SU}\)  
Math 130 |
| 16 | Math 141 or 147 (4) \(\text{FA, SP, SU}\)  
Prereq: Math 130 or Math ACT 30 or Math SAT 630  
EF 151 or 157 (4) \(\text{FA, SP}\)  
Coreq: Math 141 or 147 and EF 156  
EF 195 (5) \(\text{FA, SP}\)  
Coreq: EF 151 or 157 |

### Spring

<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
</tr>
</thead>
</table>
| 15 | English 102 (3) \(\text{FA, SP, SU}\)  
Prereq: English 110 or 118  
Chem 133 or 138 (4) \(\text{FA, SP, SU}\)  
Prereq: Chem 120 or 123 |
| 16 | Math 231 (3) \(\text{FA, SP, SU}\)  
Prereq: Math 142 or 148  
Statistics 251 (3) \(\text{FA, SP, SU}\)  
Prereq: Math 142 or 148  
ECON 201 or 207 (4) \(\text{FA, SP, SU}\)  
Prereq: Math 141 or 147  
ME 202 (2) \(\text{FA, SP}\)  
Prereq: EF 152 or 158 and Math 142 or 148 |

### Fall

<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
</tr>
</thead>
</table>
| 15-16 | Math 241 or 247 (4) \(\text{FA, SP, SU}\)  
Prereq: Math 142 or 148  
Chem 361 (3) \(\text{FA, SP}\)  
Prereq: Math 231 and EF 152 or 158  
Coreq: CE 265 |
| 16 | Science Elective *3.4 (FA, SP, SU)  
Choose one from approved list*  
CE 203 or 205 (OC & WC) (3) \(\text{FA, SP, SU}\)  
Prereq: EF 151 or 157  
Minimum student level — sophomore |

### Spring

<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
</tr>
</thead>
</table>
| 16 | Gen Ed (3) \(\text{FA, SP, SU}\)  
Cultures and Civilizations  
CE 311 (3) \(\text{FA, SP}\)  
Prereq: CE 311 and EF 152 or 158  
Coreq: CE 205 |
| 17 | Gen Ed (3) \(\text{FA, SP, SU}\)  
Arts and Humanities  
CE 342 (3) \(\text{FA, SP}\)  
Prereq: CE 205  
Coreq: CE 205  
Coreq: CE 310 |

### Fall

<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
</tr>
</thead>
</table>
| 16 | Gen Ed (3) \(\text{FA, SP, SU}\)  
Social Science  
CE 381 (3) \(\text{FA, SP}\)  
Prereq: CE 311 and Chemistry 130 or 138  
CE 382 (3) \(\text{FA, SP}\)  
Prereq: CE 302  
Coreq: CE 205 |
| 16 | Gen Ed (3) \(\text{FA, SP, SU}\)  
Arts and Humanities  
CE 342 (3) \(\text{FA, SP}\)  
Prereq: CE 205  
Coreq: CE 205  
Coreq: CE 310 |

### Spring

<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
</tr>
</thead>
</table>
| 15 | Gen Ed (3) \(\text{FA, SP, SU}\)  
Social Science  
CE Concentr. Elective **(5) \(\text{FA, SP, SU}\)  
CE Concentr. Lab **(5) \(\text{FA, SP, SU}\)  
CE 440 or 441 (3) \(\text{FA, SP, SU}\)  
Prereq: Stats 251  
Minimum student level — junior  
Technical Elective **(3) \(\text{FA, SP, SU}\)  
Technical Elective **(3) \(\text{FA, SP, SU}\)  
Technical Elective **(3) \(\text{FA, SP, SU}\)  
Technical Elective **(3) \(\text{FA, SP, SU}\) |

### Fall

<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
</tr>
</thead>
</table>
| 15 | Gen Ed (3) \(\text{FA, SP, SU}\)  
Arts and Humanities  
CE Concentr. Elective **(5) \(\text{FA, SP, SU}\)  
CE Concentr. Lab **(5) \(\text{FA, SP, SU}\)  
CE 440 or 441 (3) \(\text{FA, SP, SU}\)  
Prereq: Stats 251  
Minimum student level — junior  
Technical Elective **(3) \(\text{FA, SP, SU}\)  
Technical Elective **(3) \(\text{FA, SP, SU}\)  
Technical Elective **(3) \(\text{FA, SP, SU}\)  
Technical Elective **(3) \(\text{FA, SP, SU}\) |

### Spring

<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
</tr>
</thead>
</table>
| 15 | Gen Ed (3) \(\text{FA, SP, SU}\)  
Arts and Humanities  
CE Concentr. Elective **(5) \(\text{FA, SP, SU}\)  
CE Concentr. Lab **(5) \(\text{FA, SP, SU}\)  
CE 440 or 441 (3) \(\text{FA, SP, SU}\)  
Prereq: Stats 251  
Minimum student level — senior  
Technical Elective **(3) \(\text{FA, SP, SU}\)  
Technical Elective **(3) \(\text{FA, SP, SU}\)  
Technical Elective **(3) \(\text{FA, SP, SU}\)  
Technical Elective **(3) \(\text{FA, SP, SU}\) |

---

*Science Elective*- Students select from Biology 101, 102, 150 or 158, 160 or 166; Geography 131; Geology 101, 103, 107; Environment Engineering 513; Environ. Sol Science 462.

**CE Concentration Electives/Labs**- Students must select 2 of the following concentration sequences: environmental sequence (CE 461 or 467, CE 462), geotechnical sequence (CE 430 or 437, CE 432), structural sequence (CE 461 or 467, CE 463), transportation sequence (CE 455 or 458, CE 456), water resources sequence (CE 494 or 497, CE 496), construction sequence (CE 441 or 448, CE 432 or CE 463).

***Interests Areas/Technical Electives***

- All areas: BSET 414 (AutoCAD)
- Construction: CE 540, CE 541, CE 543
- Environmental: Chem 230, Chem 310, Chem 350, Microbiology 210
- Geotechnical: CE 431, CE 531, CE 532, CE 535, Earth and Planetary Science 470 (Geophysics); Geology 310, 330, 340, 370, and 470
- Materials: CE 521, CE 522, CE 525
- Structures: CE 462, CE 472, CE 474, CE 576
- Transportation: CE 451, CE 453, CE 551, CE 552
- Water Resources: CE 485, CE 490, CE 495/498
- Business: Accounting 200 or 207

### Civil Graduation Requirements

Students are required to maintain a cumulative grade point of at least 2.0 in all civil engineering and environmental engineering courses taken at the University of Tennessee, Knoxville, used to satisfy the graduation requirements. No more than four credit hours of civil and environmental engineering courses in which a C- or lower is the highest grade earned may be counted toward graduation. Students must earn a grade of C or better in all courses within their two selected concentrations. Students are strongly recommended to meet with their faculty advisor every semester.

Students also have opportunities for an Honors Concentration and/or a five year BS/MS program. See the Undergraduate Catalog for details and requirements.

### UTRACK Milestones:

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
<th>Term 4</th>
<th>Term 5</th>
<th>Term 6 through 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130 or higher or one SS or one AH or one CC</td>
<td>Math 130 or higher</td>
<td>EF 151 or 157 or Physics 135/137</td>
<td>BF 152/158 or Physics 136/138</td>
<td>MSE 202 or CS 102 or MSE 201</td>
<td>No Milestones</td>
</tr>
<tr>
<td>Accounting 200 or 207</td>
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<td></td>
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</tr>
</tbody>
</table>

---

* "Science Elective" - Students select from Biology 101, 102, 150 or 158, 160 or 166; Geography 131; Geology 101, 103, 107; Environment Engineering 513; Environ. Sol Science 462.

** "CE Concentration Electives/Labs" - Students must select 2 of the following concentration sequences: environmental sequence (CE 461 or 467, CE 462), geotechnical sequence (CE 430 or 437, CE 432), structural sequence (CE 461 or 467, CE 463), transportation sequence (CE 455 or 458, CE 456), water resources sequence (CE 494 or 497, CE 496), construction sequence (CE 441 or 448, CE 432 or CE 463).
**Engineering Majors**

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**Department of Electrical Engineering and Computer Science**

**Computer Engineering Catalog 2016**

**Fall 15 hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Prereqs</th>
<th>Coreqs</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 141 or 147 (4)</td>
<td>FA, SU</td>
<td>EF 151 or 157 (4)</td>
<td>FA, SP</td>
<td>CS 102 (4)</td>
</tr>
<tr>
<td>EF 151 or 157 (4)</td>
<td>FA, SP</td>
<td>Coreq-Math 141 or 147</td>
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<td>Coreq-Math 141 or 147</td>
</tr>
<tr>
<td>Coreq-EF 151 or CS 102</td>
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<td>EF 151 or 157</td>
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</table>

**Spring 16 hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Prereqs</th>
<th>Coreqs</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 231 (3)</td>
<td>FA, SP</td>
<td>ECE 201 (3)</td>
<td>FA, SP, SU</td>
<td>CS 140 (4)</td>
</tr>
<tr>
<td>EF 152 (4)</td>
<td>FA, SP</td>
<td>Prereq-EF 152/158 and Math 142/148 grades C</td>
<td>Coreq-CS 130 (formerly CS 160)</td>
<td>English 102 (3)</td>
</tr>
</tbody>
</table>

**Fall 18 hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Prereqs</th>
<th>Coreqs</th>
<th>English</th>
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<tbody>
<tr>
<td>Math 241 or 247 (4)</td>
<td>FA, SP</td>
<td>ECE 302 (3)</td>
<td>FA, SP, SU</td>
<td>CS 251 or 257 (3)</td>
</tr>
<tr>
<td>EF 153 (3)</td>
<td>FA, SP</td>
<td>Prereq-ECE 201</td>
<td></td>
<td>Math 142 or 148</td>
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<tr>
<td>Coreq-CS 102</td>
<td></td>
<td>EF 153 (3)</td>
<td>FA, SP, SU</td>
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</tr>
</tbody>
</table>

**Spring 15 hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Prereqs</th>
<th>Coreqs</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 315 (3)</td>
<td>FA, SU</td>
<td>ECE 335 (3)</td>
<td>FA, SP</td>
<td>CS 302 or 307 (4)</td>
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<tr>
<td>Coreq-ECE 202</td>
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<td>Prereq-ECE 202</td>
<td></td>
<td>Coreq-CS 140</td>
</tr>
<tr>
<td>ECE 315 (3)</td>
<td>FA, SP</td>
<td>CS 311 or 317 (3)</td>
<td>FA, SP</td>
<td>CS 361 (3)</td>
</tr>
<tr>
<td>Coreq-CS 140</td>
<td></td>
<td>CS 140 or Math 142 or 148</td>
<td></td>
<td>Upper Elective *(3)</td>
</tr>
<tr>
<td>CS 311 or 317 (3)</td>
<td>FA, SP</td>
<td>CS 140 or Math 142 or 148</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fall 15 hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Prereqs</th>
<th>Coreqs</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 401 (2)</td>
<td>FA</td>
<td>ECE 482 (OC&amp;W)</td>
<td>(3)</td>
<td>Upper Elective *(3)</td>
</tr>
<tr>
<td>Coreq-ECE 401</td>
<td></td>
<td>Upper Elective *(3)</td>
<td>FA, SP, SU</td>
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</tr>
</tbody>
</table>

**Spring 15 hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Prereqs</th>
<th>Coreqs</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 501 (3)</td>
<td>FA, SP</td>
<td>ECE 401 (2)</td>
<td>FA</td>
<td>Upper Elective *(3)</td>
</tr>
<tr>
<td>Coreq-ECE 401</td>
<td></td>
<td>Prereq-ECE 201</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Among the five Computer Engineering Upper Division Electives, you must choose courses that cover 3 tracks with one of the tracks being Networking & Embedded Systems. The course distribution among the 3 tracks should follow the 2-2-1 pattern, among which at most 2 courses can be at the 3xx-level.

The following listing is the acceptable set of electives that may be taken to satisfy the upper division electives for the Computer Engineering major. The electives have been grouped into 8 suggested tracks. The tracks group related electives that a student may wish to take in order to achieve a level of expertise in the indicated area. The 5xx-level courses are listed as suggestions to students admitted in the five-year BS/MS program.

**Networking & Embedded Systems**: ECE 453, ECE 455, ECE 461, CS 350, CS 353, ECE 555, ECE 556, Signals and Systems: ECE 316, 402, 463, 471, 472 or 478, 505, 506, 571, 572.

**Machine Learning & Artificial Intelligence**: ECE 471 or 477, CS 420, CS 425, ECE 527, CS 528, CS 529, ECE 571, Software Systems: CS 340, CS 360, CS 370, CS 456, CS 461, CS 462, CS 466, CS 461, CS 462, CS 465, CS 526, CS 541, CS 860, CS 565, CS 581, Control and Communications: ECE 316, ECE 415, ECE 416, ECE 417, ECE 418, ECE 434, ECE 441, ECE 442, ECE 443.

**Electronics and Power**: ECE 316, ECE 413, ECE 414, ECE 432, ECE 433, ECE 352, ECE 421 or 427, ECE 481 or 487, ECE 491; Cybersecurity: CS 434, CS 445, CS 466, CS 483, ECE 459, ECE 461, ECE 462, ECE 489, ECE 471, Integrated Circuits: ECE 336, 431, 432, 433, 435, 459, 531, 532, 533, 551, 555, 559.

**Progression**

The department requires at least a C in every computer engineering, computer science, electrical engineering, and mathematics course used for the undergraduate degrees. Students taking ECE 201 must also have a C or better in ECE 152 or 158.

Progression of departmental undergraduate students to the upper-division programs of the department is competitive and is based on the space available in the department. Factors considered in the decision include overall grade point average, grades earned in courses required in the lower division curricula of the department and College of Engineering, and seriousness of purpose and interest in departmental programs as exemplified by regular and orderly progress through the prescribed curriculum without abuse of withdrawal and course repeat privileges.

Students who take ECE 300 (ECE 201-202) will be evaluated during the semester they are registered for it. Transfer students for whom ECE 300 (ECE 201-202) transfer credit is given may take 9 semester hours in departmental courses before progression evaluation. All students, whether or not they transfer in, who are not accepted into the upper-division program of the department will be put in either a temporary probationary status or a non-progressed status and will not be permitted to register for any upper division courses within the department.

Students also have opportunities for an Honors Concentration and/or a five-year BS/MS program. See the Undergraduate Catalog for details and requirements.

