The USC Viterbi School of Engineering’s Undergraduate Handbook is published annually. Inquiries regarding this publication should be directed to:

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This handbook draws heavily upon other official University publications including the USC Catalogue and a variety of departmentally-distributed information pieces. Although every attempt has been made to ensure the accuracy of the information found herein, the USC Catalogue and official addenda should be considered the documents of authority for all University students. The program requirements listed in the USC Catalogue supersede any information which may be contained in this or any other publication of any school or department. The University reserves the right to change its policies, rules, regulations, requirements and course offerings at any time.

The USC Viterbi School of Engineering Undergraduate Handbook is intended to serve as a supplement, not a replacement, to the USC Catalogue. This publication is designed to synthesize all academic information pertinent to engineering undergraduates. Students entering USC Viterbi in the fall of 2017 or the spring of 2018 are bound by the requirements set forth in this booklet and the 2017-2018 University Catalogue.

**Title IX**

While it is often thought of as a law that gives women equal opportunities in athletics, Title IX is about so much more. Title IX also covers admissions, financial aid, housing, educational programs, campus safety (including sexual assault), and sex discrimination.

Title IX states: No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.

**Undergraduate Program Accreditation**

The University of Southern California is accredited by WASC, the Western Association of Schools and Colleges. The Bachelor of Science degrees in aerospace engineering, astronautical engineering, biomedical engineering, chemical engineering, civil engineering, computer engineering and computer science, electrical engineering, environmental engineering, industrial and systems engineering, and mechanical engineering are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. The Bachelor of Science degrees in computer engineering and computer science and in computer science are accredited by the Computing Accreditation Commission of ABET, http://www.abet.org.
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GET THE MOST OUT OF YOUR COLLEGE EXPERIENCE.

HERE’S HOW:

Starting college is exhilarating and challenging. Don’t worry! We are here to help you figure it all out. From course selection to internship opportunities and student organization membership to graduate school, we are here to help.

This handbook is a useful road map as you go through your undergraduate program. We’ve put a ton of good information here to steer you through your own story of success. Be sure to check this book often throughout your time at Viterbi as it is more than just a first-year guide. It is a four-year plan.

It’s more than a “first-year guide.”
This is a four-year plan

The beginning sections of this handbook will help you succeed academically at the Viterbi School with information on working with your advisors and exploring opportunities to excel in and expand on your coursework. Check out all the ways you can add to your engineering degree (aka “Engineering +”) with a second major, minors, and courses of interest in the Advising & Academics section.

Be sure to review the ways you can get involved on campus in the Student Life section. You can check out all the ways you can add to your engineering degree through student organizations, global opportunities, research, entrepreneurship, and community programs.

You won’t want to miss the resources highlighted in the Career Connections section as you start thinking about your resume, internships, career choices, and life after graduation.

Further into the Handbook, you’ll find the focus of your program in the Degree Requirements section. As you plan your schedule each semester, you will want to review your major course plan and prepare for your meetings with your academic advisor. Be sure to come to each meeting prepared with questions about your goals.

This is a lot of information. Just remember you’ve got time to figure it all out. Between this book, your faculty, staff, and advisors, you’ll get support throughout your time here.

Good luck and Fight On!
ADVISEMENT & ACADEMICS
WE WILL HELP YOU FIND YOUR PATH

READ ON FOR:
- Advisement
- Academic Programs
- Honors
- Academic Resources
- Double Majors & Minors
Viterbi advisement is about more than your classes and degree requirements. Your advisor is here to coach you through creating and accomplishing your goals, both for your USC experience and your life post-graduation. Your advisor will help you design a personalized plan that reflects your academic, career and co-curricular goals.

First Year Advisors
As a freshman student, you will begin working with your First Year Advisor at Orientation through the end of your second semester at USC. Your First Year Advisor is here to help you as you transition and acclimate to life at USC. You will meet with your First Year Advisor at least once per semester, before you register for your next semester courses. You are welcome to meet with your advisor more than once per semester through walk-in advisement or one-on-one appointments.

TOPICS TYPICALLY COVERED IN AN ADVISEMENT MEETING INCLUDE:
- Minors
- How to find research opportunities
- Overseas programs
- Academic support resources, including tutoring and supplemental instruction
- Student organizations & events on campus
- Career goals & internships
- Class selection & registration
- Your four-year plan that reflects your academic, co-curricular & career goals

Department Advisors
As a transfer or sophomore student, you will begin working with your department advisor who is specific to your major. As you begin to specialize in your major by taking more specific coursework, department advisors help you build on the academic, co-curricular and career goals you have already created. You will meet with your advisor at least once per semester, before you register for your next semester courses.

Mandatory Advisement
All Viterbi students are required to meet with their academic advisor at least once per semester for mandatory academic advisement. The Viterbi school requires you meet with your advisor at least once per semester because we want to ensure we are partnering with you as you work to accomplish your goals, meet your degree requirements, and stay on track for graduation.

See Page 20 For More Advisement Tools & Resources

THE TYPICAL ADVISEMENT TIMELINE
This timeline reflects the typical advisement schedule for a given semester. If you have a question or you need help at any point in the term, know that we are always here to support you! Feel free to email your advisor at any time.

We are here to help with short term questions you may have before the add/drop deadline. Come to walk-in advisement or send an email to your advisor for help switching your classes or other short term planning questions.

Your advisor will send you an email when it’s time to sign up for your mandatory advisement appointment. Appointments are made via my.usc.edu.

Once registration begins, your advisor is focused on make sure we help you get all your classes for the following semester. Come to walk-in advisement or send an email to your advisor for help switching your classes or other short term planning questions.

After you’re registered for your classes, your advisor is still available to talk with you about any questions you may have. Send us an email to set-up an appointment or come to walk-in advisement.

Walk-In Advisement Schedules are always available at viterbiundergrad.usc.edu/advising
ACADEMIC PROGRAMS & RESOURCES

Through a variety of programs and services, you are able to engage with Viterbi faculty, students, and staff, explore and further define your academic interests, and get connected within the USC and Viterbi communities.

Introductory Courses & The Freshman Academy
As a freshman in the Viterbi school, you will take an introductory course in your chosen major as part of your first year curriculum. The intro courses provide you with initial exposure to your major curriculum and they are your first opportunity to engage with faculty and students in your major.

In addition to your intro course, you will take the Engineering Freshman Academy (ENGR 102) in your first semester. The Academy provides a macro-level view of the profession by addressing the ethical, societal, and political impact of engineering and its technology. The class meets once a week and is taught by a full-time engineering faculty member. The seminar is focused on building community through working on collaborative projects. Case studies, discussions, and group projects will allow you to explore how engineering intersects with other areas in society including education, the environment, new technologies, the community, and more. Each Academy section is assigned "Academy Coaches," upper division Viterbi students who serve as resources and mentors to first year students.

Viterbi Academic Resource Center (VARC)
VARC provides you with free peer tutoring for 50+ math, science, and engineering courses. In addition to one-on-one peer tutoring sessions, VARC offers you group study sessions and Supplemental Instruction (SI) for select engineering courses.

Get Academic Support When You Need It.
Sign up for VARC at viterbiundergrad.usc.edu/varc.

Supplemental Instruction
Supplemental Instruction (SI) is an academic support program designed to help you improve your academic success. The SI program targets traditionally difficult courses and provides you with regularly scheduled, peer-led study sessions. These sessions are available to all students enrolled in the class at no cost. Learn more at usc.edu, search “supplemental instruction”.

Kortschak Center
The USC Kortschak Center for Learning and Creativity offers an innovative approach to assisting students with dyslexia, ADHD, and other identified learning differences. Equipped with state-of-the-art assistive technology and enhanced academic support services, the center provides you insight and guidance into your preferred method of learning.

Honors Science Courses
As a Viterbi student, you may apply for honors versions of many of your foundational science courses, including physics, chemistry, and biology. Taught at an advanced level, these courses explore the sciences deeply with enriched lab sections. Talk with your advisor about applying to take an honors course the semester before you plan enroll.

Thematic Option
Thematic Option (T.O.) is an honors general education program that replaces the traditional general education courses at USC. The program provides you with a challenging interdisciplinary experience that emphasizes reading, writing, and asking the "big questions." Incoming freshmen may apply to the program prior to starting at USC. The application is typically due in April. Learn more at usc.edu, search “thematic option”.

Engineering Honors Program
The W.V.T. Rusch Undergraduate Engineering Honors Program provides a unique opportunity to participate in a new, dynamic academic structure focusing on the National Academy of Engineering’s Grand Challenges (Beginning in spring 2018). Participants will choose between three thematic tracks: Innovation & Entrepreneurship, Service Learning, and Research. Each track will have a culminating experience similar to that of a senior thesis. In addition to your chosen track, you may enroll in the Honors Colloquium, a class that affords students the opportunity to attend weekly lectures and network with leaders in the field of engineering. The program also includes the annual fall retreat, additional lunches with guest speakers, and special events including the end of semester BBQ and the senior brunch. Students who successfully complete the Honors Program will receive special recognition at commencement. Incoming students are invited to the program while continuing students have an opportunity to apply after their first semester at USC.

PRO TIP
Want to Graduate with Honors?
You can graduate from USC with honors in engineering when you earn a minimum overall grade point average of 3.5 for cum laude, 3.7 for magna cum laude, or a 3.9 for summa cum laude.
DOUBLE MAJORS & MINORS

Dean Yortsos states: “The new canvas on which engineers now paint is one that I can characterize as Engineering + {subject}.” Engineering + is exploring your interests outside of engineering so that you can think critically about today’s challenges. Whether you want to pick up a second major, add a minor, study abroad, or conduct research; these are all examples of Engineering +.

Double Majors
With over 150 majors at USC, the world is your oyster. Engineering students have added a second major in everything from Dramatic Arts to East Asian Languages and Cultures. Depending on your unique goals and interests, you can create a double major combination that meets your passions and helps to achieve your goals. Typically, a second major requires a minimum of an additional 32 units of coursework. If you have a double major you would like to pursue, start working with your engineering advisor to see how it may fit into your long term plan.

Minors
A minor is a great way for you to explore an area of interest outside of your major and help you think about today’s engineering challenges in a different way. You can minor in programs through the various academic units at USC, such as the Annenberg School of Communication, the Dornsife College of Letters, Arts and Sciences and the Marshall School of Business.

Viterbi & ITP Minors
The Viterbi School of Engineering offers a number of minor programs available to you.

The Information Technology Program (ITP) is an academic program offering courses in applied technology to all students at USC. ITP is a leading source of curriculum innovation on campus and is also a leader in integrating emerging instructional technologies in the classroom. Minors range from 16-26 required units to complete and specializations range from 6-12 units. For more information, see itp.usc.edu.

ITP MINORS (16-26 UNITS):
» 3D Computer Graphics and Modeling
» Applied Analytics
» Applied Computer Security
» Computer and Digital Forensics
» Computer Programming
» Enterprise Information Systems
» Innovation: The Digital Entrepreneur
» Mobile App Development
» Video Game Design and Management
» Video Game Programming
» Web Technologies and Applications

ITP SPECIALIZATIONS (6-12 UNITS):
» 3D Computer Graphics and Modeling
» Applied Analytics
» Computer Programming
» Cyber Security
» Digital Forensics
» Enterprise Information Systems using SAP
» Innovation: The Digital Entrepreneur
» Mobile App Development
» Video Game Design and Management
» Video Game Programming
» Web Development

With over 150 minors available at USC, the possibilities are nearly endless! For a full list of minors available check out usc.edu, search “minors.”

PRO TIP
Get Recognized as a Renaissance Scholar
Take your double major or minor experience and apply to be a USC Renaissance Scholar your senior year. The Renaissance Scholars program honors students whose broad interests help them excel academically. Students whose majors and minors are from widely separated fields of study can compete for this $10,000 prize. For more information visit ahf.usc.edu/scholars.
STUDENT LIFE
LEARNING HAPPENS EVERYWHERE

READ ON FOR:
- Research Opportunities
- International Experiences
- Service-Learning
- The Grand Challenges Scholars Program
- Opportunities for Innovation and Entrepreneurship
- Student Organizations
- #ViterbiConnect

PRO TIP
Stay Up to Date!
viterbi.usc.edu/undergrad
fb.com/USCViterbiUndergrad
instagram & twitter: @ViterbiUG

Your starting point for information is the undergraduate website, but stay up-to-date with our Facebook, Instagram, and Twitter accounts. In addition, we send a weekly email every Sunday evening with a review of recent announcements and upcoming events that are important to the Viterbi community.
An important part of Viterbi life is getting involved in Viterbi, USC, and the greater community. Being involved helps you forge a deeper connection with your fellow USC Trojans, and helps you develop the essential skills you need to succeed at USC. At Viterbi, we offer several opportunities to get involved.

Involvement Fairs
Each semester, the University hosts a large involvement fair in the center of campus. Join the USC Surf Club and Ballroom Dance Team on the same day!

“Get Connected!” is an engineering student involvement fair held during the spring semester. If you were admitted in the spring semester or you just didn’t have time to get involved during the fall semester, Get Connected! provides yet another opportunity to learn about all the Viterbi student organizations in one convenient location.

KIUEL
The Klein Institute for Undergraduate Engineering Life (KIUEL) provides Viterbi undergraduates a variety of personal and professional activities to enhance experiences outside the classroom. KIUEL events are designed, organized, and implemented by the KIUEL Programming Committee, a team of student leaders selected to enhance Viterbi’s community through these school-wide events.

Student Organizations
Student organizations are a great way for you to get involved and connect with your fellow students. USC has over 850 student organizations for you to join. To learn more about these student organizations, visit campusactivities.usc.edu/organizations/.

Within Viterbi, we have over 50 societies, organizations, and design teams that appeal to the diverse interests of our student body. From service-oriented groups to professional organizations, there is something for everyone!

To learn more about Viterbi Student Organizations, you can visit viterbiundergrad.usc.edu/student-organizations.

VITREBI STUDENT ORGANIZATIONS

SPECIAL INTEREST GROUPS
- Alpha Omega Epsilon
- Girls in Tech
- Illumin
- KIEUL Programming Committee
- National Society of Black Engineers
- Queers in Science Engineering and Technology
- Sigma Phi Delta
- Society of Hispanic Professional Engineers
- Society of Women Engineers
- USC eSpornts
- Viterbi Plus

PROFESSIONAL SOCIETIES
- American Institute of Aeronautics and Astronautics
- American Institute of Chemical Engineers
- American Society of Civil Engineers
- American Society of Mechanical Engineers
- Associated Student of Biomedical Engineering
- Association for the Advancement of Artificial Intelligence
- Association of Computing Machinery
- Association of Chinese Students in Engineering
- Construction Management Association of America
- Earthquake Engineering Research Institute
- Institute of Electrical and Electronics Engineers
- Institute of Industrial Engineers
- Institute of Transportation Engineers
- Korean Scientists and Engineering Association
- National Organization for Business and Engineering
- Sigma Eta Pi
- Society of Automotive Engineers
- Society ofMotion Picture and Television Engineers
- Society of Petroleum Engineers
- Women in Computing

PROJECT GROUPS
- AeroDesign Team
- Code the Change
- Corpus Callasum
- Design for Change
- Engineers Without Borders
- HackSC
- Human Powered Vehicle Team
- Hyperloop at USC
- LaValab
- Los Angeles Technology Consulting Hub
- Makers of Entertaining Games Association
- Rocket Propulsion Laboratory
- SC Racing
- SparkSC
- USC Aerial Robotics
- USC Autonomous Underwater Vehicle Team
- USC Rocket Society
- USC Solar Car Team
- 3D4E (3D Printing Club)
- ASCE Concrete Canoe

HONOR SOCIETIES
- Alpha Pi Mu
- Chi Epsilon
- Eta Kappa Nu
- Omega Rho
- Pi Tau Sigma
- Sigma Gamma Tau
- Tau Beta Pi
- Upsilon Pi Epsilon
- Omega Chi Epsilon
Engineering is a global profession and studying abroad allows you to learn more about other cultures as well as gain perspective on technology issues in other countries. Today, many companies are international in scope or collaborate with partners overseas. The chance to study, work, or research abroad provides you with the opportunity to gain meaningful international exposure prior to entering the workforce. Learn more at viterbiundergrad.usc.edu/overseas.

Viterbi Summer Overseas Program
Viterbi Summer Overseas program is a seven week program offered each summer in cities throughout Europe. By participating in this program you can make progress towards your engineering degree by taking up to two major-related courses while also exploring those cities. Currently, the program runs each summer rotating through cities such as: Florence, Italy, London, United Kingdom, Madrid, Spain, Paris, France, and Rome, Italy.

International Exchange Programs
These semester-long exchange programs give Viterbi students the opportunity to study at one of our international partner schools, Hong Kong University of Science and Technology (HKUST) and National University of Singapore (NUS) while students from our partner schools study at USC.

Semester Overseas Programs
You can also participate in a number of university programs and receive credit towards your major requirements (subject to approval). Below are some examples. For more information check out www.usc.edu/overseas and speak with your advisor.

Tsinghua Summer Research Program
This six to seven week program provides an opportunity for an exchange of undergraduate students between the Viterbi School of Engineering and Tsinghua University in Beijing, China to participate in research with faculty at each institution.

Viterbi iPodia Program
iPodia is a new pedagogy which promotes peer-to-peer interactions among participating learners across disciplinary, institutional, physical and cultural boundaries. The ”i” in iPodia stands for "inverted", "interactive", "international", and any combinations of the above.

Engineers Without Borders
Engineers Without Borders USA builds a better world through engineering projects that empower communities to meet their basic human needs and equip leaders to solve the world’s most pressing challenges. The USC chapter’s most recent project was designing and implementing a sustainable system for providing clean water to a community in Honduras. To learn more visit ewb-usc.org.

Problems Without Passports
Problems Without Passports provides you with the opportunity for coursework that combines problem-based or inquiry learning research exercises with study in a foreign country.

PRO TIP
Earn a Global Scholar Distinction when you Graduate
The Global Scholars program recognizes undergraduates who have excelled in their studies both at home and abroad, including spending at least ten weeks outside the U.S. as part of their undergraduate experience. Up to ten of these students will also be selected to receive a $10,000 prize to be applied toward graduate study. For more information, visit ahf.usc.edu/scholars.
Gain a practical application of your classroom knowledge by getting involved in research. Finding research at Viterbi can be as easy as identifying research topics of interest to you and connecting with faculty who may have opportunities in their labs. Viterbi students participate in research through a variety of sources including formal programs, student organizations, national competitions, volunteering in a lab, the Undergraduate Fabrication Lab, and through coursework.

**Merit Research Program**
Each year, a select group of entering freshmen are invited to work with faculty on current research projects. The Merit Research Award is a renewable award provided you make satisfactory academic progress toward your engineering degree, maintain a B average overall, and complete a short renewal form by March 1st.

A limited number of Merit Research Awards are available to continuing students. Students who want to be considered for these awards must complete a scholarship application by March 1st of each year in order to be considered.

**Provost and Rose Hills Research Fellowships**
The Office of the Provost provides fellowships for undergraduate research each academic year in the fall and spring semesters. The Rose Hills Foundation, which supports non-profit organizations that serve the citizens of Southern California, has generously provided funding for students who would like to obtain Science and Engineering Fellowships during the summer.

**WiSe Research**
Undergraduate women in the Viterbi School are eligible to apply for a grant from the Women in Science and Engineering (WiSE) Program. This program gives female undergraduates an opportunity to receive funds to support their research activities in the laboratory with our faculty.

**Undergraduate Fabrication Laboratory**
You can take your research to a whole new level at Viterbi’s Fabrication Laboratory. The Fabrication Laboratory, aka Fab Lab, is intended to provide you with the resources you need to make almost any design project a reality. The Fab Lab allows students to take a more hands-on approach to learning and research, giving them the opportunity to design projects ranging in scope from experimental wingtips to scale models.

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**PRO TIP**
**Become a Discovery Scholar**
Get recognized for your research or design projects. The Discovery Scholars Program honors students who excel in the classroom while demonstrating the ability to create exceptional new scholarship or artistic works. It could mean a $10,000 prize when you graduate. For more information visit ahf.usc.edu/scholars.
The Viterbi School of Engineering promotes, encourages, and nurtures entrepreneurship and innovation of both its students and faculty. Here are some ways you can get involved.

**Viterbi Student Institute for Innovation**
VSI2 serves as a crucible for innovation for Viterbi students, who will learn how to turn their ideas or research into successful business ventures. VSI2 offers educational programs, new venture creation support and networking opportunities to help cultivate the next gen engineering entrepreneur.

**Viterbi Startup Garage**
The Viterbi Startup Garage is located in the heart of SCilicon Beach and is a meeting space for innovation and professional education for aspiring startups.

**Synchotron**
Have an idea? Take it to Synchotron, a 10-week educational program for start-up teams held at the Viterbi Startup Garage. Viterbi students have the opportunity to participate in this incubator program. Select teams with deep technologies are considered for $25,000 in seed money.

**Hacker House**
Hacker House is a Viterbi student organization that attracts builders, doers, makers, and entrepreneurs. Be sure to check out their regular meetings and projects this year!

**Maseeh Entrepreneurship Prize Competition**
Through a generous gift from Fariborz Maseeh, the Viterbi School of Engineering has established the MEPC, a yearly business plan competition to help inspire USC Viterbi innovators to be at the forefront of these solutions. The MEPC’s goal is to make engineering innovators more business-savvy and to empower them with refined business plans that define an effective go-to-market strategy for their ideas and inventions.

**The Min Family Engineering Social Entrepreneurship Challenge**
This competition provides USC students an opportunity to develop innovations in engineering and technology toward sustainable and effective solutions for global problems and to affect the greater global society positively.
USC Viterbi cares about its community, both inside our campus and throughout Los Angeles. Diversity is celebrated and giving back is common. By joining the Viterbi community, you’ve joined a group of passionate and diverse students who make USC Viterbi tick and inspire the next generation of engineers. Check out some of these resources and opportunities to get involved.

**Center for Engineering Diversity**
The Center for Engineering Diversity, often touted as a “home away from home” for engineering students, is dedicated to promoting scholastic, personal, and professional excellence among underrepresented students in Viterbi. CED offers its members access to a 24-hour study space and computer lab. The center is your place to connect with other students, receive mentoring from graduate students, and easily form study groups. Location: Ronald Tutor Hall (RTH) 210

**Women in Engineering**
The Women in Engineering program offers professional, academic and social opportunities for all women in Viterbi. Events such as the Faculty Student Luncheon and Introduce a Girl to Engineering Day are just a couple of the programs available for the female engineering community. In addition, there are female-oriented engineering student organizations, such as the Society of Women Engineers (SWE) the engineering sorority Alpha Omega Epsilon (AOE), and Girls in Tech for students to get involved and meet fellow female engineers.

**STEM Educational Outreach Programs**
Help promote engineering in K-12 education by volunteering for Math, Engineering, Science & Achievement (MESA), Mission Science Program, or other programs.

**Viterbi Impact Program (VIP)**
The Viterbi Impact Program connects undergraduate Viterbi students with the Los Angeles community. VIP participants play an important role in bringing engineering to the community as they work as partners with local schools and organizations.

**USC Volunteer Center**
The USC Volunteer Center is dedicated to promoting volunteerism and service in the USC and greater Los Angeles communities. The Volunteer Center organizes numerous service projects, identifies volunteer opportunities, and houses an extensive database of over 200 non-profits and other agencies that offer volunteer opportunities. To see how you can get involved, visit campusactivities.usc.edu/volunteer.

**PRO TIP**
Bring it all Together as a Grand Challenges Scholar
Grand Challenges Scholars create their own educational experiences through discovering, exploring, and working on potential solutions to one of the NAE Grand Challenges. Each year, the top 30 students who successfully complete the GCSP components will be named National Academy of Engineering Grand Challenges Scholars, recognized both by USC at graduation and the National Academy of Engineering.

viterbiundergrad.usc.edu/gcsp
CAREER CONNECTIONS
CONNECT TO YOUR FUTURE

READ ON FOR:

- Viterbi Career Gateway
- On-Campus Recruiting
- Career Prep Resources and Workshops
- Viterbi and USC Career Fairs
- The Viterbi Career Conference
- The Viterbi Industry Networking Event (VINE)
- Alumni Panels and Mentoring
- The Progressive Degree Program
Viterbi Student Engagement & Career Connections (SECC) offers future-focused support to prepare you for internships, co-ops and full-time employment or graduate school. We host a variety of technical companies throughout the year with job openings to fill. Starting in your first year, you can take advantage of extensive services specifically designed for engineering students and your future.