**UTRACK Milestones**

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
<th>Term 4</th>
<th>Term 5</th>
<th>Term 6 through 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130 or higher or one SS or one AH or one OC</td>
<td>Math 130 or higher</td>
<td>EF 151/157 or Physics 135/137</td>
<td>EF 152/158 or Physics 136/138</td>
<td>ME 202 or CS 102 or MSE 201</td>
<td>No Milestones</td>
</tr>
</tbody>
</table>
### Engineering Majors

**Department of Electrical Engineering and Computer Science**

**Computer Science Catalog 2016**

#### Fall
- **15-16 hours**
- **CS 102(4)FA, SP**
- Coreq: Math 141 or 147
- Math 141 or 147 (4) FA, SP
- Pre: Math 130 or Math ACT 28 or Math SAT 600
- Physics 131 or EF 151 or 153 (4) FA
- Coreq: Math 141 or 147
- English 161 or 155 (3) FA, SP

#### Spring
- **15-16 hours**
- **CS 130(3)FA, SP (formerly CS 180)**
- Pre: CS 102
- Math 142 or 148 (4) FA, SP
- Pre: Math 142 or 147
- Physics 135 or EF 151 or 158 (4) SP
- Pre: Math 142 or 148
- English 162 (5) FA, SP

#### Fall
- **14-15 hours**
- **CS 160(4)FA, SP**
- Pre: CS 130 (formerly CS 180)
- Gen. Ed.: (3) FA, SP
- Math 241 or 247 (4) FA, SP
- Pre: Math 142 or 148
- Biology 101 FA, SU or 150 FA, SP or Chemistry 103 FA, 120 FA, SP, SU or Physics 231 FA, SP, SU (3-4)

#### Spring
- **13 hours**
- **CS 302 or 307 (4) FA, SP**
- Pre: CS 140 and Math 142 or 148
- Math 241 or 247 (3) FA, SP
- Pre: Math 142 or 148
- Gen. Ed.: (3) FA, SP

#### Fall
- **16 hours**
- **CS 360 or 367 (4) FA, SP**
- Pre: CS 130 and 302 or 307
- CS 311 (3) FA
- Pre: CS 311
- CS Upper Division Elective (2) FA, SP
- Pre: Math 142 or 148
- GE 303 (3) FA, SP
- Gen. Ed.: (3) FA, SP

#### Spring
- **15 hours**
- **CS 355(3)SP**
- Pre: CS 302 or 307
- CS 361 (3) SP
- Pre: CS 130 and 302 or 307
- CS Upper Division Elective (2) FA, SP
- Pre: Math 142 or 148
- Gen. Ed.: (3) FA, SP
- Social Science

#### Fall
- **17 hours**
- **CS 401(2)**
- Pre: CS 360
- CS Upper Division Elective (3) FA, SP, SU
- Pre: CS 130 and Math 142 or 148
- CS Upper Division Elective (3) FA, SP, SU
- Pre: Math 142 or 148
- English 355 or 360 (WC) (3) FA, SP, SU
- Pre: ENGL 102 or 118
- Gen. Ed.: (3) FA, SP, SU

#### Spring
- **15 hours**
- **CS 402(3) SP (OC & WC)**
- Pre: CS 401
- CS Upper Division Elective (3) FA, SP, SU
- Pre: CS 130 and Math 142 or 148
- CS Upper Division Elective (3) FA, SP, SU
- Pre: Math 142 or 148
- Arts and Humanities

The following list shows an acceptable set of electives that may be taken to satisfy the upper division electives for the CS major. The electives have been grouped into 6 suggested tracks. The tracks group related electives that a student may wish to take in order to achieve a level of expertise in the indicated area. However, it is not mandatory to take any track and students are free to mix and match courses from different tracks to fit their specific interests:

- **Theory:** CS 440, 482
- **Systems:** CS 456, 462, ECE 453, 461, 462, 463
- **Software:** CS 340, 461, 465
- **Hardware:** ECE 451, 455
- **Scientific Computing:** CS 370 or 377, 471, 472, Math 231, Artificial Intelligence: CS 420 or 427, 425, ECE 471
- **Cybersecurity:** CS 425/528, 434/534, 440/545, 480/580, 483/583, ECE 459/559, 461/561, 480/580, 471/571
- **Computer Science 493 and 494 may be taken to satisfy the upper division electives. Up to two (2) Computer Science 5xx or Electrical Computer Engineering 5xx courses may count as upper division electives.**

#### Progression

- The department requires at least a C in every computer engineering, computer science, electrical engineering, or mathematics course used for the undergraduate degree.
- Progression of departmental undergraduate students to the upper-division programs of the department is competitive and is based on the space available in the department. Students are encouraged to consult with their academic advisor before registering for upper-division courses.

Students also have opportunities for an Honors Concentration and/or a five-year BS/MS program. See the Undergraduate Catalog for details and requirements.

### UTRACK Milestones:

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
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<th>Term 4</th>
<th>Term 5</th>
<th>Term 6 through 8</th>
</tr>
</thead>
</table>
| Math 120 or higher or one SS | Math 120 or higher | EF 151/153 or Physics 131/137 | EF 152/154 or Physics 136/138 | MSE 212 or CS 102 or MSE 201 or OBE 201 | No Milestones

Counts the number of courses that must be completed with a grade of C or higher.
### Department of Electrical Engineering and Computer Science
#### Electrical Engineering Catalog 2016

<table>
<thead>
<tr>
<th>Fall</th>
<th>15 hours</th>
<th>Spring</th>
<th>15 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 141 or 147 (4)</td>
<td>FA, SP, SU</td>
<td>EF 151 or 157 (4)</td>
<td>FA, SP</td>
</tr>
<tr>
<td>Prereq-Math 130 or Math 28 ACT or Math 630 SAT</td>
<td>Coreq-Math 141 or 147 and EF 105 or CS 102</td>
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</table>

<table>
<thead>
<tr>
<th>Fall</th>
<th>16 hours</th>
<th>Spring</th>
<th>17 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 231 (3)</td>
<td>FA, SP, SU</td>
<td>ECE 255 (3)</td>
<td>FA, SP, SU</td>
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<tr>
<td>Prereq-Math 142 or 148</td>
<td>Prereq-CS 130</td>
<td>Coreq-Math 142 or 148</td>
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</table>

<table>
<thead>
<tr>
<th>Fall</th>
<th>15 hours</th>
<th>Spring</th>
<th>15 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 241 or 247 (4)</td>
<td>FA, SP, SU</td>
<td>Math 251 or 257 (3)</td>
<td>FA, SP, SU</td>
</tr>
<tr>
<td>Prereq-Math 142 or 148</td>
<td>Prereq-Physics 231</td>
<td>Prereq-Math 241 or 247</td>
<td></td>
</tr>
</tbody>
</table>

**Acceptable Senior Electrical and Computer Engineering courses:** Choose 12 credit hours of ECE senior electives with Faculty Advisor’s consent. Up to 2 COSC 5XX or ECE 5XX courses may count as upper division electives. Acceptable ECE senior electives are ECE 4XX courses that are not otherwise required for the degree.

**Technical Electives:** Computer Science 140, 311 or Math 300, CS 370, Chemistry 130 or 138, Industrial 405, Materials Science and Engineering 201 or 207, 410, Mechanical Engineering 231, 321, 331, 344; Nuclear Engineering 342 or 347.

### Progression

The department requires at least a C in every computer engineering, computer science, electrical engineering, and mathematics course used for the undergraduate degrees. Students taking ECE 201 must also have a C or better in EF 152 or 158.

Progression of departmental undergraduate students to the upper-division programs of the department is competitive and is based on the space available in the department. Factors considered in the decision include overall grade point average, grades earned in courses required in the lower division curricula of the department and College of Engineering, and seriousness of purpose and interest in departmental programs as exemplified by regular and orderly progress through the prescribed curriculum without abuse of withdrawal and course repeat privileges.

Students who take ECE 300 (now ECE 201-202) will be evaluated during the semester they are registered for it. Transfer students for whom ECE 300 (now ECE 201-202) transfer credit is given may take 9 semester hours in departmental courses before progression evaluation. All students, whether or not they transfer in, who are not accepted into the upper-division program of the department will be put in either a temporary probationary status or a non-progressed status and will not be permitted to register for any upper division courses within the department.

Students also have opportunities for an Honors Concentration and/or a five year BS/MS program. See the Undergraduate Catalog for details and requirements.

### UTRACK Milestones:

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<th>Term 5</th>
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<tr>
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<td>Math 130 or higher</td>
<td>EF 151/157 or Physics 135/137</td>
<td>EF 152/158 or Physics 136/138</td>
<td>ME 202 or CS 102 or MSE 201 or CBE 201</td>
<td>No Milestones</td>
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</tbody>
</table>
# Engineering Majors

http://catalog.utk.edu

## Department of Electrical Engineering and Computer Science

### Electrical-Power & Energy Systems Concentration Catalog 2016

<table>
<thead>
<tr>
<th>Term</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 hours</td>
<td>Math 141 or 147 (4) FA, SP, SU</td>
<td>Math 231 (3) FA, SP, SU</td>
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<td>Prereq-Math 130 or Math 251 or CS 102 or Math 630 SAT</td>
<td>Math 251 or 257 (3) FA, SP, SU</td>
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<td></td>
<td>EF 151 or 157 (4) FA, SP</td>
<td>Prereq-Math 141 or 147</td>
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<td>Coreq-Math 141 or 147 and EF 105 or CS 102</td>
<td>Coreq-Math 141 or 147</td>
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<tr>
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<td>CS 102 (4) FA, SP</td>
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<td>English 101 or 118 (3) FA, SP, SU</td>
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<table>
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<th>Term</th>
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<th>Spring</th>
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<tr>
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<td>Math 142 or 148 (4) FA, SP, SU</td>
<td>Math 241 or 247 (4) FA, SP, SU</td>
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<td>EF 152 or 158 (4) FA, SP</td>
<td>Physics 231 (3) FA, SP, SU</td>
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<td>Math 130</td>
<td>Coreq-Math 231, access FORM</td>
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<td>Prereq-Math 142 or 148</td>
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<td>ECE 325 (3) FA, SP</td>
<td>ECE 336 (3) FA, SP</td>
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<td>Prereq-ECE 335</td>
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<td>ECE 335 (3) FA, SP</td>
<td>ECE 342 (3) FA, SP</td>
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<td>Prereq-ECE 313, 315</td>
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<td>ECE 341 or 347 (3) FA, SP</td>
<td>Gen. Ed. (3) FA, SP, SU</td>
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<td>Prereq-ECE 202, Math 241 or 247</td>
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<td>Physics 232</td>
<td>Gen. Ed. (3) FA, SP, SU</td>
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<td>ECE 395 (1) FA, SP</td>
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<td>Gen. Ed. (3) FA, SP, SU</td>
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<td>ECE 395 (1) FA, SP</td>
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<td>ECE Sr. Elective (3) FA, SP</td>
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<td>ECE Sr. Elective (3) FA, SP</td>
<td>Power Elective(3) FA, SP</td>
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<td>Power Elective(3) FA, SP</td>
<td>ECE 491 (2) FA</td>
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<td>ECE 401 (1) FA</td>
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<td>ECE 402 (OCW) (3) SP</td>
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<td>ECE 496 (1) SP</td>
<td>ECE 496 (1) SP</td>
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<td>Prereq-ECE 325</td>
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### Senior ECE electives:
- Choose 6 credit hours of ECE senior elective with Faculty Advisor consent. Up to 2 COSC 5XX or ECE 5XX courses may count as upper division electives. Acceptable senior electives are ECE 4XX courses that are not otherwise required for the degree.

### Power & Energy System Electives:
- ECE 415, ECE 421, ECE 422, ECE 481, ECE 482, ECE 521, ECE 522, ECE 523, ECE 525

### Technical Electives:
- COSC 140, COSC 331 or MATH 300, COSC 370, CHEM 130/138, IE 405, MME 201/207, MSE 410, ME 231, ME 321, ME 331, ME 344, NE 342 or NE 347

### Economic, Entrepreneurship, and Innovation Elective:
- Choose from IE 405, IE 457 (or ME 457), EF 357, IE 518, IE 557 (or ME 519), MGT 552, or MGT 560

### Progression

- The department requires at least a C in every computer engineering, computer science, electrical engineering, and mathematics course used for the undergraduate degrees. Students taking ECE 201 must also have a C or better in EF 152 or 158.

- Progression of departmental undergraduate students to the upper-division programs of the department is competitive and is based on the space available in the department. Factors considered in the decision include overall grade point average, grades earned in courses required in the lower division curricula of the department and College of Engineering, and seriousness of purpose and interest in departmental programs as exemplified by regular and orderly progress through the prescribed curriculum without abuse of withdrawal and course repeat privileges.

- Students who take ECE 300 (now ECE 201-202) will be evaluated during the semester they are registered for it. Transfer students for whom ECE 300 (now ECE 201-202) transfer credit is given may take 9 semester hours in departmental courses before progression evaluation. All students, whether or not they transfer in, who are not accepted into the upper-division program of the department will be put in either a temporary probationary status or a non-progressed status and will not be permitted to register for any upper division courses within the department.

- Students also have opportunities for an Honors Concentration and/or a five year BS/MS program. See the Undergraduate Catalog for details and requirements.