On-campus Interviews
To participate in on-campus interviews, students use ConnectSC and Viterbi Career Gateway for resume submission to the companies interviewing on campus; and if selected, to sign up for interviews.

Information Sessions
Information Sessions are presentations given by company recruiters. These presentations give you more in-depth information about companies and opportunities offered. They also allow you to build relationships with employers and be considered for interviews.

Workshops
Workshops provided by SECC staff and employers give comprehensive information about career-related topics and help prepare you to be more successful in your job search process.

SOME OF THE WORKSHOPS SECC PROVIDES INCLUDE:
» Writing Effective Resumes
» How to Write a Cover Letter
» Interviewing Strategies and Techniques
» Preparing for the Career Fair
» Navigating the Internship & Job Search
» Networking Basics
» Maximizing your Linked In Profile

Viterbi Career Fairs
We host Viterbi Career Fairs every semester—for all USC engineering students. In this job fair environment, you can have brief conversations with recruiters about employment opportunities. Keep an eye out every October and February for dates!

Career Conference
The Viterbi Career Conference, designed specifically for Viterbi undergraduates, takes place each fall. The conference provides an invaluable opportunity for you to develop job search skills and to connect with company representatives and alumni.

PRO TIP
Join Viterbi Career Gateway ASAP
Viterbi Career Gateway is our job portal and career resource platform dedicated to Viterbi students. This system allows you to search for engineering internship/co-op and full time jobs, gives you access to information about Viterbi-specific events and resources, and includes a customized resume builder. Learn more at viterbicareers.usc.edu/gateway
CONNECTIONS & ALUMNI

Tap into the Trojan network and connect with USC Viterbi alumni early in your college career. Alumni provide advice on everything from classes to landing your first job. Viterbi provides many ways for you to meet and stay connected with alums through programs offered throughout the year.

Viterbi Student-Alumni Mentor Program
The Viterbi Student-Alumni Mentoring Program (VSAMP) offers Viterbi undergraduate students the opportunity to develop a mentoring relationship with an alumnus who shares his/her educational and professional experience to help students achieve greater success in their academic and career pursuits.

Viterbi Industry Networking Event
VINE allows Viterbi juniors and seniors to meet employers the evening before the Career Fair and provides students the chance to practice their networking skills by engaging with top engineering companies in a professional networking environment.

Spotlight Programs
If you’re still not sure about which field of engineering you want to pursue or you just want to learn more about the different Viterbi majors, you should attend the Viterbi Spotlight programs. Each month, Viterbi hosts a panel of alumni and industry representatives who share their experiences in industry and how they utilize their Viterbi engineering education. You also get the opportunity to practice your networking skills and mingle with the panelists.

PRO TIP
Come see us for One-on-One Career Advising Starting your First Year
Advisors are available for career advising on topics ranging from resume reviews, interview prep, and job search strategies.

Office Location: RTH 218
213-740-9677
viterbi.careers@usc.edu.
It's never too early to start thinking about graduate school. If you have a clear idea of what type of degree you want to pursue - or you don’t - connect with your academic advisor and check out Viterbi’s resources to begin devising your grad school plan. Viterbi students go on to achieve all kinds of advanced degrees, from MBAs to PhDs. With some preparation, you can too.

Preparing for Graduate School
While it may seem early, we want to make sure you are thinking about all of your possible opportunities in the future. Be on the lookout for special workshops designed to help you prepare for your application to Masters and Ph.D. programs, applying for fellowships, mentoring relationships with faculty, and more.

Progressive Degree Program (B.S. + M.S.)
You can receive both your B.S. and M.S. in reduced time through the Progressive Degree Program (PDP). PDP allows you to start graduate-level coursework while finishing your undergraduate degree and can reduce the units required for your master’s degree. Typically, students complete both their B.S. and M.S. in five years. In addition, both degrees do not need to be from the same discipline. You are eligible to apply for PDP once you have completed 64 units of study (typically your junior year) and before you complete 96 units. A 3.2 GPA is required for consideration.
GENERAL EDUCATION & POLICIES

The Viterbi School of Engineering considers student success one of its highest priorities, however you are ultimately responsible for your own academic experience. You are expected to become familiar with University policies and, with the help of advisors and faculty, monitor your own academic progress.

University policies can be found in this handbook and in other university publications such as the USC Catalogue (www.usc.edu/catalogue). You can monitor your degree progress by using your STARS report through OASIS on my.usc.edu.

General Education at USC
USC General Education or “GE” for short, prepares students to be informed citizens of the 21st century. In GE courses, you will learn to think critically about the texts you read and the analysis you encounter, evaluate competing ideas and consider what is being assumed and what alternatives might exist.

As the world becomes interconnected, there is an increased need for critical thought, self-reflection, moral discernment, appreciation of diversity, aesthetic sensibility, civility, reconciliation and empathy across all spheres of life. The USC General Education program has been designed to provide you with the skills and knowledge necessary to meet the challenges of a globalized world and live a satisfying personal life.

Core Literacies
There are eight courses required across six Core Literacies. Some of these can be waived with AP/IB/A-Level credit.

- **GE A**: The Arts (1 Course)
- **GE B**: Humanistic Inquiry (2 courses)
- **GE C**: Social Analysis (2 Courses)
- **GE D**: Life Sciences (1 Course)
- **GE E**: Physical Sciences (1 Course)
- **GE F**: Quantitative Reasoning (1 Course)

Global Perspectives
There are two courses required. Engineering students are encouraged to satisfy GE G and H with a course that also satisfies a Core Literacy.

- **GE G**: Citizenship in a Global Era (1 Course)
- **GE H**: Traditions and Historical Foundations (1 Course)

GESM
All freshmen must take one of the Core Literacy courses in the GE Seminar format. These specially designated seminars take place in a small classroom setting limited to 19 students. Consult your advisor for help in identifying these seminars and to determine which semester you need to satisfy this requirement.

Meeting Your GE Requirements
Although 11 general education requirements must be met, Viterbi students can meet all 11 requirements by taking 8 classes through a careful selection of classes. You may select a GE A, B or C that also satisfies a GE G, GE H or GESM requirement. Additionally, some of your major requirements satisfy GEs. Be sure to check with your advisor to make certain you are meeting your GE requirements efficiently.

GE Course Guide
The GE Course Guide (dornsife.usc.edu/2015ge) provides more information about the GE courses offered for a specific semester. You can view the course descriptions, day and time the class is offered, and the professor teaching the course.

Writing Requirement
All majors have a two course writing requirement. The first course, WRIT 150: Writing and Critical Reasoning, is usually taken the first year of college. The second writing course, usually taken in the junior or senior year, is WRIT 340: Advanced Writing.

PRO TIP
GE Navigation
You may take one GE course with a pass/no pass letter grading option. All other major, minor, writing and GE courses must be taken for a letter grade. Additionally, once you enroll at USC, you must fulfill all unmet GE’s and writing requirements at USC.
AP, IB, AND A-LEVELS

Your hard work in high school definitely pays off. AP, IB & A-Level credit will increase your flexibility at USC to take courses that are of interest to you. The partial list below should answer most of your questions. Please see the USC Office of Articulation website for a complete understanding of how your advanced work in high school can help with USC degree requirements: usc.edu/articulation

Advanced Placement (AP) Exams
Any AP exam with a score of 4 or 5 will get you 4 units of credit at USC. In addition to unit credits, some AP scores can help satisfy degree requirements. Most commonly for engineering students, the following exams can satisfy or waive the following classes:

- Calculus AB: MATH 125 + GE-F
- Calculus BC (score of 4): MATH 125 + GE-F
- Calculus BC (score of 5): MATH 126 + GE-F
- Chemistry: CHEM 105AL + GE-E
- Biology: BISC 120L OR 220L + GE-D
- Physics (1, 2, 8, or C): GE-E
- Art History: GE-A
- European History: GE-H
- U.S. History: GE-H
- World History: GE-H
- Statistics: GE-F
- Macroeconomics: GE-F
- Microeconomics: GE-F

International Baccalaureate (IB) Exams
IB credit can be granted either from the International Baccalaureate Diploma, or individual Higher Level Exams. You can receive either 20 units of credit from the IB Diploma with a score of 30 or higher, or 6 semester units of credit for each score of 5, 6, or 7 on Higher Level exams, up to a maximum of four exams, whichever is higher.

- Mathematics (6 or 7): MATH 125 + GE-F
- Chemistry (6 or 7): CHEM 105A + GE-E
- Biology (6 or 7): BISC 120L OR 220L + GE-D
- Physics: GE-E
- Economics: GE-F
- History (Route 1): GE-H
- History (Route 2, 20th Century World History: Europe and the Middle East): GE-H
- History (Route 2, 20th Century World History: Asia and Oceania or History of Africa or History of the Americas): GE-G
- Dance, Film, Music, Theatre, or Visual Arts: GE-A
- Global Politics: GE-G

A-Level exams
USC awards 8 semester units of elective credit for A-level exams, along with H2 exams in Singapore, with a score of B or better. Students may not receive credit for both an AP exam (or IB or other international exam) and a college course taken before high school graduation covering the same subject matter, nor for an AP and IB exam covering the same subject matter.

- Art & Design, Music: GE-A
- Biology & Marine Science: GE-D
- Chemistry: CHEM 105A + GE-E
- Physics: GE-E
- Economics: GE-F
- Mathematics: MATH 125 + GE-F
- Classical Studies, Divinity and Islamic Studies: GE-H
- History: GE-G

IMPORTANT RESOURCES

USC Catalogue
The USC Catalogue (usc.edu/catalogue) serves as your resource for academic policies, curriculum requirements for majors and minors, and course descriptions for all classes at USC. Although this handbook tells you all the required courses for Viterbi majors, the Catalogue contains all of the course descriptions for your classes. The Catalogue is also useful when planning for a double major or minor.

OASIS
The Online Academic Student Information System (OASIS) provides several key pieces of information that you will need during advisement process. On OASIS, you are able to view your Permit to Register, see if you have any restrictions on your account, find your book list, and see which courses you are registered for. OASIS is also where you will be able to access your STARS report. You can access OASIS through my.usc.edu.
MAJOR COURSE PLANS

In the following pages you will find Major Course Plans for each Viterbi major. The Major Course Plans provide a general layout of how your next four years may look depending on your major. However, keep in mind that these are suggested course plans that you and your advisor will use as a guide to create your own course plan that is tailored to your individual needs and interests. Your individual course plan can vary due to factors such as AP and transfer credit, minors, overseas studies, etc.

The Major Course Plans only reflect the required courses for each major. You are required to complete a minimum of 128 units or more depending on your major. You will work with your academic advisor to determine which semesters are appropriate for you to take elective courses to ensure that you have enough units to graduate.

Prerequisites & Co-Requisites
Many of the math, science and engineering courses have one or more prerequisites or co-requisites to ensure adequate preparation for courses in a sequence. Please refer to the diagram to learn how to read the course requirements on your Major Course Plan.

Each Major Course Plan includes terms that you should be familiar with:

**OPTIONAL ELECTIVE:** Although they don’t satisfy major requirements, you can enroll in optional electives. Optional electives count towards your total USC units.

**REQUIRED ELECTIVE:** Some majors require you to take elective courses in order to make up the 128 units needed to complete your degree. These required electives can also be satisfied with AP/IB and transfer credit.

**TECHNICAL ELECTIVE:** Some majors require elective courses that are more technical. Academic Departments have lists of approved courses that satisfy the technical elective requirement.

Always consult with your Advisor if you have any questions about the Major Course Plans.