### UTRACK Milestones:

<table>
<thead>
<tr>
<th>Term</th>
<th>Math 130 or higher or one SS or one AH or one CC</th>
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<tr>
<td>1</td>
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<td>EF 151/157 or Physics 135/137</td>
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<tr>
<td>3</td>
<td>EF 152/158 or Physics 136/138</td>
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<td>4</td>
<td>ME 202 or CS 102 or MSE 201 or CBE 201</td>
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# Engineering Majors

## Industrial Engineering Catalog 2016

### Fall
<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
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</table>
| 16   | Math 141 or 147 (4) FA, SR SU  
Prereq: Math 130 or Math ACT 28 or Math SAT 630  
English 101 or 118 (3) FA, SP, SU  
Chem 120 or 128 (4) FA, SR SU  
Math 130  
EF 151 or 159 (4) FA, SP  
EF 105  
EF 106 (1) FA, SP |
| 16   | Math 142 or 148 (4) FA, SR SU  
Prereq: Math 141 or 147  
English 102 (3) FA, SP, SU  
Prereq: English 101 or 118  
Gen Ed (3) FA, SP, SU  
Social Science  
EF 152 or 159 (4) FA, SP  
Prereq: EF 151 or 157  
ME 202 (2) FA, SP  
Prereq: EF 152 or 158 and Math 142 or 148 |

### Spring
<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
</tr>
</thead>
</table>
| 17   | IE 250 (1) FA  
Industrial majors only  
IE 200 (3) FA, SP  
Prereq: Math 142 or 148  
IE 405 (3) FA, SP, SU  
Prereq: Engineering or Biosystems major  
Math 241 or 247 (4) FA, SP, SU  
Physics 231 (3) FA, SP, SU  
MSE 201 or 207 (3) FA, SP, SU  
Prereq: Chemistry 120 or 128 |
| 17   | ECON 201 or 207 (4) FA, SP, SU  
Social Science  
Math 231 (3) FA, SP, SU  
Prereq: Math 142 or 148  
Math 200 (2) FA, SP  
Cannot receive credit if previous C or better in Math 251 or 257 |
| 16   | IE 350 (WC) (1) FA  
Prereq: IE 250  
IE 301 (3) FA  
Prereq: Math 200  
IE 204 (3) FA  
Prereq: Math 200  
IE 301 or 317 (3) SP  
Prereq: IE 301 A & IE 200 or Stats 251 |

### Fall
<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
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</table>
| 15   | IE 450 (1) FA  
Prereq: IE 350  
IE 404 (2) FA, SP, SU  
Prereq: IE 300 & IE 405  
IE 405 (3) FA  
Prereq: IE 200 or Stats 251  
IE 304 (3) FA  
Minimum student level — junior |
| 15   | IE 452 (1) OC & WC FA, SP, SU  
Prereq: 404 and English 102 or 118  
IE 408 or 409 (3) SP  
Prereq: IE 200 or Stats 251  
IE 347 (3) SP  
Prereq: IE 406 or 408 |

### Spring
<table>
<thead>
<tr>
<th>Hours</th>
<th>Courses</th>
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<tbody>
<tr>
<td>17</td>
<td>IE Technical Electives chosen from AE 341 or 347, BUAD 361, BUAD 410, BULW 301, COSC 102, ECE 255, ECE 302, ECON 311, ECON 312, ECON 322, ECON 331, ECON 333, ECON 351, ECON 361, ECON 365, FINC 300, FINC 425, FINC 455, IE 423, IE 430, IE 457, IE 483, IE 484, INSC 310, INSC 451, MATH 300, MGT 300, MSE 302, MSE 340 or 347, MSE 360 or 367, MSE 390 or 397, MSE 405, ME 321, ME 363 or 367, ME 365, ME 366, ME 405, MSE 342 or 347, 3 credit hours of EF 333. Some courses may require a prerequisite or corequisite that is not part of the IE program.</td>
</tr>
<tr>
<td>17</td>
<td>*IE Technical Electives chosen from IE 423, IE 430, IE 451, IE 457, IE 483, IE 484, IE 493, IE 494, IE 495. The same course may not be used to count for both IE Technical Elective and IE Elective.</td>
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**Students also have opportunities for an Honors Concentration and/or a five year BS/MS program. See the Undergraduate Catalog for details and requirements.**

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**UTRACK Milestones:**

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<tr>
<th>Term</th>
<th>Courses</th>
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<tbody>
<tr>
<td>1</td>
<td>Math 130 or higher or one SS or one AH or one CC</td>
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<tr>
<td>2</td>
<td>Math 130 or higher</td>
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<tr>
<td>3</td>
<td>EF 151/159 or Physics 135/137</td>
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<tr>
<td>4</td>
<td>EF 152/158 or Physics 136/136</td>
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### Materials Science and Engineering Catalog 2016

#### Fall

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<tbody>
<tr>
<td><strong>English</strong> 101 or 118 (3) FA, SP, SU</td>
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<td><strong>Chem</strong> 120 or 128 (4) FA, SP, BU</td>
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<td><strong>Math</strong> 130</td>
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<tr>
<td><strong>Math 141 or 147 (4) FA, SP, PU</strong></td>
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<td><strong>EF 151 or 157 (4) FA, SP</strong></td>
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<td><strong>EF 105 (1) FA, SP</strong></td>
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<td><strong>EF 105 (1) FA, SP</strong></td>
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#### Spring

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<td><strong>English</strong> 102 (3) FA, SP, BU</td>
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<td><strong>Chem</strong> 130 or 138 (4) FA, SP, BU</td>
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<td><strong>Prep:</strong> Chem 130 or 128</td>
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<tr>
<td><strong>Math 142 or 148 (4) FA, SP, BU</strong></td>
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<td><strong>Prep:</strong> Math 141 or 147</td>
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<td><strong>EF 152 or 158 (4) FA, SP</strong></td>
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<td><strong>Prep:</strong> EF 151 or 157</td>
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<tr>
<td><strong>EF 105 (1) FA, SP</strong></td>
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#### Fall

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<td><strong>Math 241 or 247 (4) FA, SP, BU</strong></td>
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<td><strong>Prep:</strong> Math 142 or 148</td>
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<tr>
<td><strong>Physics 231 (3) FA, BU</strong></td>
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<td><strong>Prep:</strong> Math 142 or 148</td>
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<td><strong>Social Science</strong></td>
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<tr>
<td><strong>EF 230 (2) FA, SP</strong></td>
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<td><strong>Prep:</strong> EF 152 or 158 or Physics 136 or 138</td>
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#### Spring

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<td><strong>Math 231 (3) FA, SP, BU</strong></td>
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<td><strong>Prep:</strong> EF 152 or 158, Chem 130/138, and Math 241/247, MSE 201</td>
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<td><strong>MSE 330 (3) FA</strong></td>
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<td><strong>MSE 340 or 347 (3) FA</strong></td>
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<td><strong>Prep:</strong> MSE 201 and 260</td>
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<td><strong>Prep:</strong> MSE 201 and 260</td>
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<tr>
<td><strong>MSE 360 or 367 (3) SP</strong></td>
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#### Spring

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<td><strong>MSE 350 or 357 (3) SP</strong></td>
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<tr>
<td><strong>Prep:</strong> MSE 201</td>
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<tr>
<td><strong>MSE 360 or 367 (3) SP</strong></td>
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<tr>
<td><strong>Prep:</strong> MSE 201</td>
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<td><em><em>Technical Elective</em> (3) FA, SP, BU</em>*</td>
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#### Fall

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<tr>
<td><strong>MSE 405 (WC) (4) FA, SP</strong></td>
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<td><strong>Prep:</strong> MSE 201 and 260</td>
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<td><strong>MSE 480 (1) FA</strong></td>
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<td><strong>Prep:</strong> MSE 201 and 260</td>
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<td><strong>Gen: Ed. (3) FA, SP, BU</strong></td>
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<tr>
<td><strong>MSE 480 (1) FA, SP, BU</strong></td>
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#### Spring

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<tbody>
<tr>
<td><strong>MSE 4XX (5) FA, SP, BU</strong></td>
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<td><strong>Prep:</strong> Technical Elective (3) FA, SP, BU</td>
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<tr>
<td><strong>Prep:</strong> MSE 300, 340, 347, 350, 357, 390, 397, and 480</td>
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<tr>
<td><strong>MSE 405 (WC) (4) FA, SP</strong></td>
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<td><strong>Prep:</strong> MSE 201 and 260</td>
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<td><strong>Gen: Ed. (3) FA, SP, BU</strong></td>
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<td><strong>MSE 480 (1) FA, SP, BU</strong></td>
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<td><strong>MSE 4XX (3) FA, SP, BU</strong></td>
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*Technical electives: ECE 301 (strongly recommended), BCMB 230, BOL 160 or 168, (BME 409, CBE 475, CHEM 350 or 358, EF 333, any MSE course, ME 321, NE 483, NE 484, other 300 or 400 level science or engineering courses as approved by academic advisor and department head.**

**MSE 4XX Electives: Materials Science and Engineering electives: 408, 410, 421, 425, 432, 440, 445, 450, 451, 455, 457, 460, 464, 468, 474, 484, 485, 496, 496, 496, 495, 496.**

### Upper Division Status

A lower division student formally applies for upper division status after completing 50 hours of lower division engineering curriculum course work with an overall GPA of at least 2.4. This must include MSE 201.

### Provisional Status

Students who have completed 50 hours of lower-division engineering curriculum course work with an overall GPA between 2.0 and 2.4 may apply for provisional status. The granting of provisional upper-division status is based on the availability of space in the departmental programs after upper-division status students have been accommodated. Provisional status students are required to demonstrate their ability to perform satisfactorily in upper-division courses by attaining a minimum GPA of 2.0 in at least 8 hours of 300-level required courses specified by the department. Further progression to upper-division courses is dependent upon this minimum level of performance.

### MSE Graduation Requirements

Graduation in materials science and engineering requires a minimum grade point average of 2.0 for all departmental courses.

Students also have opportunities for an Honors Concentration and/or a five-year BS/MS program. See the Undergraduate Catalog for details and requirements.

### UTRACK Milestones:

<table>
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<th>Term 1</th>
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<th>Term 3</th>
<th>Term 4</th>
<th>Term 5</th>
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<td>Math 130 or higher or one SS or one AH or one CC</td>
<td>Math 130 or higher</td>
<td>EF 151/157 or Physics 135/137</td>
<td>EF 152/158 or Physics 136/138</td>
<td>ME 202 or GG 102 or MSE 201 or CBE 201</td>
<td>No Milestones</td>
</tr>
</tbody>
</table>
### Materials Science and Engineering Catalog 2016

#### BIOMATERIALS CONCENTRATION

| Fall 16 hours |
|---|---|---|---|---|---|
| English 101 or 118 (3) FA, SP, SU | Chem 120 or 128 (4) FA, SP, SU | Math 141 or 147 (4) FA, SP, SU | EF 151 or 157 (4) FA, SP | EF 105 (1) FA, SP |
| Math 130 | Prereq-Math 130 or Math ACT 28 or Math SAT 650 | Coreq-Math 141 or 147 and EF 155 |

| Spring 16 hours |
|---|---|---|---|---|---|
| English 102 (3) FA, SP, SU | Prereq-English 101 or 118 | Chem 130 or 138 (4) FA, SP, SU | Math 142 or 148 (4) FA, SP | EF 152 or 158 (4) FA, SP |
| Prereq-Math 141 or 147 | Coreq-Math 142 or 148 |

| Fall 17 hours |
|---|---|---|---|---|---|
| MSE 201 or 207 (3) FA, SP, SU | MSE 230 (1) FA | Math 241 or 247 (4) FA, SP, SU | Physics 231 (3) FA, SP, SU | EF 230 (2) FA, SP |
| Prereq-Chemistry 120 or 128 | Coreq-MSE 301 | Coreq-Math 142 or 148 | Coreq-Math 241 or 247 |

| Spring 16 hours |
|---|---|---|---|---|---|
| MSE 290 (1) SP | Math 202 (3) FA, SP | Math 231 (3) FA, SP, SU | MSE 250 (3) SP |
| Cannot receive credit if previous C or better in Math 251 or 257 | Prereq-Math 142 or 148 | Prereq-Physics 231 | Prereq-Math 142 or 148, EF 230 and Coreq-Math 231 and MSE 201 |

| Fall 16 hours |
|---|---|---|---|---|---|
| MSE 300 (3) FA | MSE 301 (3) FA | MSE 320 (3) FA | MSE 340 or 347 (3) FA | MSE 360 or 367 (3) FA |
| Prereq-MSE 201 and 210 | Prereq-Math 142/148, 231, EF 230 | Prereq-MSE 201 and 200 | Prereq-MSE 301 |

| Spring 17 hours |
|---|---|---|---|---|---|
| MSE 304 (3) SP | MSE 390 or 397 (3) SP | MSE 370 (3) FA | MSE 360 or 357 (3) SP | Biology 360/168 or BOMB 230 |

#### Progression

Progression of students to departmental upper-division courses is competitive. Factors considered include overall grade point average, performance in selected lower division courses, and evidence of satisfactory and orderly progress through the prescribed curriculum.

#### Upper Division Status

A lower division student formally applies for upper division status after completing 50 hours of lower division engineering curriculum course work with an overall GPA of at least 2.4. This must include MSE 201.

#### Provisional Status

Students who have completed 50 hours of lower-division engineering curriculum course work with an overall GPA between 2.0 and 2.4 may apply for provisional status.

The granting of provisional upper-division status is based on the availability of space in the departmental programs after upper-division status students have been accommodated.

Provisional students are required to demonstrate their ability to perform satisfactorily in upper-division courses by attaining a minimum GPA of 2.0 in at least 8 hours of 300-level required courses specified by the department. Further progression to upper-division courses is dependent upon this minimum level of performance.

#### MSE Graduation Requirements

Graduation in materials science and engineering requires a minimum grade point average of 2.0 for all departmental courses.

Students also have opportunities for an Honors Concentration and/or a five year BS/MS program. See the Undergraduate Catalog for details and requirements.

### UTRACK Milestones:

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
<th>Term 4</th>
<th>Term 5</th>
<th>Term 6 Through 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130 or higher or one SS</td>
<td>Math 130 or higher</td>
<td>EF 151/157 or</td>
<td>EF 150/158 or Physics 136/138</td>
<td>ME 302 or CS 102 or MSE 301</td>
<td>No Milestones</td>
</tr>
</tbody>
</table>
Engineering Majors
http://catalog.utk.edu

Materials Science and Engineering Catalog 2016
NANOMATERIALS CONCENTRATION

Fall
16 hours
- English 101 or 118 (3) FA, SP, SU, or 15 hours
- Chem 120 or 128 (4) FA, SP, SU, or 15 hours
- Math 141 or 147 (4) FA, SP, SU, or 15 hours
- EF 151 or 157 (4) FA, SP, Coreq Math 141 or 147 and EF 151
- EF 105 (1) FA, SP, Coreq EF 151 or 157

Spring
16 hours
- English 102 (3) FA, SP, SU, or 15 hours
- Prereq English 101 or 118
- Chem 130 or 138 (4) FA, SP, SU, or 15 hours
- Math 142 or 148 (4) FA, SP, SU, or 15 hours
- EF 152 or 158 (4) FA, SP, Coreq EF 151 or 157
- MSE 101 (1) SP

Fall
17 hours
- MSE 201 or 207 (3) FA, SP, SU, or 16 hours
- Prereq Chemistry 120 or 128
- MSE 210 (1) FA, Coreq MSE 201
- Math 241 or 247 (4) FA, SP, SU, or 16 hours
- Prereq Math 141 or 147
- Physics 211 (3) FA, SP, SU, Coreq Math 142 or 148
- Econ 201 or 207 (4) SP, SU, FA, Prereq EF 152 or 158, or Physics 136 or 138
- MSE 201

Spring
16 hours
- MSE 290 (1) SP
- Math 260 (2) FA, SP, Coreq Math 142 or 148, or better in math 251 or 257
- Math 231 (3) FA, SP, SU, Coreq Math 142 or 148
- Physics 232 (4) FA, SP, SU, Coreq Physics 231
- MSE 250 (3) SP, Coreq Math 142 or 148, EF 230 and Coreq-Math 231 and MSE 201
- MSE 260 (3) SP, Coreq EF 152 or 158, Chem 130/138, and Math 241/247, MSE 201

Fall
16 hours
- MSE 300 (1) FA, Coreq MSE 201 and 210
- MSE 301 (3) FA, Coreq Math 142/148, 231, EF 230
- MSE 330 (5) FA, Coreq MSE 201 and 230
- MSE 340 or 347 (3) FA, Coreq MSE 201
- MSE 360 or 367 (3) FA, Coreq MSE 201
- Gen. Ed. (3) FA, SP, SU, Coreq EF 230
- Arts and Humanities

Spring
16 hours
- MSE 304 (1) SP, Coreq MSE 300, 320, 340, 360
- MSE 390 or 397 (5) SP, Coreq MSE 201
- MSE 370 (3) SP, Coreq MSE 340 and 360 and Coreq MSE 230
- MSE 302 (3) SP, Coreq MSE 201
- MSE 350 or 357 (3) SP, Coreq MSE 201
- Technical Elective* (3) FA, SP, SU, Petition required in advance
- Gen. Ed. (3) FA, SP, SU, Coreq EF 230
- Social Science

Fall
16 hours
- MSE 410 (3) FA, SP, Coreq Physics 230, level junior
- MSE 405 (WC) (4) FA, SP, Coreq Physics 230
- MSE 480 (5) FA, SP, Coreq Physics 230, level junior
- Gen. Ed. (3) FA, SP, SU, Coreq EF 230
- Gen. Ed. (3) FA, SP, SU, Coreq EF 230
- Social Science

Spring
16 hours
- MSE 408 (3) FA, SP, Coreq MSE 201
- Technical Elective* (3) FA, SP, SU, Petition required in advance
- MSE 400 (DIC) (3) SP, Coreq MSE 304, 340/347, Coreq-PHYS 135/137
- Gen. Ed. (3) FA, SP, SU, Coreq EF 230
- Gen. Ed. (3) FA, SP, SU, Coreq EF 230
- Arts and Humanities

*Technical electives: Chem 473; MSE 421, 465, 474; Phys 411. Credit for other courses that address processing, structure, properties or behavior of nanomaterials may be substituted by permission of academic advisor and department head.