EXAMPLE COURSE LAYOUT

<table>
<thead>
<tr>
<th>COURSE</th>
<th>PHYS 152L</th>
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</thead>
<tbody>
<tr>
<td>COURSE NUMBER, OR CATEGORY IS IN BOLD AT THE TOP OF EACH LISTING.</td>
<td>PHYS 151L, (MATH 226)</td>
</tr>
<tr>
<td>COURSE CREDIT MAY BE GIVEN FOR ADVANCED PLACEMENT, INT’L BACCALAUREATE OR A-LEVEL EXAMS.</td>
<td>4</td>
</tr>
<tr>
<td>COURSES LISTED HERE AS PREREQUISITES MUST BE FULLFILLED PRIOR TO ENROLLING IN THIS PARTICULAR COURSE.</td>
<td>FOR EXAMPLE: PHYSICS 152L IS 4 UNITS, HAS A PRE-REQUISITE OF PHYS 151L, A CO-REQUISITE OF MATH 226, AND IS NOT ELIGIBLE FOR CREDIT GIVEN BY AP, IB, OR A-LEVEL EXAMS</td>
</tr>
<tr>
<td>COURSES LISTED IN PARENTHESES MUST BE TAKEN WITHIN THE SAME SEMESTER OR PRIOR TO THE PARTICULAR COURSE.</td>
<td>COURSES LISTED IN BRACKETS MUST BE TAKEN WITHIN THE SAME SEMESTER AS THE PARTICULAR COURSE.</td>
</tr>
<tr>
<td>COURSES LISTED IN BRACKETS MUST BE TAKEN WITHIN THE SAME SEMESTER AS THE PARTICULAR COURSE.</td>
<td>UNIT VALUE OF THE PARTICULAR COURSE LISTED.</td>
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</tbody>
</table>

PRO TIP
Your STARS Report
Use your STARS report (Student Academic Record System), available on OASIS, to track your degree progress. Your STARS report shows you which requirements you have completed, are still outstanding, and are currently in progress.
AEROSPACE & MECHANICAL

MAJORS & AREAS OF EMPHASIS

- Aerospace Engineering (Tracks: Aeronautics, Structures, Controls, Thermal Systems, Design)
- Mechanical Engineering (Tracks: Computational, Design, Dynamics/Control, Thermo/Fluids)
- Mechanical (Petroleum) Engineering

LEARN MORE: viterbi.usc.edu/ame
Aerospace and Mechanical Engineers design complex mechanical, thermal, fluidic, acoustical, optical, and electronic systems, with characteristic sizes ranging from microns to tens of kilometers. Such systems are used everywhere, from the depths of the ocean and far underground, to near-Earth, planetary, interplanetary and galactic space.

AME RESEARCH
We advance and define research frontiers that shape the future of our life in the air, on the ground, and in space. We push forward the understanding of environments both natural (oceans, atmosphere) and engineered (internal combustion, pulsed ignition). Other efforts advance our understanding of control and dynamics of autonomous systems and robotics, advance manufacturing technology, aircraft design and flight mechanics of very small and very fast flying machines, and biodynamical systems in medical devices, natural propulsion, and evolutionary system dynamics.

We have a balance of programs - theoretical, computational, and experimental - which exemplify the Viterbi School’s approach to intensive and collaborative research.
### AEROSPACE ENGINEERING

#### FIRST YEAR

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<td>MATH 125 (GE F)</td>
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<td>CHEM 105L or MASC 110L</td>
<td>PHYS 151L (GE E)</td>
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<td>ITP 168</td>
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#### SECOND YEAR

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#### THIRD YEAR

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#### FOURTH YEAR

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<td>AMT 451</td>
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<td>AMT 481</td>
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#### MATHEMATICS (16 UNITS)

- **MATH 125:** Calculus I
- **MATH 126** or **MATH 129:** Calculus II
- **MATH 226** or **MATH 229:** Calculus III
- **MATH 245:** Mathematics of Phys. and Engr.

#### PHYSICS (12 UNITS)

- **PHYS 151L:** Mechanics and Thermodynamics
- **PHYS 152L:** Electricity and Magnetism
- **PHYS 153L:** Optics and Modern Physics

#### CHEMISTRY / MATERIALS SCIENCE (4 UNITS)

- **CHEM 105L:** General Chemistry
  or **MASC 110L:** Materials Science

#### GENERAL EDUCATION (32 UNITS)

- **GE A:** The Arts (1 Course)
- **GE B:** Humanistic Inquiry (2 Courses)
- **GE C:** Social Analysis (2 Courses)
- **GE D:** Life Sciences (1 Course)
- **GE E:** Physical Sciences (1 Course)
- **GE F:** Quantitative Reasoning (1 Course)
- **GE G, H:** Global Perspectives (2 Courses)*
- **GESM:** General Education Seminar (1 Course)*

#### WRITING (7 UNITS)

- **WRIT 150:** Writing and Critical Reasoning
- **WRIT 340:** Advanced Writing

#### ENGINEERING (67 UNITS)

- **AMT 105:** Intro. to Aerospace Engineering
- **AMT 201:** New Statics Course
- **AMT 204:** Strength of Materials
- **AMT 231L:** Mechanical Behavior of Materials
- **AMT 261:** Basic Flight Mechanics
- **AMT 301:** Dynamics
- **AMT 302:** Dynamic Systems
- **AMT 308:** Comp. -Aided Analysis for Design
- **AMT 309:** Dynamics of Fluids
- **AMT 310:** Engineering Thermodynamics I
- **AMT 341AL:** Mechatronics Laboratory I
- **AMT 341BL:** Mechatronics Laboratory II
- **AMT 404:** Comp. Solutions to Engr. Problems
- **AMT 436:** Energy and Propulsion
- **AMT 441AL:** Senior Projects Laboratory
- **AMT 451:** Linear Control Systems I
- **AMT 481:** Aircraft Design
- **ASTE 280:** Astronautics & Space Environment I
- **ENGR 102:** Engineering Freshman Academy
- **ITP 168:** Introduction to MATLAB

#### SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

- **GE:** Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

- **OPTIONAL ELECTIVES:** Consult with your academic advisor to explore optional elective courses. These courses are not required.

- **TECHNICAL ELECTIVES:** Any upper-division course in engineering, Chemistry, Physics, and Mathematics. See major advisor for exceptions/substitutions.
Optional Course Tracks for the Aerospace Engineering Degree:

The Aerospace Engineering curriculum covers foundational concepts in a number of areas, ranging from dynamics and aerodynamics to computer aided analysis for design to computational solutions to engineering problems. Through your first five to six semesters, students will gain exposure to foundational concepts in Aerospace and Mechanical Engineering.

Your final two to three semesters in the program, you may continue and graduate with the Aerospace Engineering Standard Track listed to the left or choose to specialize.

### AERONAUTICS

**Fourth Year: FALL SEMESTER**

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**Fourth Year: SPRING SEMESTER**

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### STRUCTURES

**Fourth Year: FALL SEMESTER**

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### CONTROLS

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**Fourth Year: SPRING SEMESTER**

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### THERMAL SYSTEMS

**Third Year: SPRING SEMESTER**

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<td>AME 302</td>
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<td>AME 309</td>
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<td>AME 331</td>
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**Fourth Year: FALL SEMESTER**

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**Fourth Year: SPRING SEMESTER**

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<td>PHYS 153</td>
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### DESIGN

**Fourth Year: FALL SEMESTER**

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<td>AME 459 or ASTE 480</td>
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**Fourth Year: SPRING SEMESTER**

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As you will notice in the curriculum, students following the standard program will have the opportunity to take more technical and AME Core electives, while students following a specialized track will take specific courses.

**Aerospace Engineering offers the following tracks:**
- Aeronautics
- Structures
- Controls
- Thermal Systems
- Design
# MECHANICAL ENGINEERING

## FIRST YEAR

### FALL SEMESTER

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<tr>
<td>GE B</td>
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<tr>
<td>AME 101L</td>
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### SPRING SEMESTER

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## SECOND YEAR

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### SPRING SEMESTER

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## THIRD YEAR

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<tr>
<td>AME 331</td>
<td>Senior Projects Laboratory</td>
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<tr>
<td>AME 341bL</td>
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## FOURTH YEAR

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<tr>
<td>AME 441aL</td>
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<td>OPTIONAL ELECTIVE</td>
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### SPRING SEMESTER

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<td>AME CORE</td>
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<td>AME CAPSTONE ELECTIVE</td>
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<td>AME CORE</td>
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### MATHEMATICS (16 UNITS)

- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

### PHYSICS (12 UNITS)

- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism
- PHYS 153L: Optics and Modern Physics

### CHEMISTRY / MATERIALS SCIENCE (4 UNITS)

- CHEM 105AL: General Chemistry or MASC 110L: Materials Science

### GENERAL EDUCATION (32 UNITS)

- GE A: The Arts (1 course)
- GE B: Humanistic Inquiry (2 courses)
- GE C: Social Analysis (2 courses)
- GE D: Life Sciences (1 course)
- GE E: Physical Sciences (1 course)
- GE F: Quantitative Reasoning (1 course)
- GE G, H: Global Perspectives (2 courses)*
- GESM: General Education Seminar (1 course)*

### WRITING (7 UNITS)

- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### ENGINEERING (66 UNITS)

- MATH 201: Statics
- MATH 204: Strength of Materials
- MATH 301: Dynamics
- MATH 302: Dynamic Systems
- MATH 308: Comp.-Aided Analysis for Design
- MATH 309: Fluid Dynamics
- MATH 310: Engineering Thermodynamics I
- MATH 331: Heat Transfer
- MATH 341AL: Mechoptronics Laboratory I
- MATH 341BL: Mechoptronics Laboratory II
- MATH 441AL: Senior Projects Laboratory
- AME CORE
- AME DESIGN ELECTIVE
- AME CAPSTONE ELECTIVE
- TECHNICAL ELECTIVES

### SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

AME CORE: Any upper-division AME course not already required.

AME CAPSTONE ELECTIVE: AME 409, 415, 423, 430, or 443

AME DESIGN ELECTIVE: AME 305, 408, 410, 415, 430, or 481

TECHNICAL ELECTIVES: Any upper-division course in engineering, Chemistry, Physics, and Mathematics. See major advisor for exceptions/substitutions.
Optional Course Tracks for the Mechanical Engineering Degree:

The Mechanical Engineering curriculum covers foundational concepts in a number of areas, ranging from dynamics and aerodynamics to computer aided analysis for design to computational solutions to engineering problems. Through your first five to six semesters, students will gain exposure to foundational concepts in Aerospace and Mechanical Engineering.

Your final two to three semesters in the program, you may continue and graduate with the Mechanical Engineering Standard Track listed to the left or choose to specialize.

As you will notice in the curriculum, students following the standard program will have the opportunity to take more technical and AME Core electives, while students following a specialized track will take specific courses relative to the specialization.

**Mechanical Engineering offers the following tracks:** Thermo/Fluids, Dynamics/Controls, Design, and Computational.

### COMPUTATIONAL

<table>
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<tbody>
<tr>
<td>ITP 165</td>
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<tr>
<td>AME 404</td>
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<tr>
<td>AME 415</td>
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<tr>
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<tbody>
<tr>
<td>GE C</td>
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<td>MATH 445</td>
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<tr>
<td>CSCI 455</td>
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<td>AME 408</td>
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### DESIGN

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<td>AME 403</td>
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<td>AME 409</td>
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### DYNAMICS & CONTROLS

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<td>AME 451</td>
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<td>TECH ELECTIVE</td>
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<td>AME 441a</td>
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<td>AME 443</td>
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### THERMO & FLUIDS

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<td><strong>OPTIONAL ELECTIVE</strong></td>
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**MECHANICAL (PETROLEUM)**

### FIRST YEAR
#### FALL SEMESTER
- **GE B**
  - AME 101L: 4 units
- **AMAT 125 (GE F)**
  - CHEM 105L or MASC 110: 4 units
- **ENG 102**: 2 units

#### SPRING SEMESTER
- **WRIT 150**: 4 units
- **GE A**
  - MATH 125 (GE F): 4 units
- **MATH 126 or MATH 129**: 4 units
- **PHYS 151L (GE E)**
  - ITP 168: 2 units

### SECOND YEAR
#### FALL SEMESTER
- **GE C**
  - AME 201: 4 units
- **AMAT 226 or AMAT 229**: 4 units
- **AMAT 245**: 4 units
- **AMAT 253L**: 4 units
- **WRIT 340**: 3 units

#### SPRING SEMESTER
- **GE B**
  - AME 204: 4 units
- **MATH 245**: 4 units
- **AMAT 341aL**: 4 units
- **AMAT 341bL**: 2 units

### THIRD YEAR
#### FALL SEMESTER
- **AME 301**: 3 units
- **PTE 463**: 4 units
- **MASC 310**: 4 units
- **AME 341aL**: 3 units

#### SPRING SEMESTER
- **AME 308**: 3 units
- **AME 309**: 4 units
- **PTE 464**: 4 units
- **AME 341bL**: 2 units

### FOURTH YEAR
#### FALL SEMESTER
- **GE C**
  - PTE 461: 4 units
- **PTE 465**: 3 units
- **PTE 466**: 3 units
- **AME 408**: 3 units
- **AME 441aL**: 3 units

#### SPRING SEMESTER
- **GE D**
  - AME 331: 3 units
- **AME 409**: 4 units
- **TECHNICAL ELECTIVE**: 4 units
- **OPTIONAL ELECTIVE**: 2 units

### MATHEMATICS (16 UNITS)
- **AMAT 125**: Calculus I
- **AMAT 126** or **AMAT 129**: Calculus II
- **AMAT 226** or **AMAT 229**: Calculus III
- **AMAT 245**: Mathematics of Phys. and Engr.

### PHYSICS (12 UNITS)
- **AMAT 151L**: Mechanics and Thermodynamics
- **AMAT 152L**: Electricity and Magnetism
- **AMAT 153L**: Optics and Modern Physics

### CHEMISTRY / MATERIALS SCIENCE (4 UNITS)
- **CHEM 105AL**: General Chemistry
- **MASC 110L**: Materials Science

### GENERAL EDUCATION (32 UNITS)
- **GE A**: The Arts (1 course)
- **GE B**: Humanistic Inquiry (2 courses)
- **GE C**: Social Analysis (2 courses)
- **GE D**: Life Sciences (1 course)
- **GE E**: Physical Sciences (1 course)
- **GE F**: Quantitative Reasoning (1 course)
- **GE G,H**: Global Perspectives (2 courses)*
- **GESM**: General Education Seminar (1 course)*

### WRITING (7 UNITS)
- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

### ENGINEERING (66 UNITS)
- **AMAT 101L**: Intro. to Mech. Engr. & Graphics
- **AMAT 201L**: Statics
- **AMAT 204L**: Strength of Materials
- **AMAT 301L**: Dynamics
- **AMAT 302L**: Dynamic Systems
- **AMAT 308L**: Comp.-Aided Analysis for Design
- **AMAT 309L**: Fluid Dynamics
- **AMAT 310L**: Engineering Thermodynamics I
- **AMAT 331L**: Heat Transfer
- **AMAT 341AL**: Mechatronics Laboratory I
- **AMAT 341BL**: Mechatronics Laboratory II
- **AMAT 408L**: Comp.-Aided Design of Mech Systems
- **AMAT 409L**: Senior Design Project
- **AMAT 441AL**: Senior Projects Laboratory
- **ENGR 102L**: Engineering Freshman Academy
- **ITP 168L**: Introduction to MATLAB
- **PTE 461L**: Formation Evaluation
- **PTE 463L**: Intro. to Transport Processing in Porous Media
- **PTE 464L**: Petroleum Reservoir Engineering
- **PTE 465L**: Drilling Technology
- **MASC 310**: Mechanical Behavior of Materials

**SPECIAL NOTES**

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

TECHNICAL ELECTIVES: Any upper-division course in engineering, Chemistry, Physics, and Mathematics. See major advisor for exceptions/substitutions.
Astronautical engineers design, build, and operate space vehicles for exploration and applications beyond the Earth’s atmosphere. This program prepares students for engineering careers in the space sector of the aerospace industry, space research, development, and operations in industry and government centers and laboratories, as well as for graduate study.

The Astronautical Engineering (ASTE) program provides the fundamentals of science and engineering, specialized courses in astronautical engineering, and technical electives to broaden as well as deepen the coursework. ASTE students learn spacecraft and launch vehicle design and operations, propulsion, orbital mechanics, spacecraft dynamics and control, navigation, instrumentation and sensors, and much more.

ASTE RESEARCH
The Department of Astronautical Engineering (ASTE) is at the center of exciting and innovative research in spacecraft and space exploration, from basic science to new ways of designing and integrating spacecraft. ASTE operates world-class research facilities such as the Collaborative High Altitude Flow Facility (CHAFF) space simulation chamber, a six-meter cryogenically cooled chamber capable of testing propulsion systems in high vacuum.

Astronautical engineering students can engage in research under faculty guidance as early as the freshman year. In addition, ASTE has several ongoing hands-on student projects. The Microsatellite Project designs and builds CubeSats, small spacecraft approximately the size of a loaf of bread. Its second spacecraft, which has the first dish antenna ever used on a cubesat, has been successfully operating for more than an year. The Rocket Propulsion Laboratory designs and builds solid-fueled rockets. Its goal is to be the first student group ever to send a rocket to 100 km altitude (see photo at left). The Lunar Lander group builds subscale models of landing craft. These use jet engines for primary thrust and auxiliary thrusters for attitude and sideways motion. The goal is to demonstrate fully autonomous liftoff, travel and landing.

RESEARCH HIGHLIGHTS
» Spacecraft architecture and design
» Space science, space instrumentation and sensors
» Advanced spacecraft propulsion
» Processes in the heliosphere and planetary magnetospheres
» Atomic and molecular interactions
» Plasma interactions in spacecraft environment
» Multi-spacecraft formation flying
» Self-diagnosing and self-repairing spacecraft

COMPANIES THAT HIRE ASTE STUDENTS
Aerospace Corporation, The Boeing Company, Defense Advanced Research Projects Agency (DARPA), Lockheed Martin, Northrop Grumman, various government agencies, Jet Propulsion Laboratory (JPL), NASA Research Centers (Glenn, Marshall, Johnson), Raytheon, SpaceX, Virgin Galactic...

And many more!

CAREER OPTIONS
» Design rocket vehicles
» Design, build, and test satellites
» Operate unmanned spacecrafts and probes
» Build space instrumentation and sensors
» Conduct government research
» Lead space operations
» Become a researcher at a university or government research center
# ASTRONAUTICAL ENGINEERING

## FIRST YEAR
### FALL SEMESTER
- WRIT 150 4
- ASTE 101L 4
- MATH 125 (GE F) 4
- CHEM 105AL or MASC 110L 4
- ENGR 102 2

### SPRING SEMESTER
- GE A 4
- MATH 126 or MATH 129 4
- PHYS 151L (GE E) 4
- ITP 168 2

## SECOND YEAR
### FALL SEMESTER
- AME 201 3
- MATH 226 or MATH 229 3
- PHYS 152L 4
- AME 204 3
- MATH 245 4
- PHYS 153L 4
- ISTE 280 3

### SPRING SEMESTER
- WRIT 340 3
- AME 301b 3
- AME 308 3
- AME 341bL 3

## THIRD YEAR
### FALL SEMESTER
- AME 301a 3
- AME 301b 3
- AME 330 3
- ISTE 301A 3
- ISTE 330 3
- AME 404 3

### SPRING SEMESTER
- TECHNICAL ELECTIVE 3
- WRIT 340 3

## FOURTH YEAR
### FALL SEMESTER
- AME 441a 3
- TECHNICAL ELECTIVE 3
- ISTE 470 3
- AME 404 3
- TECHNICAL ELECTIVE 3

### SPRING SEMESTER
- GE B 4
- ASTE 421 3
- ASTE 480 3
- TECHNICAL ELECTIVE 3
- TECHNICAL ELECTIVE 3

## MATHEMATICS (16 UNITS)
- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

## PHYSICS (12 UNITS)
- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism
- PHYS 153L: Optics and Modern Physics

## CHEMISTRY / MATERIALS SCIENCE (4 UNITS)
- CHEM 105AL: General Chemistry
- MASC 110L: Materials Science

## GENERAL EDUCATION (32 UNITS)
- GE A The Arts (1 Course)
- GE B Humanistic Inquiry (2 Courses)
- GE C Social Analysis (2 Courses)
- GE D Life Sciences (1 Course)
- GE E Physical Sciences (1 Course)
- GE F Quantitative Reasoning (1 Course)
- GE G,H Global Perspectives (2 Courses)*
- GESM General Education Seminar (1 Course)*

## WRITING (7 UNITS)
- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

## ENGINEERING (68 UNITS)
- AME 201: Statics
- AME 204: Strength of Materials
- AME 301: Dynamics
- AME 308: Comp.-Aided Analysis for Design
- AME 341AL: Mechatronics Laboratory I
- AME 341BL: Mechatronics Laboratory II
- AME 404: Comp. Solutions to Engr. Problems
- AME 441AL: Senior Projects Laboratory
- ISTE 101L: Intro. to Astronautics
- ISTE 280: Astronautics & Space Environment I
- ISTE 301A: Thermal and Statistical Systems I
- ISTE 301B: Thermal and Statistical Systems II
- ISTE 330: Astronautics & Space Environment II
- ISTE 421: Space Mission Design
- ISTE 470: Spacecraft Propulsion
- ISTE 480: Spacecraft Dynamics
- ENGR 102: Engineering Freshman Academy
- ITP 168: Introduction to MATLAB

## TECHNICAL ELECTIVES
- Any upper-division course in engineering, Chemistry, Physics, Mathematics, or Math 225 except CE 404, 412, and ISE 440. No more than 3 units of ISTE 490 or ISTE 491 course work can be used for Technical Electives.

## SPECIAL NOTES
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

- OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

2017-18 MAJOR COURSE PLAN
BIOMEDICAL MAJORS & AREAS OF EMPHASIS

» Biomedical Engineering
» Biomedical (Biochemical) Engineering
» Biomedical (Electrical) Engineering
» Biomedical (Mechanical) Engineering

LEARN MORE: viterbi.usc.edu/bme
The interdisciplinary field of Biomedical Engineering (BME) combines elements of engineering (electronics, systems analysis, mechanics) with the life sciences (biology, physiology, biochemistry) to define and solve problems in biology and medicine.

Students choose this branch of engineering for the excitement of working with people and living systems, and for the opportunity to apply advanced technology to the complex problems of medical care.

Students can participate in a variety of directed study courses or classroom projects at facilities such as the County-USC Medical Center, House Ear Institute, the Biomedical Simulations Resource Center, the Medical Ultrasonic Transducer Resource Center, Rancho Los Amigos National Rehabilitation Center and Children’s Hospital-Los Angeles (CHLA).

**EMPHASES & OPTIONS**
While many students choose a primary degree in Biomedical Engineering with no added specialization, we do offer the opportunity to deepen your education in three separate programs: Biochemical (BMEC), Electrical (BMEN), and Mechanical (BMEL).

**Biomedical (Biochemical) Engineering (BMEC)** combines biomedical engineering with chemistry. As a BMEC student, you will take additional coursework in areas like Separation Processes (design, operation and optimization for processes like distillation and absorption), Chemical Engineering Thermodynamics and Biomaterials.

**Biomedical (Electrical) Engineering (BMEN)** is for students interested in the building of electronic biomedical devices and the effects of electrical stimulation. As a BMEN student, you’ll take additional coursework in areas like Linear Circuits, Digital Logic, Electromagnetics and Digital Electronic Circuit Design.

**Biomedical (Mechanical) Engineering (BMEL)** is for students interested in the mechanics and dynamics of medical devices and biological systems. As a BMEL student, you will take additional coursework in areas like Mechanics, Thermodynamics, Biomechanics, Materials Behavior and Processing, and Fluid Mechanics.

The BME programs are easily adapted to include the prerequisites for most medical schools, while also providing applied technical training beyond the basic life sciences. USC Pre-Med students are supported throughout the medical school application process by the Pre-Health Advisement office. Graduates go on to attend top medical, dental and pharmacy schools around the country, including the USC Keck School of Medicine.