Progression
Progression of students to departmental upper-division courses is competitive. Factors considered include overall grade point average, performance in selected lower division courses and evidence of satisfactory and orderly progress through the prescribed curriculum.

Upper Division Status
A lower division student formally applies for upper division status after completing 50 hours of lower division engineering curriculum course work with an overall GPA of at least 2.4. This must include MSE 201.

Provisional Status
Students who have completed 50 hours of lower-division engineering curriculum course work with an overall GPA between 2.0 and 2.4 as mandatory. The granting of provisional upper-division status is based on the availability of space in the departmental programs after upper division status students have been accommodated. Provisional students are required to demonstrate their ability to perform satisfactorily in upper-division courses by attaining a minimum GPA of 2.0 in at least 8 hours of 300-level required courses specified by the department. Further progression to upper-division courses is dependent upon this minimum level of performance.

MSE Graduation Requirements
Graduation in materials science and engineering requires a minimum grade point average of 2.0 for all departmental courses. Students also have opportunities for an Honors Concentration and/or a five year BS/MS program. See the Undergraduate Catalog for details and requirements.

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<td>Math 130 or higher</td>
<td>EF 151/157 or Physics 135/137</td>
<td>EF 152/158 or Physics 136/138</td>
<td>ME 202 or CS 102 or MSE 201</td>
<td>No Milestones</td>
</tr>
</tbody>
</table>
Title Goes Here
Title Goes Here
Title Goes Here
Title Goes Here

Mechanical Engineering Catalog 2016

Fall
16 hours
Math 141 or 147 (4) FA, SP, SU
Prereq: Math 130 or Math ACT 28 or Math SAT 630
EF 151 or 153 (4) FA, SP, SU
Coreq: Math 141 or 147 and EF 105
EF 155 (1) FA, SP, SU
Coreq: EF 151 or 157
English 101 or 119 (3) FA, SP, SU
Chem 120 or 128 (4) FA, SP, SU
Math 150

Spring
16 hours
Math 142 or 148 (4) FA, SP, SU
Prereq: Math 141 or 147
EF 152 or 154 (4) FA, SP, SU
Prereq: EF 152 or 157
Coreq: Math 142 or 148
ME 202 (2) FA, SP, SU
Prereq: EF 152 or 158 and Physics 156 or 158
English 142 (3) FA, SP, SU
Prereq: English 101 or 118
Gen Ed (3) FA, SP, SU
Culture & Civilizations

Fall
16 hours
Math 241 or 247 (4) FA, SP, SU
Prereq: Math 142 or 148
ME 231 (3) FA, SP, SU
Prereq: EF 152 or 158 and ME 202
with grades of C or better
EF 230 (2) FA, SP
Prereq: EF 152 or 158 and Physics 156 or 158
Gen Ed (3) FA, SP, SU
Culture & Civilizations
Econ 201 or 207 (4) FA, SP, SU
Social Science

Spring
16 hours
Math 231 (3) FA, SP, SU
Prereq: Math 142 or 148
Math 251 or 257 (3) FA, SP, SU
Prereq: Math 142 or 148
ME 231 (3) FA, SP, SU
Prereq: Math 142 or 148
ME 251 or 257 (3) FA, SP, SU
Prereq: Math 142 or 148
MSE 201 or 207 (3) FA, SP, SU
Gen Ed (3) FA, SP, SU
Arts & Humanities

Fall
15 hours
ME 331 (3) FA, SP, SU
Prereq: Math 241 or 247
AE 341 or 347 (3) FA, SP, SU
Prereq: ME 231 with grade C or better and Math 241 or 247
ME 365 (3) FA, SP
Prereq: ME 321 with grade C or better and ME 201
ME 345 (3) FA, SP, SU
Prereq: AE 341/347
ME 365 or 367 (3) FA, SP, SU
Prereq: ME 331 and 391 or 397
EC 301 (3) FA, SP, M
Prereq: Math 231
ME 391 or 397 (3) FA, SP, SU
Prereq: EF 230, Math 251/257, and Math 241/247, and Math 231 with grade C or better
Gen Ed (3) FA, SP, SU
Arts & Humanities

Spring
15 hours
ME 475 or 477 (3) FA, SP, SU
Prereq: ME 344
ME 449 (3) FA, SP, SU
Prereq: ME 321, 346 & 348/347 and English 102 or 118
Any 300 level or above in AE, BME, or ME not already required.
Any 300 level or above in AE, BME, or ME not already required.
Gen Ed (3) FA, SP, SU
Arts & Humanities

Fall Status Progression
A lower-division student may apply for progression to upper division after completing EF 152/158, CHEM 120/128, MATH 231, ME 202, ME 231, AE 341, and ME 321 with a grade of C or better in each, and an overall GPA of at least 2.4.

Provisional Status Progression
Students who complete EF 152/158, CHEM 120/128, MATH 231, ME 202, ME 231, ME 321, ME 344, and ME 450 with a GPA of at least 2.0 shall be placed in the provisional status. Additional requirements are to meet the minimum grade point average of 2.0 in all departmental courses and to complete the required hours in the major.

Transfer Students
Transfer students must have completed the required courses with grades of C or better.

Departmental Academic Standing
The faculty of the Department of Mechanical, Aerospace and Biomedical Engineering expect all students who enter to make progress toward graduation. To graduate from the department, a student must earn a minimum grade point average of 2.0 in all departmental courses counted toward the degree. Students not meeting the required departmental GPA may be dropped from their major.

ME Graduation Requirements
A minimum GPA of 2.5 in all departmental courses counted toward the degree taken at the University of Tennessee, Knoxville, is required for graduation. Students may petition for exclusion from the major.

General Requirements
Students must complete the following requirements for graduation:

- Full Status Progression
- Provisional Status Progression
- Transfer Students
- Departmental Academic Standing
- ME Graduation Requirements
- General Requirements

UTRACK Milestones
Term 1
Math 130 or higher or one SS
Term 2
Math 130 or higher
Term 3
EF 151/157 or Physics 139/137
Term 4
EF 152/158 or Physics 139/137
Term 5
ME 202 or CS 102 or MSE 201 or CBE 201
Term 6 through 8
No Milestones
# Nuclear Engineering Catalog 2016

## Fall

<table>
<thead>
<tr>
<th>Hours</th>
<th>Course</th>
<th>Prerequisite</th>
<th>Corequisite</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Math 141 or Math 147</td>
<td>Math 130 or 139 or Math ACT 29 or Math SAT 650</td>
<td>EF 151 or 157</td>
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<td>15</td>
<td>English 101 or 118</td>
<td>Math 130</td>
<td>EF 152 or 157</td>
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<td>16</td>
<td>Chem 120 or Math 148</td>
<td>Math 130</td>
<td>EF 152 or 157</td>
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</tr>
<tr>
<td>15</td>
<td>EF 152 or 153</td>
<td>EF 151 or 157</td>
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</tbody>
</table>

## Spring

<table>
<thead>
<tr>
<th>Hours</th>
<th>Course</th>
<th>Prerequisite</th>
<th>Corequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Math 142 or Math 148</td>
<td>Math 130 or 139 or Math ACT 29 or Math SAT 650</td>
<td>EF 151 or 157</td>
</tr>
<tr>
<td>15</td>
<td>English 102 or 118</td>
<td>Math 130</td>
<td>EF 152 or 157</td>
</tr>
<tr>
<td>16</td>
<td>Chem 130 or Math 148</td>
<td>Math 130</td>
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<tr>
<td>15</td>
<td>EF 152 or 153</td>
<td>EF 151 or 157</td>
<td></td>
</tr>
</tbody>
</table>

## Full Status Progression

A lower-division student may apply for progression to upper division after completing CHEM 120* or CHEM 128*, CHEM 130* or CHEM 138*, MATH 141* or MATH 147*, MATH 142* or MATH 148*, MATH 231, EF 151* or EF 157*, EF 152* or EF 158*, and PHYS 231*, with a grade of C or better in each, and an overall GPA of at least 2.5.

## Provisional Status Progression

Students who have completed CHEM 120* or CHEM 128*, CHEM 130* or CHEM 138*, MATH 141* or MATH 147*, MATH 142* or MATH 148*, MATH 231, EF 151* or EF 157*, EF 152* or EF 158*, and PHYS 231* with a grade of C or better and have an overall GPA between 2.0 and 2.5 may apply for provisional status. The granting of provisional status is based on the availability of space in departmental programs after full status students have been accommodated. Provisional status students are required to demonstrate their ability to perform satisfactorily in upper division by attaining a minimum GPA of 2.5 in the first 9 hours of 300-level required engineering courses. Award of upper-division full status is dependent upon this performance. Students who have not progressed to upper-division will be dropped from departmental courses.

Students also have opportunities for an Honors Concentration and/or a five year BS/MS program. See the Undergraduate Catalog for details and requirements.

## Nuclear Graduation Requirements

Students are required to maintain a cumulative grade point average of at least 2.0 in all nuclear engineering courses taken at the University of Tennessee, Knoxville used to satisfy the graduation requirement. No more than four (4) credit hours of required nuclear engineering courses in which a C- or lower is the highest grade earned may be counted toward graduation. This is in addition to the university’s graduation requirements.

Students are strongly recommended to meet with their faculty advisor every semester.

## Milestones

<table>
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<tr>
<th>Term</th>
<th>Course</th>
<th>Milestone</th>
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<tr>
<td>2</td>
<td>Math 130 or higher</td>
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<td>EF 151/157 or Physics 135/137</td>
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<td>4</td>
<td>EF 152/158 or Physics 136/138</td>
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<td>5</td>
<td>ME 202 or CS 102 or MSE 201 or CBE 201</td>
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<tr>
<td>6</td>
<td>No Milestones</td>
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</tbody>
</table>

*Technical Electives are selected from upper-division mathematics, chemistry, physics and engineering courses and must be pre-approved by the department advisor. Courses in Nuclear Engineering other than 500, 502 and 598 may also be used as technical electives.
# Nuclear Engineering Catalog 2016

## Radiological Concentration

<table>
<thead>
<tr>
<th>Term</th>
<th>Fall 16 hours</th>
<th>Spring 15 hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Math 141 or 147 (4) FA, SP, SU</td>
<td>Math 142 or 148 (4) FA, SP, SU</td>
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<td>Prereq- Math 130 or Math ACT 28 or Math SAT 630</td>
<td>Prereq- Math 141 or 147</td>
</tr>
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<td>English 101 or 118 (3) FA, SP, SU</td>
<td>English 102 (3) FA, SP, SU</td>
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<td></td>
<td>Chem 120 or 128 (4) FA, SP, SU</td>
<td>Chem 130 or 138 (4) FA, SP, SU</td>
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<td>Math 130</td>
<td>Prereq- Chem 120 or 128</td>
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<td></td>
<td>EF 151 or 157 (4) FA, SP</td>
<td>EF 152 or 158 (4) FA, SP</td>
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<td>Coreq- Math 141 or 147 and EF 105</td>
<td>Prereq- EF 151 or 157</td>
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<td>EF 105 (1) FA, SP</td>
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<th>Term</th>
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<th>Spring 15 hours</th>
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<td>Math 231 (3) FA, SP, SU</td>
<td>Math 241 or 247 (4) FA, SP, SU</td>
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<td>NE 200 (2) FA</td>
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<td>NE 233 (3) SP</td>
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<td>Prereq- EF 241 or 247</td>
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<td>Physics 231 (3) FA, SP, SU</td>
<td>Physics 232 (4) FA, SP, SU</td>
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<td>Coreq- Math 142 or 148 and Math 142 or 148</td>
<td>Gen Ed (3) FA, SR SU</td>
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<td>EF 230 (2) FA, SP</td>
<td>Arts and Humanities</td>
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<tr>
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<td>ECON 201 or 207 (4) FA, SP, SU</td>
<td>Social Science</td>
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<th>Term</th>
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<th>Spring 17 hours</th>
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<tr>
<td></td>
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<td>Math 400 (4) SP</td>
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<td>Coreq- ECE 301 &amp; Math 241/247</td>
<td>Coreq- NE 401 and 470</td>
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<td>Stats 251 (3) FA, SP, SU</td>
<td>NE 400 or 427 (4) FA</td>
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<td>Prereq- Math 401 or 470</td>
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<td>Gen Ed (3) FA, SR SU</td>
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*Technical Electives are selected from upper division mathematics, chemistry, physics and engineering courses and must be pre-approved by the department. Courses in Nuclear Engineering other than 500, 502 or 598 may also be used as technical electives. Pre-med, pre-vet, and pre-dentistry students should take Chem 350, Chem 360 and 369.

### Full Status Progression

A lower-division student may apply for progression to upper division after completing CHEM 120 or CHEM 128, CHEM 130 or CHEM 138, MATH 141 or MATH 147, MATH 142 or MATH 148, MATH 231, EF 151 or EF 157, EF 152 or EF 158, and PHYS 231, with a grade of C or better in each, and an overall GPA of at least 2.5.

### Provisional Status Progression

Students who have completed CHEM 120 or CHEM 128, CHEM 130 or CHEM 138, MATH 141 or MATH 147, MATH 142 or MATH 148, MATH 231, EF 151 or EF 157, EF 152 or EF 158, and PHYS 231 with a grade of C or better and have an overall GPA between 2.0 and 2.5 may apply for provisional status. The granting of provisional status is based on the availability of space in departmental programs after full status students have been accommodated. Provisional status students are required to demonstrate their ability to perform satisfactorily in upper-division by attaining a minimum GPA of 2.5 in the first 9 hours of 300-level required nuclear engineering courses. Award of upper-division full status is dependent upon this performance. Students who have not progressed to upper-division will be dropped from departmental courses.