**RESEARCH HIGHLIGHTS**
- Retinal prostheses
- Medical imaging
- Neural prostheses
- Biomedical photonics
- Cortical prostheses
- Sensory neurophysiology
- Sensorimotor control
- Cardio-respiratory control and dynamics
- Ultrasonic imaging
- Computational neurobiology
- Mechanisms of memory and learning
- System modeling and simulation

**COMPANIES THAT HIRE BME STUDENTS**
Abbott Laboratories, Advanced Bionics, Alfred E. Mann Institute, Amgen, Edwards Lifesciences, House Ear Institute, Lifescan, Medtronic, Neutrogena, Nike... And many more!

**CAREER OPTIONS**
- Become physicians or pharmacists
- Build advanced therapeutic & surgical devices
- Create safe implantable artificial materials
- Conduct biomedical research
- Develop artificial organs
- Design natural prosthetics
- Improve medical imaging devices
BIOMEDICAL ENGINEERING

FIRST YEAR

**FALL SEMESTER**

BME 101 or GE B 4

WRIT 150 4

MATH 125 (GE F) 4

CHEM 105aL (GE E) 4

ENGR 102 2

**SPRING SEMESTER**

BME 101 or GE B 4

GE A 4

MATH 126 or MATH 129 4

CHEM 105bL 4

OPTIONAL ELECTIVE 2

SECOND YEAR

**FALL SEMESTER**

BME 210 4

MATH 245 4

WRIT 150 4

MATH 126 or MATH 129 4

PHYS 151L (GE E) 4

OPTIONAL ELECTIVE 2

**SPRING SEMESTER**

BME 302L 4

CHEM 322aL 4

OPTIONAL ELECTIVE 3

**FIRST YEAR**

SPRING SEMESTER

FINITE SEMESTER

BME ANCHOR COURSE 3

BME 402 4

BME 405L 4

OPTIONAL ELECTIVE 5

THIRD YEAR

**FALL SEMESTER**

WRIT 340 3

EE 202L 4

BME 423 4

CHEM 322aL 4

BME ANCHOR COURSE 3

**SPRING SEMESTER**

BME 402 4

CHEM 322bL 4

OPTIONAL ELECTIVE 3

**FOURTH YEAR**

**FALL SEMESTER**

BISC 320L (CHEM 320L) 4

BME 403L or 405L (CHEM 322L) 4

BME 425 PHYS 152L 4

BME 410 4

OPTIONAL ELECTIVE 4

**SPRING SEMESTER**

BME 405L or 403L 4

EE 204L 4

ENGR 102 4

OPTIONAL ELECTIVE 1

**SPECIAL NOTES**

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

TECHNICAL ELECTIVES: At least 8 units, taken from ONE of the following three areas of specialization:

Bioelectronics/Computers: [BME 201, BME 416, BME 430, BME 451, BME 452, BME 453, CSCI 445, EE 109L, EE 209, EE 330, EE 348L, EE 352L, EE 354L, EE 454L, EE 483, ENGR 345 or 370B] or Biomechanics: [AME 201, AME 204, AME 301, AME 302, AME 303 or 309B, CHE 330, CHE 331, CHE 480L, CHE 489, ENGR 305, ENGR 306, or MASC 310] or Biochemical Engineering: [BME 201, BME 412, BME 414, BME 430, BME 453, CHE 330, CHE 350, CHE 480L, CHE 489, ENGR 305, ENGR 306, or MASC 310]
# BIOMEDICAL (BIOCHEMICAL)

## FIRST YEAR

### FALL SEMESTER
- **BME 101 or GE B**
- **WRIT 150**
- **MATH 125 (GE F)**
- **CHEM 105aL (GE E)**
- **ENGR 102**

### SPRING SEMESTER
- **BME 101 or GE B**
- **GE A**
- **MATH 126 or MATH 129**
- **CHEM 105bL**
- **OPTIONAL ELECTIVE**

## SECOND YEAR

### FALL SEMESTER
- **BISC 220L (GE D)**
- **GE B**
- **MATH 226 or MATH 229**
- **PHYS 151L (GE E)**
- **OPTIONAL ELECTIVE**

### SPRING SEMESTER
- **GE C**
- **BME 210**
- **MATH 245**
- **PHYS 152L**
- **OPTIONAL ELECTIVE**

## THIRD YEAR

### FALL SEMESTER
- **BISC 320L**
- **CHEM 322aL**
- **CHE 330**
- **BME 423**
- **BME 430**

### SPRING SEMESTER
- **EE 202L**
- **BME 410**
- **CHEM 322bL**
- **BISC 330L**
- **CHE 350**

## FOURTH YEAR

### FALL SEMESTER
- **MASC 310**
- **BME 403L**
- **BME 405L**
- **WRIT 340**
- **BME 413**

### SPRING SEMESTER
- **CHE 489**
- **BME 402**
- **BME 416**
- **OPTIONAL ELECTIVE**

## MATHEMATICS (16 UNITS)
- **MATH 125**: Calculus I
- **MATH 126 or 129**: Calculus II
- **MATH 226 or 229**: Calculus III
- **MATH 245**: Mathematics of Phys. and Engr.

## PHYSICS (8 UNITS)
- **PHYS 151L**: Mechanics and Thermodynamics
- **PHYS 152L**: Electricity and Magnetism

## CHEMISTRY (16 UNITS)
- **CHEM 105AL**: General Chemistry
- **CHEM 105BL**: General Chemistry
- **CHEM 322AL**: Organic Chemistry
- **CHEM 322BL**: Organic Chemistry

## BIOLOGY (12 UNITS)
- **BISC 220L**: Cell Biology & Physiology
- **BISC 230L**: Molecular Biology
- **BISC 330L**: Biochemistry

## GENERAL EDUCATION (32 UNITS)
- **GE A**: The Arts (1 Course)
- **GE B**: Humanistic Inquiry (2 Courses)
- **GE C**: Social Analysis (2 Courses)
- **GE D**: Life Sciences (1 Course)
- **GE E**: Physical Sciences (1 Course)
- **GE F**: Quantitative Reasoning (1 Course)
- **GE G,H**: Global Perspectives (2 Courses)*
- **GESM**: General Education Seminar (1 Course)*

## WRITING (7 UNITS)
- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

## ENGINEERING (55 UNITS)
- **BME 101**: Intro. to Biomedical Engineering
- **BME 210**: Biomed. Comp. Simulation Meth.
- **BME 402**: Control & Comm. in Nervous Sys.
- **BME 403L**: Physiological Systems
- **BME 405L**: Senior Projects Measurements & Instrumentation
- **BME 410**: Intro. to Biomaterials & Tissue Engr.
- **BME 413**: Bioengineering Signals & Systems
- **BME 416**: Dev. & Reg. of Medical Products
- **BME 423**: Statistical Methods in BME
- **BME 430**: Principles & Applications of Systems Biology
- **CHE 330**: Chemical Engr. Thermodynamics
- **CHE 350**: Intro. to Separation Processes
- **CHE 489**: Biochemical Engineering
- **EE 202L**: Linear Circuits

## SPECIAL NOTES
Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

**GE**: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

**OPTIONAL ELECTIVES**: Consult with your academic advisor to explore optional elective courses. These courses are not required.
# 2017-18 MAJOR COURSE PLAN

## BIOMEDICAL (ELECTRICAL)

### FIRST YEAR

**FALL SEMESTER**
- **BME 101 or GE B**
- **WRIT 150**
- **MATH 125 (GE F)**
- **CHEM 105aL (GE E)**
- **ENGR 102**

**SPRING SEMESTER**
- **BME 101 or GE B**
- **GE A**
- **MATH 126 or MATH 129**
- **CHEM 105bL**
- **ITP 165**

### SECOND YEAR

**FALL SEMESTER**
- **BME 210**
- **MATH 226 or MATH 229**
- **PHYS 151L (GE E)**
- **BME 403L**
- **OPTIONAL ELECTIVE**

**SPRING SEMESTER**
- **EE 209L**
- **MATH 445**
- **BME 423**
- **BME 425**
- **OPTIONAL ELECTIVE**

### THIRD YEAR

**FALL SEMESTER**
- **EE 202L**
- **BME 413**
- **BME 416**
- **OPTIONAL ELECTIVE**

**SPRING SEMESTER**
- **BME 402**
- **OPTIONAL ELECTIVE**

### FOURTH YEAR

**FALL SEMESTER**
- **BISC 320L**
- **CHEM 322aL**
- **SECOND TRACK COURSE: EE 338 OR 354L**
- **BME 403L**
- **OPTIONAL ELECTIVE**

**SPRING SEMESTER**
- **CHEM 105bL**
- **BME 410**
- **MATH 245**
- **BME 405L**
- **OPTIONAL ELECTIVE**

### MATHEMATICS (20 UNITS)
- **MATH 125:** Calculus I
- **MATH 126 or 129:** Calculus II
- **MATH 226 or 229:** Calculus III
- **MATH 245:** Mathematics of Phys. and Engr. I
- **MATH 445:** Mathematics of Phys. and Engr. II

### PHYSICS (8 UNITS)
- **PHYS 151L:** Mechanics and Thermodynamics
- **PHYS 152L:** Electricity and Magnetism

### CHEMISTRY (12 UNITS)
- **CHEM 105AL:** General Chemistry
- **CHEM 105BL:** General Chemistry
- **CHEM 322aL:** Organic Chemistry

### BIOLOGY (8 UNITS)
- **BISC 220L:** Cell Biology & Physiology
- **BISC 320L:** Molecular Biology

### GENERAL EDUCATION (32 UNITS)
- **GE A:** The Arts (1 Course)
- **GE B:** Humanistic Inquiry (2 Courses)
- **GE C:** Social Analysis (2 Courses)
- **GE D:** Life Sciences (1 Course)
- **GE E:** Physical Sciences (1 Course)
- **GE F:** Quantitative Reasoning (1 Course)
- **GE G,H:** Global Perspectives (2 Courses)*
- **GESM:** General Education Seminar (1 Course)*
- **WRIT 150:** Writing and Critical Reasoning
- **WRIT 340:** Advanced Writing

### ENGINEERING (60 UNITS)
- **BME 101:** Intro. to Biomedical Engineering
- **BME 210:** Biomed. Comp. Simulation Methods
- **BME 402:** Control & Comm. in Nerv. System
- **BME 403L:** Physiological Systems
- **BME 405L:** Senior Projects Measurements & Instrumentation
- **BME 413:** Bioengineering Signals & Systems
- **BME 416:** Development and Regulation of Medical Products
- **BME 423:** Statistical Methods in BME
- **BME 425:** Basics of Biomedical Imaging
- **EE 109L:** Introduction to Embedded Systems
- **EE 209:** Foundations of Digital System Design
- **EE 202L:** Linear Circuits
- **ITP 165:** Introduction to C++ Programming
- **DIGITAL TRACK: EE 354L:** Introduction to Digital Circuits
- **ENGR 102:** Engineering Freshman Academy

### *SPECIAL NOTES*
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.
- **GE:** Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.
- **OPTIONAL ELECTIVES:** Consult with your academic advisor to explore optional elective courses. These courses are not required.
- **TECHNICAL ELECTIVES:** At least 4 units of engineering coursework, including at least two units of upper-division coursework.

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2017-18 MAJOR COURSE PLAN

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# BIOMEDICAL (MECHANICAL)

## FIRST YEAR

### FALL SEMESTER

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<th>Course</th>
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### SPRING SEMESTER

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<td>MATH 126 or MATH 129</td>
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## SECOND YEAR

### FALL SEMESTER

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### SPRING SEMESTER

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<tr>
<td>PHYS 152L</td>
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## THIRD YEAR

### FALL SEMESTER

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<td>AME 301</td>
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### SPRING SEMESTER

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<td>CHEM 322aL</td>
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<td>AME 309</td>
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## FOURTH YEAR

### FALL SEMESTER

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<td>BME 413</td>
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<td>BME 403L or 405L</td>
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<td>BME 404</td>
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<td>WRIT 340</td>
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### SPRING SEMESTER

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<td>GE C</td>
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<td>BME 416</td>
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</table>

## MATHEMATICS (16 UNITS)

- **MATH 125**: Calculus I
- **MATH 126 or 129**: Calculus II
- **MATH 226 or 229**: Calculus III
- **MATH 245**: Mathematics of Phys. and Engr. I

## PHYSICS (8 UNITS)

- **PHYS 151L**: Mechanics and Thermodynamics
- **PHYS 152L**: Electricity and Magnetism

## CHEMISTRY (12 UNITS)

- **CHEM 105AL**: General Chemistry
- **CHEM 105BL**: General Chemistry
- **CHEM 322AL**: Organic Chemistry

## BIOLOGY (8 UNITS)

- **BISC 220L**: Cell Biology & Physiology
- **BISC 320L**: Molecular Biology

## GENERAL EDUCATION (32 UNITS)

- **GE A**: The Arts (1 Course)
- **GE B**: Humanistic Inquiry (2 Courses)
- **GE C**: Social Analysis (2 Courses)
- **GE D**: Life Sciences (1 Course)
- **GE E**: Physical Sciences (1 Course)
- **GE F**: Quantitative Reasoning (1 Course)
- **GE G,H**: Global Perspectives (2 Courses)*
- **GESM**: General Education Seminar (1 Course)*

## WRITING (7 UNITS)

- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

## ENGINEERING (63 UNITS)

- **AME 201**: Statics
- **AME 204**: Strength of Materials
- **AME 301**: Dynamics
- **AME 308**: Comp. - Aid. Analysis for Design
- **ITEP 308**: Comp. - Aid. Design for Bio-Mechanical Systems
- **AME 309**: Dynamics of Fluids
- **BME 101**: Intro. to Biomedical Engineering
- **BME 210**: Biomed. Comp. Simulation Methods
- **BME 402**: Control & Comm. in Nerv. System
- **BME 403L**: Physiological Systems
- **BME 404**: Biomechanics
- **BME 405L**: Senior Projects: Meas. and Instrument
- **BME 413**: Bioengineering Signals & Systems
- **BME 416**: Development and Regulation of Medical Products
- **BME 423**: Statistical Methods in BME
- **EE 302L**: Linear Circuits
- **ENGR 102**: Engineering Freshman Academy
- **MASC 310**: Materials Behavior and Processing

## TECHNICAL ELECTIVES

Five units of upper-division engineering coursework, including at least three units of 400-level BME coursework.

## SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

TECHNICAL ELECTIVES: Five units of upper-division engineering coursework, including at least three units of 400-level BME coursework.
CHEMICAL

MAJORS & AREAS OF EMPHASIS

- Chemical Engineering
- Chemical (Biochemical) Engineering
- Chemical (Environmental) Engineering
- Chemical (Nanotechnology) Engineering
- Chemical (Petroleum) Engineering
- Chemical (Polymers/Materials Science) Engineering

LEARN MORE: viterbi.usc.edu/mork
Chemical engineers design, control and optimize large-scale chemical, physiochemical and biochemical processes. They are also involved in the development and design of new materials ranging from advanced composites used in automotive and space-related industries to materials used in the biomedical and electronics fields.

Chemical Engineers are employed in areas as diverse as the chemical, pharmaceutical, energy, material and environmental industries. Emerging fields in chemical engineering include biotechnology, the design of environmentally benign processes and the synthesis of new materials (including bio- and nanomaterials). Chemical engineers are uniquely qualified to provide solutions to many pressing problems in the areas of energy, environment and materials science.

While many students choose a primary degree in chemical engineering with no added specialization, we also offer the opportunity to deepen your education in five separate emphasis programs: Biochemical (CHEB), Petroleum (CHPE), Nanotechnology (CHEN), Polymers/Materials (CHPM), and Environmental (CHEE).

CHE RESEARCH
Researchers in the Mork Family Department of Chemical Engineering & Materials Science are at the forefront of investigations that will aid in emerging technologies. Research areas include technologies that impact oil and gas performance and maximize the world’s fossil fuel supply, the latest polymers and composites, and ways to remediate contaminated soils. In addition, researchers are creating new technologies for a more efficient, environmentally sensitive future.

The Mork Family Department is well-equipped for experimental research with modern instrumentation located in core laboratories across campus, including NMR spectrometers, electron microscopes, surface analysis instrumentation, and nanofabrication tools located in clean room space.

Undergraduate students undertake senior design projects in plant design and also have many opportunities to work in the laboratories of our faculty in the areas of Chemical Engineering, Materials Science, and Petroleum Engineering. Our students also attend national conferences (e.g. AIChE, MRS, and SPE), participate in summer internships, and compete in national and international design projects such as the World Solar Challenge.

RESEARCH HIGHLIGHTS

» Nanobioparticle engineering
» Membrane separation, membrane reactors
» Material characterization, corrosion
» Polymers, ceramics and composites
» Statistical mechanics, molecular modeling and simulation
» Synthetic and systems biology
» Advanced computing and simulations
» Nano-, bio- and photonic materials
» Peptide and protein engineering
» Immunoengineering for cancer therapy
» Modeling of oil and gas reservoir performance
» Fluid flow through porous media
» Studies of fluid, foam, and polymer flow
» Enhanced oil recovery
» Subsurface imaging
» Microfluidics for nanomaterial synthesis and bioanalysis

COMPANIES THAT HIRE CHE STUDENTS

Amgen, Baxter, CH2M Hill, Chevron, ConocoPhillips, Dow Chemical, DuPont, Environ, ExxonMobil, Halliburton, Hewlett-Packard, Intel, Proctor & Gamble...

And many more!

CAREER OPTIONS

» Design and optimize cost-effective ways to produce energy, drugs, plastics and chemicals
» Develop new biological and therapeutic agents
» Establish new methods for chemical processing
» Find solutions for environmental problems
» Streamline petroleum exploration and refining
» Create new consumer products and manufacturing systems
» Regulate environmental health and safety standards
» Production, design, development and research in all fields that involve chemical changes
## 2017-18 MAJOR COURSE PLAN

### CHEMICAL ENGINEERING

#### FIRST YEAR

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#### SECOND YEAR

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#### THIRD YEAR

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#### FOURTH YEAR

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### MATHEMATICS (16 UNITS)
- **MATH 125**: Calculus I
- **MATH 126** or **MATH 129**: Calculus II
- **MATH 226** or **MATH 229**: Calculus III
- **MATH 245**: Mathematics of Phys. and Engr.

### PHYSICS (8 UNITS)
- **PHYS 151L**: Mechanics and Thermodynamics
- **PHYS 152L**: Electricity and Magnetism

### CHEMISTRY (24 UNITS)
- **CHEM 105aL**: General Chemistry
- **CHEM 105bL**: General Chemistry
- **CHEM 300L**: Analytical Chemistry
- **CHEM 322aL**: Organic Chemistry
- **CHEM 430**: Physical Chemistry: Thermodynamics & Kinetics
- **CHEMISTRY ELECTIVE**: CHEM 322bL or 431

### GENERAL EDUCATION (32 UNITS)
- **GE A**: The Arts (1 Course)
- **GE B**: Humanistic Inquiry (2 Courses)
- **GE C**: Social Analysis (2 Courses)
- **GE D**: Life Sciences (1 Course)
- **GE E**: Physical Sciences (1 Course)
- **GE F**: Quantitative Reasoning (1 Course)
- **GE G, H**: Global Perspectives (2 Courses)*
- **GESM**: General Education Seminar (1 Course)*

### WRITING (7 UNITS)
- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

### ENGINEERING (54-57 UNITS)
- **CHE 120**: Intro. to Chemical Engineering
- **CHE 205**: Numerical Methods in Chemical Engineering
- **CHE 330**: Chemical Engr. Thermodynamics
- **CHE 350**: Intro. to Separation Processes
- **CHE 405**: Probability and Statistics for CHE
- **CHE 443**: Viscous Flow
- **CHE 444**: Chemical Engineering Lab
- **CHE 444L**: Chemical Engineering Lab
- **CHE 445**: Heat Transfer in CHE Processes
- **CHE 446**: Mass Transfer in CHE Processes
- **CHE 460L**: Chem. Proc. Dynamics & Control
- **CHE 476**: Chemical Engineering Materials
- **CHE 480**: Chem. Process and Plant Design
- **CHE 485**: Computer Aided Process Design
- **ENGR 102**: Engineering Freshman Academy
- **TECHNICAL ELECTIVE**: Any upper-division CHE course that is not already required.
- **APPROVED ELECTIVES**: 8-9 units of approved electives including CHE 205 (2), EE 438L (3), and ISE 460 (3) or BUAD 301 (3) or other courses with department approval.

### SPECIAL NOTES
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.
- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.
- OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.
- TECHNICAL ELECTIVE: Any upper-division CHE course that is not already required.
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**MATHEMATICS (16 UNITS)**

- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

**PHYSICS (8 UNITS)**

- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

**CHEMISTRY (20 UNITS)**

- CHEM 105aL: General Chemistry
- CHEM 105bL: General Chemistry
- CHEM 300L: Analytical Chemistry
- CHEM 322aL: Organic Chemistry
- CHEM 430: Physical Chemistry: Thermodynamics & Kinetics

**BIOLOGY (12 UNITS)**

- BISC 300L: Intro. to Microbiology
- BISC 320L: Molecular Biology
- BISC 330L: Biochemistry

**GENERAL EDUCATION (32 UNITS)**

- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)

**GEF** Quantitative Reasoning (1 Course)

**GE G, H** Global Perspectives (2 Courses)*

**GSEM** General Education Seminar (1 Course)*

**WRITING (7 UNITS)**

- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

**ENGINEERING (51-52 UNITS)**

- BME 410: Intro. to Biomaterials
- CHE 120: Intro. to Chemical Engineering
- CHE 205: Numerical Methods in Chemical Engineering
- CHE 330: Chemical Engr. Thermodynamics
- CHE 350: Intro. to Separation Processes
- CHE 405: Applications of Probability & Statistics for Chemical Engineers or ISE 460: Engineering Economy
- CHE 442: Chemical Reactor Analysis
- CHE 443: Viscous Flow
- CHE 444aBL: Chem. Engineering Laboratory
- CHE 445: Heat Transfer in CHE Processes
- CHE 446: Mass Transfer in CHE Processes
- CHE 460L: Chemical Process Dynamics
- CHE 480: Chem. Process and Plant Design
- CHE 485: Computer-Aided Plant Design
- CHE 489: Biochemical Engineering
- ENGR 102: Engineering Freshman Academy

**BIOELECTIVE**

* SPECIAL NOTES

- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.
- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.
- OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.
- BIOELECTIVE: Approved Bioengineering course or BISC 403
- BISC 403: Must have 48 engineering units in order to register for this class
## 2017-18 MAJOR COURSE PLAN

### CHEMICAL (ENVIRONMENTAL)

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<th>Fall Semester</th>
<th>Spring Semester</th>
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<td>CHEM 300L</td>
<td>MATH 226, PHYS 151L</td>
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<td>CE 463L</td>
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<td>CHE 446</td>
<td>CHEM 322aL (CHEM 105bL)</td>
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### Mathematics (16 Units)
- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

### Physics (8 Units)
- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

### Chemistry (20 Units)
- CHEM 105AL: General Chemistry
- CHEM 105BL: General Chemistry
- CHEM 300L: Analytical Chemistry
- CHEM 322aL: Organic Chemistry
- CHEM 430L: Physical Chemistry: Thermodynamics & Kinetics

### General Education (32 Units)
- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)
- GE F: Quantitative Reasoning (1 Course)
- GE G, H: Global Perspectives (2 Courses)*
- GESM: General Education Seminar (1 Course)*

### Writing (7 Units)
- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### Engineering (63 Units)
- CE 453: Water Quality Control
- CE 463L: Water Chemistry and Analysis
- CHE 120: Intro to Chemical Engineering
- CHE 205: Numerical Methods in Chemical Engineering
- CHE 330L: Chemical Engr. Thermodynamics
- CHE 350L: Intro to Separation Processes
- CHE 442: Chemical Reactor Analysis
- CHE 443L: Viscous Flow
- CHE 444aL: Chem. Engineering Laboratory
- CHE 444aL: Chem. Engineering Laboratory
- CHE 445: Heat Transfer in ChE Processes
- CHE 446L: Mass Transfer in ChE Processes
- CHE 460L: Chemical Process Dynamics
- CHE 476L: Chemical Engineering Materials
- CHE 480L: Chem. Process and Plant Design
- CHE 485L: Computer Aided Process Design
- CHE 486L: Design of Environ. Benign Plants
- ENE 428L: Air Pollution Fundamentals
- ENGR 102: Engineering Freshman Academy

### Optional Electives
Consult with your academic advisor to explore optional elective courses. These courses are not required.