Students also have opportunities for an Honors Concentration and/or a five-year BS/MS program. See the Undergraduate Catalog for details and requirements.

### Nuclear Graduation Requirements

Students are required to maintain a cumulative grade point average of at least 2.0 in all nuclear engineering courses taken at the University of Tennessee, Knoxville used to satisfy the graduation requirement. No more than four (4) credit hours of required nuclear engineering courses in which a C- or lower is the highest grade earned may be counted toward graduation. This is in addition to the university’s graduation requirements.

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<td>EF 152/158 or Physics 136/138</td>
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</tr>
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Full Status Progression:

- A lower-division student may apply for progression to upper division after completing CHEM 120 or CHEM 128, CHEM 130 or CHEM 138, MATH 141 or MATH 147, MATH 142 or MATH 148, MATH 231, EF 151 or EF 157, EF 152 or EF 158, and PHYS 231, with a grade of C or better in each, and an overall GPA of at least 2.5.

Provisional Status Progression:

- Students who have completed CHEM 120 or CHEM 128, CHEM 130 or CHEM 138, MATH 141 or MATH 147, MATH 142 or MATH 148, MATH 231, EF 151 or EF 157, EF 152 or EF 158, and PHYS 231 with a grade of C or better and have an overall GPA between 2.0 and 2.5 may apply for provisional status. The granting of provisional status is based on the availability of space in departmental programs after full status students have been accommodated. Provisional status students are required to demonstrate their ability to perform satisfactorily in upper-division by attaining a minimum GPA of 2.5 in the first 9 hours of 300-level required nuclear engineering courses. Award of upper-division full status is dependent upon this performance. Students who have not progressed to upper-division will be dropped from departmental courses.

Students also have opportunities for an Honors Concentration and/or a five-year BS/MS program. See the Undergraduate Catalog for details and requirements.

Nuclear Graduation Requirements:

- Students are required to maintain a cumulative grade point average of at least 2.0 in all nuclear engineering courses taken at the University of Tennessee, Knoxville used to satisfy the graduation requirement. No more than four (4) credit hours of required nuclear engineering courses in which a C- or lower is the highest grade earned may be counted toward graduation. This is in addition to the university’s graduation requirements.

Students are strongly recommended to meet with their faculty advisor every semester.

UTRACK Milestones:

- **Term 1**
  - Math 130 or higher or one SS or one AH or one CC
- **Term 2**
  - Math 130 or higher
  - EF 151/157 or Physics 135/137
- **Term 3**
  - EF 152/158 or Physics 136/138
  - ME 202 or CS 102 or MSE 201 or CBE 201
- **Term 4**
  - EF 152/158 or Physics 136/138
- **Term 5**
  - EF 152/158 or Physics 136/138
- **Term 6 through 8**
  - No Milestones
Undergraduate Minors 2016-2017

**College of Agricultural Sciences and Natural Resources**
- Agricultural leadership
- Animal science
- Biosystems engineering technology
- Entomology and plant pathology
- Environmental and soil sciences
- Food and agricultural business
- Food science
- Food technology
- Forestry
- International agriculture and natural resources
- Natural resource and environmental economics
- Plant sciences
- Watershed
- Wildlife and fisheries science

**College of Architecture and Design**
- Architectural studies
- Design studies
- Industrial design
- Interior design

**College of Business Administration**
- Business administration
- Entrepreneurship

**College of Communication and Information**
- Communication studies
- Information studies & technology
- Journalism & electronic media

**College of Education, Health, and Human Sciences**
- Art education
- Child and family studies
- Elementary education
- English as a second language education
- Leadership studies
- Mathematics education
- Nutrition
- Public health
- Restaurant and food service management
- Retail and consumer sciences
- Retail technology
- Science education
- Secondary education
- Tourism and hospitality management
- World language education

**College of Engineering**
- Aerospace engineering
- Biomedical engineering
- Computer science (not open to computer engineering)
- Concepts of cybersecurity (not for EECS majors)
- Cybersecurity (for EECS majors)
- Datacenter technology and management (for EECS, IE, and ME majors)
- Engineering entrepreneurship
- Environmental engineering
- Honors engineering leadership
- Materials science & engineering
- Mechanical engineering
- Nuclear decommissioning and environmental management
- Reliability & maintainability engineering

**College of Arts and Sciences**
- Africana studies
- American studies
- Anthropology
- Arab studies
- Art history
- Art studio
- Asian studies
- Astronomy
- Biological sciences
- Chemistry
- Chinese
- Cinema studies
- Classical archaeology
- Classical civilization
- Classics (Greek or Latin)
- Comparative literature
- Economics
- English
- English technical communication
- Environmental studies
- French and Francophone studies
- Geography
- Geology
- German
- Global studies
- History
- Italian
- Japanese
- Judaic studies
- Latin American and Caribbean studies
- Linguistics
- Mathematics
- Medieval and Renaissance studies
- Music (applied, composition, culture & theory)
- Music Business
- Neuroscience
- Philosophy
- Physics
- Physics — five-year BS/MS
- Political science
- Portuguese
- Psychology
- Religious studies
- Russian
- Russian literature in translation
- Spanish (Hispanic studies)
- Sociology (environmental issues and globalization)
- Statistics
- Sustainability
- Theatre
- VolsTeach math
- VolsTeach science
- Women’s studies

**Howard H. Baker Jr. Center for Public Policy**
- Public policy analytics
Pre-Health Information

All Pre-Health Advising takes place in the Arts & Sciences Advising Center, 313 Ayres Hall, 865-974-4481. Advisors are available in Arts and Sciences Advising Services to assist pre-medical students as they plan their programs. When a student declares a major, he/she should obtain an advisor in the department of the declared major, but should continue to consult with the pre-medical advisors in Arts and Sciences Advising Services about the pre-medical program.

Students who are currently enrolled in another college, i.e., Engineering or Architecture, are required to take the following minimum courses for most medical schools:

- English 101-102 or Honors 118
- Biology 150-160 or Honors 158-168, and Lab 159
- Chemistry 120-130 or Honors 128-138
- Chemistry 350-360 or Honors 358-368, and Lab 369
- Physics 221-222 (231-232 for engineering students only)

The following courses are not required by medical schools, but their content is included on MCAT 2015

- Biology 240
- Biochemistry and Cellular and Molecular Biology 401
- Psychology 110, Sociology 120

Note that many of these courses have prerequisites and that the courses listed above constitute the minimal requirements for most medical schools. Pre-medical students are strongly urged to consult with a health professions advisor on a regular basis in 313 Ayres Hall. Students will want to verify with the medical schools of interest for specific requirements beyond what is listed here.

Selection Criteria at UT Health Science Center

1. Successful completion of the pre-medical requirements with grades of C or better earned in each course.
2. Letters of evaluation from three faculty members who have a good awareness of the student’s ability.
3. Experience in/exposure to the health field.
4. Total academic performance, with attention given to course content and load, trends in performance, and general commitment to scholarship.
5. Satisfactory scores on the Medical College Admission Test (MCAT).
6. Personal interview with two members of the Committee on Admissions. (Competitively qualified applicants will be invited for interviews after their applications have been reviewed by the Committee.)
7. Other criteria such as extracurricular activities; motivation and goals; research experience; the morals, character, and integrity of the individual; and any disciplinary or civil records that a person may have accrued.

Please note that high GPA and MCAT scores are not by themselves a sufficient basis for entrance into medical school. The Committee on Admissions takes a close look at the total experience of the applicant in making its final decisions. In addition, the Committee on Admissions reserves the right to require additional course work from any applicant. Correspondence course work must be approved prior to scheduling.

Pre-Professional File

During the junior year, pre-med students should attend a pre-professional file group meeting to learn about setting up the pre-professional file. Group meetings are scheduled weekly in Arts and Sciences Advising Services, 313 Ayres Hall. In the meeting, students are given information on pre-professional evaluations, AMCAS, and other aspects of the medical school application process. The most important aspect of the file is the letters of evaluation from faculty members who are familiar with the student’s aptitude, ability, and personal characteristics. Two of the evaluations should come from faculty members teaching in science-based disciplines. Students should make every effort to become well acquainted with their professors prior to requesting the evaluations. Once the file has been started, students should maintain contact with the health professions assistant to periodically check on the file and to provide updated contact information. For the purposes of AMCAS, the file prepared in Arts & Sciences is considered a letter packet, and the primary contact for the packet is the chair of the health professions, Mary Anne Hoskins.

Alpha Epsilon Delta (AED)

Alpha Epsilon Delta is a pre-health honor society that seeks to provide information and opportunities for students with an interest in the health professions. The Tennessee Beta Chapter of AED is active at The University of Tennessee. AED activities include information sessions on preparing to apply to professional schools, local speakers from the medical community, trips to Tennessee medical schools and health centers, and service activities. The schedule of meetings is available at aedutk.wix.com/aed-utk.

Requirements for membership include three terms of college (at least one at UTK), a cumulative GPA of 3.2, a science GPA of 3.2, and participation in AED sponsored events and meetings. Students interested in joining AED should apply for membership at the beginning of fall term. Applications are available in Arts and Sciences Advising Services, 313 Ayres Hall, and at the organizational Web site. Any pre-health student, regardless of membership, may participate in the programs sponsored by AED. Pre-health students wishing to receive notification of pre-health activities and AED events should send an e-mail to mhoskins@utk.edu to request to be added to the pre-health distribution list.

Distribution List

Pre-health students should contact Arts & Sciences Advising Services atasadvising@utk.edu at their earliest convenience to request to be added to the pre-health distribution list. Students on the distribution list are routinely updated about pre-health programming, announcements, and opportunities relevant to the health professions.
Chancellor Honors Requirements

Curricular Requirements
To maintain status in and earn a degree from the Chancellor’s Honors Program, students are required to:

First-year honors writing sequence
- ENGL 198 — Chancellor’s Honors Writing I and ENGL 298 — Chancellor’s Honors Writing II (WC)1.

Five approved honors courses from at least three of the following categories2:
- Artistic Expression and Humanistic Thought
- Behavioral, Social, and Communication Sciences
- Natural Sciences
- Human Cultures and Civilizations
- Logic, Mathematics, and Quantitative Reasoning

Two-semester, or approved equivalent, capstone experience in undergraduate research, scholarship, or creative activity culminating in a senior thesis or project. (UNHO 497-UNHO 498 or approved equivalent)

TOTAL: 25+ credit hours of honors coursework3.

Co-curricular Requirements
Ready for the World Experience: an approved international/intercultural learning experience to be fulfilled through one of the following:
1. Study-abroad
2. International travel for service, research, internship, or other academic purpose
3. Completion of a major or minor in a modern foreign language
4. Completion of an approved intercultural domestic project

Campus and Community Engagement: an annual requirement to actively participate in the life of the campus and community by:
1. Attendance at least three honors-approved events (called “Becker Seminars”) each semester
2. Completion of at least 25 hours of documented community service each year

Electronic Portfolio: electronic website (which can be private) where students will summarize and make connections between curricular and co-curricular experiences and reflect. Designed to be a four-year undertaking, the completed portfolio will be reviewed prior to student’s graduation.

Chancellor’s Honors students are expected to make timely progress towards honors graduation while maintaining a minimum cumulative GPA of 3.5. Students risk losing their place in the program if they fail to meet these requirements.

1 ENGL 198-ENGL 298 fulfills two of the three Communicating through Writing courses required by the university. All CHP students must complete ENGL 198-ENGL 298 regardless of existing credits from AP or dual enrollment composition courses.
2 The University Honors Committee, comprised of appointed representatives from each of the undergraduate academic colleges, approves existing honors courses for the Chancellor’s Honors Program requirements. A complete, up-to-date list of approved courses by category is available on the CHP Blackboard site as well as the Honors and Scholars website (http://honors.utk.edu/chp-approved-honors-courses/). Students may also apply for approval of a maximum of one honors-by-contract or study abroad course (for which they have received transfer credit from UT).
3 No AP or dual enrollment credit will be accepted for honors credits for the Chancellor’s Honors Program requirements.

Required Honors Curriculum for Haslam Scholars
Scholars are required to complete 12 hours of a foreign language regardless of the amount of foreign language credit they have at the time of matriculation.

Scholars must maintain a 3.50 cumulative GPA and obtain a B or higher in all HSP courses.

<table>
<thead>
<tr>
<th>Curricular Requirement</th>
<th>First Year</th>
<th>Second Year</th>
<th>Third Year</th>
<th>Fourth Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HSP 257: Power (fall)</td>
<td>HSP 287: Knowledge (fall)</td>
<td>HSP 497: Thesis Research (fall)(*)</td>
<td>HSP 499: Senior Colloquium (Spring)(*)</td>
</tr>
<tr>
<td></td>
<td>HSP 267: Life (spring)</td>
<td>HSP 368: Scotland Study Abroad (summer)</td>
<td>HSP 497: Thesis Research (**)</td>
<td>HSP 499: Senior Colloquium (Spring)(*)</td>
</tr>
</tbody>
</table>
Engineering Honors Programs

National Scholarships and Fellowships

The Office of National Scholarships and Fellowships exists to both inform and mentor students who wish to apply for nationally competitive scholarships and fellowships like the Truman, Rhodes, Marshall or Fulbright. We also assist outstanding undergraduates who wish to apply for Rotary Ambassadorial, Goldwater and Udall Scholarships.

The Office of National Scholarships and Fellowships will work with students to determine what fellowship would best fit their interests. Once students have decided to apply, we will assist them with the application process. To apply for most scholarships administered by our office, students need to begin the application process over a year before the scholarship period begins.

For more about each of the scholarships handled by the Office of National Scholarships and Fellowships, visit on the first floor of the Howard Baker Center or call (865) 974-3518 to schedule an appointment.

ORNL Summer Research and Internship

There exist numerous opportunities for undergraduates to supplement their academic learning with real world experience. The Chancellor’s Office and Oak Ridge National Laboratory (ORNL) each sponsor summer internship programs designed to promote research and creative activity among undergraduate students. The Department of Energy (DOE) also sponsors summer and semester length opportunities.

The role of the faculty mentor is paramount in these programs as they will provide guidance in the choice of a project and in the practice of professional approaches and methods. Projects proposed may be a student’s undergraduate thesis, a part of the faculty mentor’s research program, another research project or an ongoing project begun previously. The key is that the student be involved in actual scholarly work independent of a classroom setting.

For more information visit the website at www.ornl.gov Click on “jobs” on the left hand menu.

For more honors and research information, contact:

Dr. Kevin Kit
Engineering Honors Director
322 Perkins Hall
865-974-9810
kkit@utk.edu

Office of Undergraduate Research
Marisa Mazen
1534 White Ave.
865-974-8560
research.utk.edu/undergrad

Engineering Honors Programs

Admission

Admission as a first year student to the Engineering Honors Program and Honors Concentrations by invitation, which is extended by the Engineering Dean’s office to students meeting rigorous academic standards in their high school coursework and to all students accepted into the Chancellors Honors Program.

Admission as a transfer student or after completing significant coursework at the University of Tennessee is by direct application to the departmental honors concentration in the student’s major department.

Requirements

Coursework

- Four 100- or 200-level departmental honors courses (14 hours minimum, at least two courses must be from Engineering Fundamentals, Physics, Math, Chemistry, or Biology).
- Coursework requirements in the upper division are specific to the individual departments and the student is referred to those individual descriptions for explanation.

GPA

A minimum GPA to continue or graduate with a Departmental Honors Concentration may be required by the individual departments, see departmental description.

Breadth

An honors student is expected to broaden their undergraduate experience beyond a prescribed curriculum. Engineering Honors Concentration students must satisfy two of the five National Academy of Engineering (NAE) Grand Challenge Scholars Requirements (One of these must be at an Intermediate level and the other at an Introductory level. See next page for details.)

Additional Opportunities for Engineering Honors Students

NAE Grand Challenge Honors Programs

The Grand Challenge Engineer Program is for students who wish to concentrate in one of the NAE breadth areas and have an exposure to the others. It requires one Extensive experience and four Introductory Experiences in the five breadth areas. A qualified research experience must be related to one of the 14 NAE Grand Challenges.

The Grand Challenge Scholars Program is for students who wish to build a broad level of experience in all the NAE areas into their undergraduate program. It requires one Extensive experience, two Intermediate experiences, and two Introductory Experiences. A qualified research experience must be related to one of the 14 NAE Grand Challenges.
## Breadth Requirement Experience Levels for Honors Concentration, GCE, and GCS

<table>
<thead>
<tr>
<th></th>
<th>Extensive</th>
<th>Intermediate</th>
<th>Introductory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research</strong></td>
<td>Completion of a three-semester-long undergraduate research experience. Must result in a mentor-approved paper or poster which is presented at EUReCA, UT Honors Symposium, or other venue approved by the Honors director.</td>
<td>Completion of a two-semester-long undergraduate research experience. Must result in a mentor-approved paper or poster which is presented at EUReCA, UT Honors Symposium, or other venue approved by the Honors director.</td>
<td>Completion of a one-semester-long undergraduate research experience. Must result in a mentor-approved paper or poster which is presented at EUReCA, UT Honors Symposium, or other venue approved by the Honors director.</td>
</tr>
<tr>
<td><strong>Interdisciplinary coursework</strong></td>
<td>Minimum of 9 hours from either a) interdisciplinary honors courses, or b) interdisciplinary courses offered as part of the UT-HELM minor.</td>
<td>Minimum of 6 hours from either a) interdisciplinary honors courses, or b) interdisciplinary courses offered as part of the UT-HELM minor.</td>
<td>Minimum of 3 hours from either a) interdisciplinary honors courses, or b) interdisciplinary courses offered as part of the UT-HELM minor.</td>
</tr>
<tr>
<td><strong>Entrepreneurship</strong></td>
<td>Minimum of 9 hours from the new Interdisciplinary Minor in Entrepreneurship</td>
<td>Minimum of 6 hours from the new Interdisciplinary Minor in Entrepreneurship</td>
<td>Minimum of 3 hours from the new Interdisciplinary Minor in Entrepreneurship</td>
</tr>
<tr>
<td><strong>Global experience</strong></td>
<td>Full semester abroad and a foreign language minor</td>
<td>Full semester abroad or a foreign language minor or a minimum 6-hour faculty led study abroad.</td>
<td>One course abroad or COE non-credit global experience.</td>
</tr>
<tr>
<td><strong>Service learning</strong></td>
<td>An extensive experience in Service Learning would normally be designed by the student and approved by the Honors director to reflect individual student interests.</td>
<td>Minimum of 6 hours from UH 267 Service Learning, COE Design course associated with the Smart Cities Initiative, or other courses carrying UT service learning designation</td>
<td>Minimum of 3 hours chosen from UH 267 Service Learning, COE Design course associated with the Smart Cities Initiative, or other course carrying UT service learning designation</td>
</tr>
</tbody>
</table>

The Departmental Honors Concentrations requires one Intermediate experience and one Introductory experience. This designation is recognized on the student’s diploma and official transcript.
# Advanced Placement

<table>
<thead>
<tr>
<th>Subject</th>
<th>AP Score</th>
<th>Credit Given</th>
</tr>
</thead>
<tbody>
<tr>
<td>American History</td>
<td>4 or 5</td>
<td>History 221-222</td>
</tr>
<tr>
<td>Biology</td>
<td>3</td>
<td>Biology 101</td>
</tr>
<tr>
<td>Biology</td>
<td>4</td>
<td>Biology 101-102</td>
</tr>
<tr>
<td>Biology</td>
<td>5</td>
<td>Biology 101-102 and 160</td>
</tr>
<tr>
<td>Calculus AB</td>
<td>3</td>
<td>Math 125</td>
</tr>
<tr>
<td>Calculus AB</td>
<td>4</td>
<td>Math 141</td>
</tr>
<tr>
<td>Calculus AB</td>
<td>5</td>
<td>Math 147</td>
</tr>
<tr>
<td>Calculus BC</td>
<td>3</td>
<td>Math 141</td>
</tr>
<tr>
<td>Calculus BC</td>
<td>4</td>
<td>Math 141-142</td>
</tr>
<tr>
<td>Calculus BC</td>
<td>5</td>
<td>Math 147-148</td>
</tr>
<tr>
<td>Chemistry</td>
<td>4 or 5</td>
<td>Chemistry 120-130</td>
</tr>
<tr>
<td>Chinese Language and Culture</td>
<td>4 or 5</td>
<td>CHIN 131-132</td>
</tr>
<tr>
<td>Computer Science A</td>
<td>5</td>
<td>Computer Science 102</td>
</tr>
<tr>
<td>Economics - Microeconomics</td>
<td>3 or above</td>
<td>Economics 211 (If both, then credit for Econ 201)</td>
</tr>
<tr>
<td>Economics - Macroeconomics</td>
<td>3 or above</td>
<td>Economics 213 (If both, then credit for Econ 201)</td>
</tr>
<tr>
<td>English Language &amp; Composition</td>
<td>4 or 5</td>
<td>English 101</td>
</tr>
<tr>
<td>English Literature &amp; Composition</td>
<td>4 or 5</td>
<td>*Students admitted fall 2016, credit for English 101</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Students admitted prior to fall 2016, credit for English 101-102</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>3</td>
<td>Geology 201</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>4 or 5</td>
<td>Geology 201-202</td>
</tr>
<tr>
<td>European History</td>
<td>4 or 5</td>
<td>History LD-242 (Culture and Civilization)</td>
</tr>
<tr>
<td>French Language and Culture</td>
<td>3</td>
<td>French 211-212</td>
</tr>
<tr>
<td>French Language and Culture</td>
<td>4 or 5</td>
<td>French 212-333</td>
</tr>
<tr>
<td>German Language and Culture</td>
<td>4 or 5</td>
<td>German 211-212 or German 311-312</td>
</tr>
<tr>
<td>German Language and Culture</td>
<td>3</td>
<td>German 211-212</td>
</tr>
<tr>
<td>Government and Politics - Comparitive Exam</td>
<td>2014 exams and prior, 3,4, or 5; 2015 and later, 4 or 5</td>
<td>Political Science 102</td>
</tr>
<tr>
<td>Government and Politics - US Exam</td>
<td>2014 exams and prior, 3,4, or 5; 2015 and later, 4 or 5</td>
<td>Political Science 101</td>
</tr>
<tr>
<td>Human Geography</td>
<td>4 or 5</td>
<td>Geography 121</td>
</tr>
<tr>
<td>Latin Literature</td>
<td>3, 4, or 5</td>
<td>Latin 251-252</td>
</tr>
<tr>
<td>Music Theory - Aural Subscore</td>
<td>4</td>
<td>MUTH 130</td>
</tr>
<tr>
<td>Music Theory - Aural Subscore</td>
<td>5</td>
<td>MUTH 130, 140</td>
</tr>
<tr>
<td>Music Theory - Nonaural (written) Subscore</td>
<td>4</td>
<td>MUTH 110</td>
</tr>
<tr>
<td>Music Theory - Nonaural (written) Subscore</td>
<td>5</td>
<td>MUTH 110, 120</td>
</tr>
<tr>
<td>Physics I</td>
<td>4 or 5</td>
<td>Physics 221</td>
</tr>
<tr>
<td>Physics II</td>
<td>4 or 5</td>
<td>Physics 222</td>
</tr>
<tr>
<td>Physics C - E &amp; M</td>
<td>5</td>
<td>Physics 136</td>
</tr>
<tr>
<td>Physics C - E &amp; M</td>
<td>4</td>
<td>Physics 102 or 222 or 231</td>
</tr>
<tr>
<td>Physics C - Mechanics</td>
<td>5</td>
<td>Physics 135</td>
</tr>
<tr>
<td>Physics C - Mechanics</td>
<td>4</td>
<td>Physics 101 or 161 or 221</td>
</tr>
<tr>
<td>Psychology</td>
<td>3, 4, or 5</td>
<td>Psychology 110</td>
</tr>
<tr>
<td>Spanish Language or Literature</td>
<td>3</td>
<td>Spanish 211-212</td>
</tr>
<tr>
<td>Spanish Language or Literature</td>
<td>4</td>
<td>Spanish 212 and 300</td>
</tr>
<tr>
<td>Spanish Language or Literature</td>
<td>5</td>
<td>Spanish 300 and 305</td>
</tr>
<tr>
<td>Statistics</td>
<td>4 or 5</td>
<td>Statistics 201</td>
</tr>
<tr>
<td>World History</td>
<td>4 or 5</td>
<td>History 261-262</td>
</tr>
</tbody>
</table>

**How to refuse AP and IB credits:** If you prefer to take the course at UT that you have AP or IB credit for, you must officially refuse your AP or IB credit by going to the One-Stop Shop in Hodges Library by the Add Deadline (first 10 days of the semester).
## International Baccalaureate

### International Baccalaureate (IB) Exam Credit

<table>
<thead>
<tr>
<th>Subject</th>
<th>AP Score</th>
<th>Credit Given</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology (higher level)</td>
<td>5+</td>
<td>Biology 101-102</td>
</tr>
<tr>
<td>Chemistry (higher level)</td>
<td>5+</td>
<td>Chemistry 120-130</td>
</tr>
<tr>
<td>English (A1 exam)</td>
<td>5</td>
<td>English 101</td>
</tr>
<tr>
<td>English (A1 exam)</td>
<td>6+</td>
<td>English 101-102</td>
</tr>
<tr>
<td>English (A2 and B exam)</td>
<td>N/A</td>
<td>No credit</td>
</tr>
<tr>
<td>Environmental Systems and Societies</td>
<td>4+</td>
<td>Geography 121</td>
</tr>
<tr>
<td>(standard level)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Film (higher level)</td>
<td>5+</td>
<td>Cinema Studies LD</td>
</tr>
<tr>
<td>French (standard level)</td>
<td>5+</td>
<td>French 212</td>
</tr>
<tr>
<td>French (higher level)</td>
<td>5+</td>
<td>French 212, 333</td>
</tr>
<tr>
<td>Geography</td>
<td>4+</td>
<td>Geography 121</td>
</tr>
<tr>
<td>German (standard level)</td>
<td>4</td>
<td>German 211-212</td>
</tr>
<tr>
<td>German (higher level)</td>
<td>4+</td>
<td>German 211-212 or German 301-302 or German 311-312</td>
</tr>
<tr>
<td>History (higher level)</td>
<td>4+</td>
<td>History LD-LD</td>
</tr>
<tr>
<td>Latin (standard level)</td>
<td>5+</td>
<td>Latin 251-252</td>
</tr>
<tr>
<td>Latin (higher level)</td>
<td>4+</td>
<td>Latin 251-252</td>
</tr>
<tr>
<td>Math (higher level)</td>
<td>4+</td>
<td>Mathematics 141-142 plus 4 hours LD Math Credit</td>
</tr>
<tr>
<td>Music</td>
<td>6+</td>
<td>Musicology 110</td>
</tr>
<tr>
<td>Philosophy (higher level)</td>
<td>4+</td>
<td>Philosophy 101</td>
</tr>
<tr>
<td>Physics (higher level 1)</td>
<td>4+</td>
<td>Physics 221</td>
</tr>
<tr>
<td>Physics (higher level 2)</td>
<td>4+</td>
<td>Physics 222</td>
</tr>
<tr>
<td>Psychology (standard or higher level)</td>
<td>4+</td>
<td>Psychology 110</td>
</tr>
<tr>
<td>Social and Cultural Anthropology</td>
<td>4+</td>
<td>Anthropology 130</td>
</tr>
<tr>
<td>Spanish (higher level)</td>
<td>4+</td>
<td>Spanish 211-212</td>
</tr>
<tr>
<td>Theatre (higher level)</td>
<td>4+</td>
<td>Theatre 100 and Theatre LD</td>
</tr>
<tr>
<td>Visual Arts (higher level)</td>
<td>5+</td>
<td>Art LD</td>
</tr>
<tr>
<td>World Religions (standard level)</td>
<td>4+</td>
<td>Religious Studies LD</td>
</tr>
</tbody>
</table>
# Placement Exams

## Freshman Math Placement

Based on ACT Math or SAT Math Placement Scores

<table>
<thead>
<tr>
<th>Math ACT</th>
<th>Math SAT</th>
<th>Math Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>570</td>
<td>Math 130 Pre Calculus</td>
</tr>
<tr>
<td>28</td>
<td>630</td>
<td>Math 141 Calculus 1</td>
</tr>
<tr>
<td>32</td>
<td>720</td>
<td>Math 147 Honors Calculus 1</td>
</tr>
</tbody>
</table>

**Adjustments to Placement:**

1. AP credits in Math or Dual Enrollment credits in Math trump the ACT Math/SAT Math placements.
2. Take the equivalent of Math 130 at a local community college or at UT in the summer prior to classes starting in the Fall.
3. Take an online placement test through the Math Department website (www.math.utk.edu). There will be two tests, one for attaining Math 130 (Level 3) and one for attaining Math 141 (Level 4). Engineering students take the test for Math 141. The test maybe repeated 3 times. Use the online remediation system to review, and then (re)take the placement test. The system is adaptive to the math elements needed for success.

## Engineering Math courses

Students must be taking Math 141 or higher to be eligible for Engineering Fundamentals 151/157 or Physics 135/137.

Math 130 is a preparation class: These are required Math classes:

<table>
<thead>
<tr>
<th>Math 130 Pre Calculus 4 credit hours</th>
<th>Math 141/147 Cal I/Honors 4 credit hours</th>
<th>Math 142/148 Cal II/Honors 4 credit hours</th>
<th>Math 241/247 Cal III/Honors 4 credit hours</th>
<th>Math 231/237 Diff. Eq. 3 credit hours</th>
<th>Math 251/257 Matrix/Honors 3 credit hours</th>
</tr>
</thead>
</table>

\[
mgh_0 + \frac{1}{2}mv_0^2 + \frac{1}{2}k\Delta x_0^2 + W_{in} = mgh_f + \frac{1}{2}mv_f^2 + \frac{1}{2}k\Delta x_f^2 + E_{loss}
\]
Placement Exams

First-Year Composition Placement

1. **Regular Sequence**: English 101 (Fall) + English 102 (Spring). Students may not take English 102 before passing English 101.


3. **Honors Sequence**: English 118 (Fall) + 200-level English course or English 355 (Spring). Students placed into 118 by ACT or SAT scores—see below. Not for Chancellor’s Honors Program students. (Note: students who get a passing grade of B- or below in English 118 must take English 102 in Spring).

4. **Chancellor’s Honors Sequence**: English 198 (Fall) + English 298 (Spring). Limited to students in the Chancellor’s Honors Program.

5. **AP Credit Sequence***: Credit for 101 through AP score + Choice of either English 290 or English 102 (Fall or Spring).

*AP Credit: A score of 4 or 5 on either the College Board Advanced Placement Test in Literature and Composition or the Language and Composition exam gives credit for English 101 only. Students must take English 290 or English 102 to complete the First-Year Composition requirement.

**Note**: CLEP credit is not accepted for the First-Year Composition requirement.

<table>
<thead>
<tr>
<th>ACT Scores</th>
<th>SAT Scores</th>
<th>Fall Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>At or below 18 English &amp; 18 Composite</td>
<td>Below 450 Verbal &amp; 850 Composite</td>
<td>English 101 and English 103</td>
</tr>
<tr>
<td>English 19-28 &amp; Composite 19-28</td>
<td>Verbal 450-680 &amp; Composite 850-1280</td>
<td>English 101 (Strongly recommend English 103 for students who want or need additional help)</td>
</tr>
<tr>
<td>At or above 29 English &amp; 29 Composite</td>
<td>Above 680 Verbal &amp; 1280 Composite</td>
<td>English 118 (Offered only in Fall)</td>
</tr>
</tbody>
</table>

FOREIGN LANGUAGE – Not Required in Engineering

Students can take a foreign language assessment as part of the Pre-Orientation steps. The College of Engineering does not require the study of foreign language to earn a diploma. However, intermediate (200 level) foreign language sequence satisfies the University’s General Education area of Cultures and Civilizations.

Students interested in earning intermediate foreign language credits in Spanish, French, German or others, contact:
Douglas W. Canfield
Modern Foreign Language Department
Room 7 Alumni Memorial Building
865-974-8193
lrc@utk.edu

Students interested in earning intermediate foreign language credits in Latin (Classics) contact:
Dr. Christopher Craig
Professor and Head
Department of Classics
1101 McClung Tower
865-974-2723
craig@email.utk.edu

**Placement Exam**

All students planning to enroll in a French, German, Latin, or Spanish course who have completed at least two years of this language in high school and have not yet taken a college course in the language must take a UT placement exam before enrolling. This rule does not apply to students who receive AP credit in the language. The score on the exam will determine placement in the appropriate course. Ordinarily, a student will not be allowed to enroll in a course at a level above that determined by his/her placement exam score.

**Transition Course**

Some students who have had two years of the same language in high school and receive a placement score below the level required for admittance into intermediate-level language courses may be placed in a 150 language course. These courses are designed to prepare students for enrollment in intermediate-level foreign language courses and count as elective credit. Students who receive credit for this course may not receive credit for any other 100-level course of the same language.
## General Education Requirements

### Arts and Humanities (2 courses)
Taking two courses from the list below satisfies this requirement

**Approved Arts and Humanities (AH) Courses**

#### Africana Studies
- 160: Art of Africa, Oceania and Pre-Columbian America
- 225: Introduction to African Literature
- 226: Introduction to Caribbean Literature
- 233: Major Black Writers

#### Architecture
- 111: Architecture and the Built Environment
- 117: Honors-Architecture and the Built Environment
- 211: History and Theory of Architecture I
- 217: Honors-History and Theory of Architecture I
- 218 Honors-History and Theory of Architecture II

#### Art Design/Graphic
- 150: The Idea of Graphic Design

#### Art History
- 162: Art of Africa, Oceania and Pre-Columbian America
- 167: Honors-Art of Africa, Oceania and Pre-Columbian America
- 172: Western Art I
- 173: Western Art II
- 177: Honors-Western Art I
- 178: Honors-Western Art II
- 183: Asian Art
- 187: Honors-Asian Art

#### Cinema Studies
- 281: Introduction to Film Studies

#### Classics
- 221: Early Greek Mythology
- 222: Classical Greek and Roman Mythology
- 232: Archeology and Art of Ancient Greece and Rome
- 253: Greek and Roman Literature in English Translation

#### English
- 201: British Literature I-Beowulf through Johnson
- 202: British Literature II-Wordsworth to Present
- 206: Introduction to Shakespeare
- 207: Honors-British Literature I
- 208: Honors-British Literature II
- 221: World Literature I-Ancient through Early Modern
- 222: World Literature II-18th Century to Present
- 225: Introduction to African Literature
- 226: Introduction to Caribbean Literature
- 231: American Literature I-Colonial Era through the Civil War
- 232: American Literature II-Civil War to Present
- 233: Major Black Writers
- 237: Honors-American Literature I-Colonial Era through the Civil War
- 238: Honors-American Literature II-Civil War to Present
- 247: Honors: Introduction to Poetry
- 248: Honors: Introduction to Drama
- 251: Introduction to Poetry
- 252: Introduction to Drama
- 253: Introduction to Fiction
- 254: Themes in Literature
- 258: Honors: Introduction to Fiction
- 281: Introduction to Film Studies

#### Haslam Scholars Program
- 258: Foundations of Modernity
- 287: Knowledge

#### Musicology
- 110: Introduction to Music in Western Culture
- 115: Music in the United States
- 120: History of Rock
- 125: Jazz in American Culture
- 210: History of Western Music-Ancient to the Baroque
- 220: History of Western Music-Classical to the Present
- 290: Soundscapes-Exploring Music in a Changing World

#### Philosophy
- 101: Introduction to Philosophy
- 107: Honors-Introduction to Philosophy
- 200: Special Topics
- 244: Professional Responsibility
- 252: Contemporary Moral Problems

#### Religious Studies
- 225: Introduction to Judaism, Christianity, Islam
- 280: Introduction to the Religions of Asia

#### Russian
- 221: Rebels, Dreamers and Fools-The Outcast in 19th Century Russian Literature
- 222: Heaven or Hell-Utopias and Dystopias in 20th Century Russian Literature

#### Theatre
- 100: Introduction to Theatre
- 107: Honors: Introduction to Theatre

#### University Honors
- 257: Special Topics in the Arts and Humanities
- 258: Special Topics in the Arts and Humanities

## Social Sciences (2 courses)
This requirement is satisfied by taking two courses from the following list.

**Approved Social Sciences (SS) Courses**

#### Africana Studies
- 201: Introduction to African-American Studies
- 202: Introduction to African-American Studies

#### Agricultural and Resource Economics
- 201: Economics of the Global Food and Fiber System

#### Anthropology
- 130: Cultural Anthropology
- 137: Honors-Cultural Anthropology

#### Baker Center for Public Policy
- 101: Introduction to Public Policy

#### Child and Family Studies
- 210: Human Development
- 220: Marriage and Family-Roles and Relationships

#### Economics
- 201: Intro to Economics-A Survey Course
- 207: Honors-Introductory Economics

#### Educational Psychology
- 210: Psychoeducational Issues in Human Development

#### Geography
- 101: World Geography
- 111: Geography of the Digital World
- 121: Human Geography: People and Places

#### Haslam Scholars Program
- 257: Power
- 208: Perspectives on Globalization

#### Interior Design
- 200: Human Environment Relations
- 207: Honors-Human Environment Relations

#### Political Science
- 101: US Government and Politics
- 102: Introduction to Political Science
- 107: Honors-US Government and Politics

#### Psychology
- 110: General Psychology
- 117: Honors-General Psychology

#### Religious Studies
- 232: Religions in Global Perspective
- 233: Religion and Society in North America

#### Social Work
- 250: Social Welfare

#### Sociology
- 110: Social Justice and Social Change
- 120: General Sociology
- 127: Honors-General Sociology
- 232: Religions in global perspective

#### University Honors
- 267: Special Topics in the Social Sciences
- 268: Special Topics in the Social Sciences

#### Women’s Studies
- 230: Marriage and Family-Roles and Relationships
General Education Requirements

Cultures and Civilizations (2 courses)
This requirement is satisfied by either
(1) taking two courses from the following list or
(2) taking a two-course sequence in a foreign language at the intermediate level
or
(3) taking a six-hour intensive foreign language course at the intermediate level.

Approved Cultures and Civilizations (CC) Courses

Africana Studies
• 235: Introduction to African Studies
• 236: Introduction to African Studies

Anthropology
• 120: Prehistoric Anthropology
• 127: Honors-Prehistoric Anthropology

Classics
• 201: Introduction to Classical Civilization

Cultural Studies in Education
• 200: Survey of International Education

Environmental and Soil Sciences
• 120: Soils and Civilizations
• 220: Waters and Civilizations
• 227: Honors-Waters and Civilizations

Food Science and Technology
• 150: History and Culture of Food

Global Studies
• 250: Introduction to Global Studies

History
• 241: Development of Western Civilization
• 242: Development of Western Civilization
• 247: Honors-Development of Western Civilization
• 248: Honors-Development of Western Civilization
• 255: Introduction to Latin America and Caribbean Studies
• 256: Introduction to Latin America and Caribbean Studies
• 261: History of World Civilization
• 262: History of World Civilization
• 267: Honors-History of World Civilization
• 268: Honors-History of World Civilization

Haslam Scholars Program
• 368: Study Abroad: Edinburgh, Scotland

Latin America and Caribbean Studies
• 251: Early Latin American and Caribbean History
• 252: Modern Latin American and Caribbean History

Medieval Studies
• 201: Medieval Civilization I
• 202: Medieval Civilization II

Modern Foreign Languages and Literatures
• 200: Topics in International Literatures and Cultures

Plant Sciences
• 115: Plants That Changed the World
• 491: International Study: History and Culture of International Gardens and Landscapes

Religious Studies
• 101: World Religions in History
• 102: The Comparison of World Religions
• 107: Honors–World Religions in History

Sociology
• 250: Introduction to Global Studies

University Honors
• 277: Special Topics in Cultures and Civilizations
• 278: Special Topics in Cultures and Civilizations

Intermediate Foreign Language Courses

American Sign Language
• 211 and 212: Intermediate American Sign Language I and II

Arabic
• 221 and 222: Intermediate Modern Standard Arabic I and II

Asian Studies
• Hebrew 241 and 242, or Persian 261 and 262

Chinese
• Chinese 231 and 232

Classics
• Latin 251 and 252 or Greek 261 and 264

French
• French 211 and 212 or 217 and 218 Honors

German
• German 211 and 212

Hebrew
• Hebrew 241 and 242

Italian
• Italian 211 and 212

Japanese
• Japanese 251 and 252

Persian
• Persian 261 and 262

Portuguese
• Portuguese 211 and 212

Religious Studies
• Intermediate Biblical Hebrew 221 and 222

Russian
• Russian 201 and 202

Spanish
• Spanish 211 and 212 or 217 and 218 Honors

Intensive Intermediate Foreign Language Courses (6 credit hours)

French
• French 223

German
• German 223

Italian
• Italian 223

Portuguese
• Portuguese 223

Spanish
• Spanish 223

For a complete listing of all approved courses, please reference the extensive list online in the Undergraduate Catalog, http://catalog.utk.edu/.

\[
\begin{align*}
\vec{V}_{B/A} & = \vec{V}_{A/G} + \vec{V}_{B/G} \\
\vec{V}_{B/A} & = \vec{V}_{B/G} - \vec{V}_{A/G} \\
\vec{V}_{B/A} & = -\vec{V}_{B/G}
\end{align*}
\]
General Education Requirements in Engineering

**Communicating Through Writing**
1. English 101 or 118 (Honors)
2. English 102 or completion of Honors sequence
3. See major requirements

**Natural Sciences**
1. EF 151 or 157 (Honors) (Physics 135/137 for Computer Science ONLY)
2. EF 152 or 158 (Honors) (Physics 136/138 for Computer Science ONLY)

**Social Sciences**
1. Economics 201 or 207 (Honors) required for all majors EXCEPT Chemical, Electrical, Computer, Computer Science
2. Pick one from Catalog Social Sciences list

**Communicating Orally**
1. See major requirements

**Quantitative Reasoning**
1. Math 141 or 147 (Honors)
2. Math 142 or 148 (Honors)

**Arts and Humanities**
1. ____________
2. ____________
Pick two from Catalog Arts and Humanities list

**Cultures and Civilizations**
1. ____________
2. ____________
Pick two from Catalog Cultures and Civilizations list

---

**Major**
General Education Requirements in Engineering

*General Education Requirements by Major
See http://catalog.utk.edu for the University of Tennessee General Education Requirements

Communication Through Writing:
- Aerospace - AE 449
- Biomedical - BME 430
- Biosystems - English 360
- Chemical - CBE 415
- Civil - CE 205
- Computer, Electrical - ECE 402
- Computer Science - CS 402
- Industrial - IE 422
- Materials Science - MSE 405
- Mechanical - ME 449
- Nuclear - NE 402

Cultures and Civilizations:
Students may satisfy Cultures and Civilizations in one of two ways: intermediate proficiency in a foreign language, demonstrated by credit for the 200-level sequence in the foreign language, OR two completed courses from the Cultures and Civilizations list from the catalog. The College of Engineering does NOT require foreign language, but students are welcome to use intermediate proficiency in foreign language to satisfy this requirement.

Communicating Orally:
- Aerospace, Biomedical, Mechanical - AE 410, BME 410 or ME 410
- Biosystems - BSE 401
- Chemical - CBE 488 or 490
- Civil - CE 205
- Computer, Electrical - ECE 402
- Computer Science - CS 402
- Industrial - IE 422
- Materials Science - MSE 489
- Nuclear - NE 400

\[ f' = f_0 \frac{v + v_L}{v + v_S} \]
The Office of the University Registrar is pleased to present BannerDARS, the online version of DARS (Degree Audit Reporting System). Students and faculty advisors can access, view and print a degree audit report from anywhere they have Internet access.

To access BannerDARS, go to https://myutk.utk.edu

To login to BannerDARS, you will need your Net ID and password (this is the same Net ID and password that you use for MyUTK and Webmail).

To run a BannerDARS Audit, you will need to know the catalog year you are following for graduation and your degree program (major).

**Not familiar with BannerDARS?**

A BannerDARS report provides an easy way for a student and advisor to understand how a student’s classes are used to meet the requirements for a particular major. And when the time comes, the Office of the University Registrar uses the BannerDARS report to clear students for graduation.

In addition, “What IF” audits can be run to find out how a student’s courses would affect requirements in a new degree program if that student changes majors.

Take a moment and visit the site today. You’ll love the convenience of viewing your progress from anywhere you have an Internet connection.

For more information, please contact Alison Connor in the Office of the University Registrar at 974-0176 or aconnor@utk.edu.

**Universal Tracking (UTracK)**

Universal Tracking (UTracK) is an academic monitoring system designed to help students stay on track for timely graduation. Tracking will begin with first-time, first-year, full-time, degree-seeking college students entering fall 2013.

**Policy**

1. Students must declare a major or exploratory track at the time they are admitted to the university. Some majors have a competitive admissions process.
2. All students must transition out of exploratory tracks into a major track no later than the end of the fourth tracking semester at UTK.
3. Students who are off track must develop an advisor-approved plan for getting back on track before they will be allowed to register for future tracking semesters.
4. Students who are off track for two consecutive semesters will be placed on hold and required to select a new major that is better aligned with their abilities.

**Definitions**

**Exploratory Tracks**

- **College-Level Exploratory**—Students who are deciding among one or more majors that are all offered by the same college follow an exploratory track for that college (e.g., Arts and Sciences Exploratory, Business Exploratory, etc.)
- **University Exploratory**—Students who have no clear idea of which major to pursue and/or those who are trying to decide among majors that are not in a single college follow the University Exploratory track.

**Milestones**—In order to remain on track for a major or exploratory area, students must complete minimum requirements for each tracking semester known as milestones. Milestones include successful completion of specified courses and/or attainment of a minimum GPA.

**Tracking Semesters**—Only fall and spring semesters are tracking semesters. Mini and summer semesters are not tracking semesters, they provide an opportunity for students to catch up on unmet milestones. Study abroad and co-op semesters are not tracking semesters. Students participating in study abroad and co-op are not required to complete milestones while they are away from campus.

**Tracking Audit**—Tracking audits will help students identify their milestone progress; audits are tied to a catalog year. Tracking audits will be used to notify students when they are off track.

**Off Track for a Single Semester**—Students who are off track at the end of a tracking semester must meet with an advisor as soon as possible but no later than the end of the next tracking semester to develop a plan for getting back on track. Students who do not have an advisor-approved plan for getting back on track will not be allowed to register for future tracking semesters.

**Off Track for Two Consecutive Semesters**—Students who are off track for two consecutive semesters will have a hold placed on their registration and must meet with a new advisor in one of the advising centers no later than the end of the “add” period of the next tracking term to select a new major that is better aligned with the student’s abilities.
Registration Quick Guide

Log on to MyUTK (https://my.utk.edu)
Username: NetID (no spaces)
Password: NetID Password

1. Find the “UTK Student Registration Links” web part.
   • Select the desired term.
   • Select the “Add/Drop Classes” link.

2. Advising - if advising has not been cleared, you will receive a message to contact your advisor before you can register.

3. Holds - if you are unable to register due to a hold, click View Holds from the Student menu.

4. To Add - use the worksheet to enter Course Reference Numbers (CRN). If you are adding a course that has a co-requisite, you MUST enter both course CRNs in the worksheet.

5. To search for CRNs, click the Class Search button.

6. To drop - click the Action box beside the course.

7. Multiple Subject Search - You can search on multiple Subjects by holding the Shift key down and clicking more than one Subject. To select all Subjects, hold Shift + Ctrl, scroll to the bottom of the subject list and click the last subject. This feature is useful for searching all courses with a particular attribute, such as GenEd-Arts/Humanities.

8. To register for classes -
   • click the box in front of the course to select your course (C=Closed)
   • click “Register” or “Add to Worksheet”

9. Error Message examples:
   • student level restriction requires permission of department or instructor
   • pre-requisite, co-requisite or test score mandatory to take this course

10. Waitlists - Departments can choose to have a Priority or a First-In/First-Out Waitlist.
    • Students are not automatically enrolled from the Waitlist.
    • You will be notified by e-mail that a seat is available and will have 24 hours to add the course.
    • You will need to get required permissions prior to adding during the 24-hour period.

For more information, please visit the One Stop Shop.

\[ x(t) = A \sin(\omega t + \delta) = A \sin(\omega t) + A \cos(\omega t) \]
\[ v(t) = A \omega \cos(\omega t + \delta) = -a_1 \omega \cos(\omega t) - a_2 \omega \sin(\omega t) \]
\[ a(t) = -A \omega^2 \sin(\omega t + \delta) = -a_1 \omega^2 \sin(\omega t) - a_2 \omega^2 \cos(\omega t) \]
\[ \omega = \sqrt{\frac{m}{k}} \]
\[ A = \sqrt{a_1^2 + a_2^2} \]
\[ \delta = \tan^{-1} \left( \frac{a_2}{a_1} \right) \]
\[ a_1 = \frac{v_0}{\omega} \]
\[ a_2 = x_0 \]
\[ T = \frac{2\pi}{\omega} \]
\[ f = \frac{1}{T} \]
\[ \omega = 2\pi f \]
<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th></th>
<th>Wednesday</th>
<th></th>
<th>Friday</th>
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</tr>
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<tbody>
<tr>
<td>8:00-8:50</td>
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<tr>
<td>9:05-9:55</td>
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<td>10:10-11:00</td>
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<td>11:15-12:05</td>
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<td>4:40-5:30</td>
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<td>5:45-6:30</td>
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<table>
<thead>
<tr>
<th>Time</th>
<th>Tuesday</th>
<th></th>
<th>Thursday</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>9:40-10:55</td>
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<td>12:40-1:55</td>
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<td>3:40-4:55</td>
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<tr>
<td>5:05-6:20</td>
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### Fall Semester 2016

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes Begin</td>
<td>Wednesday, August 17</td>
</tr>
<tr>
<td>Labor Day</td>
<td>Monday, September 5</td>
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<tr>
<td>1st Session Ends</td>
<td>Wednesday, October 5</td>
</tr>
<tr>
<td>Fall Break</td>
<td>Thursday - Friday, October 6-7</td>
</tr>
<tr>
<td>2nd Session Begins</td>
<td>Thursday, October 10</td>
</tr>
<tr>
<td>Thanksgiving</td>
<td>Thursday-Friday, November 24-25</td>
</tr>
<tr>
<td>Classes End</td>
<td>Tuesday, November 29</td>
</tr>
<tr>
<td>Study Day</td>
<td>Wednesday, November 30</td>
</tr>
<tr>
<td>Exams</td>
<td>Thursday-Thursday, December 1, 2, 5, 6, 7, 8</td>
</tr>
<tr>
<td>Graduate Hooding</td>
<td>Thursday, December 8</td>
</tr>
<tr>
<td>Commencement</td>
<td>Friday, December 9</td>
</tr>
<tr>
<td>Official Graduation Date</td>
<td>Friday, December 9</td>
</tr>
</tbody>
</table>

### Spring Semester 2017

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes Begin</td>
<td>Wednesday, January 11</td>
</tr>
<tr>
<td>MLK Holiday</td>
<td>Monday, January 16</td>
</tr>
<tr>
<td>1st Session Ends</td>
<td>Wednesday, March 1</td>
</tr>
<tr>
<td>2nd Session Begins</td>
<td>Thursday, March 2</td>
</tr>
<tr>
<td>Spring Break</td>
<td>Monday - Friday, March 13-17</td>
</tr>
<tr>
<td>Spring Recess</td>
<td>Friday, April 14</td>
</tr>
<tr>
<td>Classes End</td>
<td>Friday, April 28</td>
</tr>
<tr>
<td>Study Day</td>
<td>Monday, May 1</td>
</tr>
<tr>
<td>Exams</td>
<td>Tuesday-Tuesday, May 2, 3, 4, 5, 8, 9</td>
</tr>
<tr>
<td>Graduate Hooding</td>
<td>Thursday, May 11</td>
</tr>
<tr>
<td>College Commencement Ceremonies</td>
<td>Wednesday-Friday, May 10-12</td>
</tr>
<tr>
<td>Official Graduation Date</td>
<td>Saturday, May 13</td>
</tr>
</tbody>
</table>

### Summer Term 2017

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini Session Begins</td>
<td>Wednesday, May 10</td>
</tr>
<tr>
<td>Memorial Day Holiday</td>
<td>Monday, May 29</td>
</tr>
<tr>
<td>Mini Session Ends</td>
<td>Wednesday, May 31</td>
</tr>
<tr>
<td>Full and 1st Sessions Begin</td>
<td>Thursday, June 1</td>
</tr>
<tr>
<td>Independence Day Holiday</td>
<td>Tuesday, July 4</td>
</tr>
<tr>
<td>1st Session Ends</td>
<td>Thursday, July 6</td>
</tr>
<tr>
<td>2nd Session Begins</td>
<td>Monday, July 10</td>
</tr>
<tr>
<td>Full and 2nd Sessions End</td>
<td>Friday, August 11</td>
</tr>
<tr>
<td>Summer Graduation Date*</td>
<td>Saturday, August 12</td>
</tr>
</tbody>
</table>

*There is no commencement ceremony in the summer. This date is the official graduation date that will appear on the transcript of graduating students. The Academic Calendar is available on the Web site of the Office of the University Registrar http://registrar.tennessee.edu/academic_calendar/index.shtml.
Key Term Dates

Fall 2016 - Undergraduate

Priority Registration ................................................................. March 21, 2016
Fall 2016 Graduation Application Deadline and Admission to Candidacy Deadline for Graduate Students .......... August 9, 2016
Classes Begin ............................................................................ August 17, 2016
Last Day to Add, Change Grading Options or Drop without a “W” — 1st Session Courses .......................... August 22, 2016
Last Day to Final Register, Add, Change Grading Options or Drop without a “W”- Full Session Courses ........ August 26, 2016
Last Day to Adjust Hours for Financial Aid Awarding .......................................................... August 30, 2016
Labor Day (No Classes) ............................................................... September 5, 2016
Last Day to Drop with a “W” - 1st Session Courses ................................................................. September 23, 2016
First Session Classes End ............................................................ October 5, 2016
Fall Break (No Classes) ............................................................... October 6-7, 2016
Second Session Classes Begin .................................................... October 10, 2016
Last Day to Add, Change Grading Options or Drop without “W” - 2nd Session Courses ...................... October 14, 2016
Last Day to Drop with “W” - Full Term Courses .......................................................... November 8, 2016
Last Day to Drop with “W” - 2nd Session Courses .......................................................... November 16, 2016
Thanksgiving Holidays (No Classes) ................................................ November 24-25, 2016
Total Withdrawal from the University Deadline ........................................................ November 29, 2016
Classes End (Full and Second Session) ........................................ November 29, 2016
Study Day .................................................................................. November 30, 2016
Exam Period ................................................................................ December 1, 2, 5, 6, 7, 8, 2016
Commencement (Thompson Boling Assembly Center & Arena) .................................................. December 9, 2016
Official Graduation Date on Transcript .......................................................... December 9, 2016

Financial Calendar for Fall Term 2016

Statement information available on MYUTK.UTK.EDU ........................................ August 5, 2016
Priority Registration Payment/Deadline .......................................................... August 15, 2016 by 4:30 p.m.
Late Registration/Late Fees Begin ........................................................................... August 17, 2016
Late Registration Payment/Deadline ........................................................................ August 26, 2016 by 4:30 p.m.

* PAYMENT AND CONFIRMATION OF ATTENDANCE FORM MUST BE RECEIVED BY THESE DEADLINES WHETHER OR NOT YOU HAVE RECEIVED a VolXpress STATEMENT. You may view your account at MyUTK.
# Engineering Campus Office Locations by Building

<table>
<thead>
<tr>
<th>Building</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berry Hall</td>
<td>419</td>
</tr>
<tr>
<td>Dougherty Hall</td>
<td>414</td>
</tr>
<tr>
<td>National Office, Tau Beta Pi Engineering Honor Society</td>
<td>508</td>
</tr>
<tr>
<td>Claxton</td>
<td>513</td>
</tr>
<tr>
<td>East Stadium Hall</td>
<td>507</td>
</tr>
<tr>
<td>Min H. Kao Electrical Engineering &amp; Computer Science Building</td>
<td>401</td>
</tr>
<tr>
<td>Pasqua Hall</td>
<td>616</td>
</tr>
<tr>
<td>Perkins Hall</td>
<td>555</td>
</tr>
<tr>
<td>Science &amp; Engineering Research Facility (SERF)</td>
<td>315</td>
</tr>
<tr>
<td>Senter Hall</td>
<td>301</td>
</tr>
<tr>
<td>Textiles &amp; Nonwovens Development Center (TANDEC)</td>
<td>101</td>
</tr>
<tr>
<td>John D. Tickle Engineering Building</td>
<td>309</td>
</tr>
<tr>
<td>UT Conference Center</td>
<td>112</td>
</tr>
<tr>
<td>Under Construction or Design</td>
<td>118</td>
</tr>
<tr>
<td>Not Shown</td>
<td>119</td>
</tr>
</tbody>
</table>

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### Key for Engineering Buildings

- **Building**
- **Room**
- **Dougherty Hall**
  - Department of Chemical & Biomolecular Engineering
  - Department Mechanical, Aerospace, and Biomedical Engineering
  - National Office, Tau Beta Pi Engineering Honor Society
- **Claxton**
  - Innovative Computing Laboratory
- **East Stadium Hall**
  - Center for Materials Processing
  - Reliability & Maintainability Center
- **Min H. Kao Electrical Engineering & Computer Science Building**
  - Department of Electrical Engineering & Computer Science
  - Center for Intelligent Systems & Machine Learning
  - CURENT
- **Pasqua Hall**
  - Department of Nuclear Engineering
- **Perkins Hall**
  - College of Engineering Administrative Offices
    - Communications
    - Computer Assistance
    - Dean's Office
    - Development
    - Finance & Administrative Affairs
    - Academic and Student Affairs
    - Engineering Advising Services
    - Engineering Diversity Programs
    - Engineering Fundamentals Program
    - Engineering Professional Practice
    - Faculty Affairs
    - Tennessee Louis Stokes Alliance for Minority Participation
- **Science & Engineering Research Facility (SERF)**
  - Scintillation Materials Research Center
- **Senter Hall**
  - Ion Beam Materials Laboratory (IBML)
- **Textiles & Nonwovens Development Center (TANDEC)**
  - See individual directory listings
- **John D. Tickle Engineering Building**
  - Department of Civil & Environmental Engineering
  - Department of Industrial & Systems Engineering
- **UT Conference Center**
  - Center for Transportation Research
- **Under Construction or Design**
  - Joint Institute for Advanced Materials (JIAM)
- **Not Shown**
  - Biosystems Engineering & Soil Science — 2506 E.J. Chapman Drive, Knoxville, TN
  - National Transportation Research Center — 2360 Cherohala Blvd., Knoxville, TN
  - UT Space Institute — 411 B.H. Goethert Parkway, Tullahoma, TN