### Special Notes
Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

- **GE**: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

- **ISE 460**: Engineering Economy
- **BUAD 301**: Technical Entrepreneurship
- **PTE 463L**: Trans. Processes in Porous Media

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* GE: General Education
### CHEMICAL (NANOTECHNOLOGY)

#### FIRST YEAR

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<td><strong>MATH 226</strong> or <strong>MATH 229</strong>: Calculus III</td>
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<th><strong>PHYSICS (8 UNITS)</strong></th>
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<tr>
<td><strong>PHYS 151L</strong>: Mechanics and Thermodynamics</td>
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<td><strong>PHYS 152L</strong>: Electricity and Magnetism</td>
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<th><strong>CHEMISTRY (24 UNITS)</strong></th>
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<td><strong>CHEM 105aL</strong>: General Chemistry</td>
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<td><strong>CHEM 430</strong>: Physical Chemistry: Thermodynamics &amp; Kinetics</td>
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<td><strong>CHEM 453</strong>: Advanced Inorganic Chemistry</td>
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<th><strong>GENERAL EDUCATION (32 UNITS)</strong></th>
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<td><strong>GE A</strong>: The Arts (1 Course)</td>
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<td><strong>GE B</strong>: Humanistic inquiry (2 Courses)</td>
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<td><strong>GE E</strong>: Physical Sciences (1 Course)</td>
</tr>
<tr>
<td><strong>GE F</strong>: Quantitative Reasoning (1 Course)</td>
</tr>
<tr>
<td><strong>GE G, H</strong>: General Perspectives (2 Courses)*</td>
</tr>
<tr>
<td><strong>GESM</strong>: General Education Seminar (1 Course)*</td>
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</table>

<table>
<thead>
<tr>
<th><strong>WRITING (7 UNITS)</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>WRIT 150</strong>: Writing and Critical Reasoning</td>
</tr>
<tr>
<td><strong>WRIT 340</strong>: Advanced Writing</td>
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<table>
<thead>
<tr>
<th><strong>ENGINEERING (54 UNITS)</strong></th>
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<tbody>
<tr>
<td><strong>CHE 120</strong>: Intro. to Chemical Engineering</td>
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<td><strong>CHE 205</strong>: Numerical Methods in Chemical Engineering</td>
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<tr>
<td><strong>CHE 330</strong>: Chemical Engr. Thermodynamics</td>
</tr>
<tr>
<td><strong>CHE 350</strong>: Intro. to Separation Processes</td>
</tr>
<tr>
<td><strong>CHE 391</strong>: Intro. to Nanotechnology Research</td>
</tr>
<tr>
<td><strong>CHE 405</strong>: Applications of Prob. &amp; Stats. for CHE or ISE 460: Engineering Economy or BUAD 301: Technical Entrepreneurship</td>
</tr>
<tr>
<td><strong>CHE 442</strong>: Chemical Reactor Analysis</td>
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<td><strong>CHE 443</strong>: Viscous Flows</td>
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<td><strong>CHE 444aBL</strong>: Chemical Engineering Lab</td>
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<tr>
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<tr>
<td><strong>CHE 446</strong>: Mass Transfer in CHE Processes</td>
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<tr>
<td><strong>CHE 460L</strong>: Chemical Process Dynamics &amp; Control</td>
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<tr>
<td><strong>CHE 480</strong>: Chem. Process and Plant Design</td>
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<tr>
<td><strong>CHE 485</strong>: Comp.-Aided Chemical Process Design</td>
</tr>
<tr>
<td><strong>CHE 487</strong>: Nanotech and Nanoscale Engineering</td>
</tr>
<tr>
<td><strong>CHE 491</strong>: Nanotech Research for Undergrads</td>
</tr>
<tr>
<td><strong>ENGR 102</strong>: Engineering Freshman Academy</td>
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<table>
<thead>
<tr>
<th><strong>MASC 350L</strong>: Design, Synthesis and Processing of Engineering Materials</th>
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<tbody>
<tr>
<td><strong>NANOTECH. ELECTIVE</strong></td>
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</table>

**SPECIAL NOTES**

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

**GE**: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

**OPTIONAL ELECTIVES**: Consult with your academic advisor to explore optional elective courses. These courses are not required.

**NANOTECH. ELECTIVE**: EE/MASC 438L, CHE 489, or CHE/PTE 463L.

**CHE 391, 491**: Technical electives may be taken in place of these courses. Contact the department for approved courses.
## CHEMICAL (PETROLEUM)

### FIRST YEAR

#### FALL SEMESTER

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#### SPRING SEMESTER

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### SECOND YEAR

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<td>PHYS 152L</td>
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<td>MATH 245</td>
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<td>CHE 350 (CHEM 105bL)</td>
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### THIRD YEAR

#### FALL SEMESTER

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<td>CHEM 405</td>
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<td>CHE 442</td>
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<td>PTE 461</td>
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<td>PTE 464L (CHEM 444aL)</td>
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### FOURTH YEAR

#### FALL SEMESTER

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<td>CHEM 445</td>
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<td>PTE 465L</td>
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### MATHEMATICS (16 UNITS)

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<tr>
<td>MATH 126 or MATH 129: Calculus II</td>
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<tr>
<td>MATH 224: Mathematics of Phys. and Engr.</td>
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### PHYSICS (8 UNITS)

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PHYS 151L: Mechanics and Thermodynamics</td>
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<tr>
<td>PHYS 152L: Electricity and Magnetism</td>
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### CHEMISTRY (24 UNITS)

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<td>CHEM 105BL: General Chemistry</td>
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<tr>
<td>CHEM 300L: Analytical Chemistry</td>
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</tr>
<tr>
<td>CHEM 322AL: Organic Chemistry</td>
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</tr>
<tr>
<td>CHEM 430: Physical Chemistry: Thermodynamics &amp; Kinetics</td>
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<td>CHEMISTRY ELECTIVE: CHEM 322bL or 431</td>
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### GENERAL EDUCATION (32 UNITS)

<table>
<thead>
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<tbody>
<tr>
<td>GE A: The Arts (1 Course)</td>
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<tr>
<td>GE B: Humanistic Inquiry (2 Courses)</td>
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<tr>
<td>GE C: Social Analysis (5 Courses)</td>
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<tr>
<td>GE D: Life Sciences (1 Course)</td>
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<tr>
<td>GE E: Physical Sciences (1 Course)</td>
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<tr>
<td>GE F: Quantitative Reasoning (1 Course)</td>
<td></td>
</tr>
<tr>
<td>GE G, H: Global Perspectives (2 Courses)*</td>
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<tr>
<td>GESM: General Education Seminar (1 Course)*</td>
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### WRITING (7 UNITS)

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<tr>
<th>Course</th>
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<tbody>
<tr>
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<td>WRIT 340: Advanced Writing</td>
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### ENGINEERING (60 UNITS)

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<th>Course</th>
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<td>CHE 120: Intro. to Chemical Engineering</td>
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<td></td>
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<td>CHE 330: Chemical Engr. Thermodynamics</td>
<td></td>
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<tr>
<td>CHE 350: Intro. to Separation Processes</td>
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<tr>
<td>CHE 440: Chemical Reactor Analysis</td>
<td></td>
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<tr>
<td>CHE 443: Viscous Flow</td>
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</tr>
<tr>
<td>CHE 444AL: Chemical Engineering Lab</td>
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</tr>
<tr>
<td>CHE 444BL: Chemical Engineering Lab</td>
<td></td>
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<tr>
<td>CHE 445: Heat Transfer in Chem Processes</td>
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<tr>
<td>CHE 446: Mass Transfer in CHE Processes</td>
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<tr>
<td>CHE 460L: Chemical Process Dynamics</td>
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<tr>
<td>CHE 476: Chemical Engineering Materials</td>
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<tr>
<td>CHE 480: Chem. Process and Plant Design</td>
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# CHEMICAL (POLYMERS/MATERIALS)

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<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
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<td>WRIT 150</td>
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<td>MATH 125 (GE F)</td>
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<tr>
<td>CHEM 105aL (GE E)</td>
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<tr>
<td>ENGR 102</td>
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### SPRING SEMESTER

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<tr>
<td>CHE 120 (MATH 125, CHEM 105aL)</td>
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<td>CHE 205 (MATH 125)</td>
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<tr>
<td>MATH 126 or MATH 129</td>
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<tr>
<td>CHEM 105bL</td>
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<tr>
<td>PHYS 151L (GE E)</td>
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## SECOND YEAR

### FALL SEMESTER

<table>
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<th>Course</th>
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<td>WRIT 340</td>
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<td>CHE 350 (CHEM 105bL)</td>
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## THIRD YEAR

### FALL SEMESTER

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### SPRING SEMESTER

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## FOURTH YEAR

### FALL SEMESTER

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### GENERAL EDUCATION (32 UNITS)

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<td>GE C</td>
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### MATHEMATICS (16 UNITS)

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</tr>
<tr>
<td>CHE 460L: Chemical Process Dynamics</td>
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</tr>
<tr>
<td>CHE 472: Polymer Science &amp; Engineering</td>
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</tr>
<tr>
<td>CHE 476: Chemical Engineering Materials or MASC 310: Materials Behavior and Processing</td>
<td>4</td>
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<tr>
<td>CHE 480: Chem. Process and Plant Design</td>
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</tr>
<tr>
<td>CHE 485: Computer Aided Process Design</td>
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</table>

### SPECIAL NOTES

- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.
- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.
- OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.
- POLYMER/MAT ELECTIVES: Select 9 units from BME 410, CHE 474L, 475, 477, 487, EE 438L, or MASC 440.
# CHEMICAL (SUSTAINABLE ENERGY)

## FIRST YEAR

### FALL SEMESTER

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<th>Course</th>
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<tbody>
<tr>
<td>GE A</td>
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<td>WRIT 150</td>
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<tr>
<td>CHEM 105aL (GE E)</td>
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<td>ENGR 102</td>
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### SPRING SEMESTER

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<td>CHEM 105bL (GE E)</td>
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<td>PHYS 151L (GE E)</td>
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## SECOND YEAR

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<td>MATH 226 or MATH 229</td>
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<tr>
<td>PHYS 152L</td>
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<td>OPTIONAL ELECTIVE</td>
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### SPRING SEMESTER

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<td>GE B</td>
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<td>MATH 245</td>
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<td>CHE 350</td>
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## THIRD YEAR

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<td>CHEM 442</td>
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<td>CHE 450</td>
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<tr>
<td>CHEM 444bL</td>
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<tr>
<td>CHEM 443</td>
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<tr>
<td>CHE 476 or MASC 350L</td>
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<td>SUSTAINABLE ENERGY ELECTIVE</td>
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## FOURTH YEAR

### FALL SEMESTER

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<tr>
<td>CHE 444bL (CHE 350, CHE 443)</td>
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<tr>
<td>CHE 445</td>
</tr>
<tr>
<td>CHE 485 or ISE 460 or *BUAD 301</td>
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### SPRING SEMESTER

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<tr>
<td>CHEM 460L</td>
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<td>CHE 480</td>
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<td>GE B</td>
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## MATHEMATICS (16 UNITS)

- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

## PHYSICS (8 UNITS)

- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

## CHEMISTRY (24 UNITS)

- CHEM 105aL: General Chemistry
- CHEM 105bL: General Chemistry
- CHEM 300L: Analytical Chemistry
- CHEM 322aL: Organic Chemistry
- CHEM 430L: Physical Chemistry: Thermodynamics & Kinetics
- Chemistry Technical Electives:
  - CHEM 322bL: Organic Chemistry
  - CHEM 323L: Physical Chemistry: Quantum Mechanics
  - CHEM 431L: Physical Chemistry: Quantum Mechanics

## GENERAL EDUCATION (32 UNITS)

- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)

## ENGINEERING (54 UNITS)

- CHE 120: Intro. to Chemical Engineering
- CHE 205: Numerical Methods in Chemical Engineering
- CHE 330: Chemical Engr. Thermodynamics
- CHE 350: Intro. to Separation Processes
- CHE 405: Applications of Prob. & Stats. for ChE or ISE 460: Engineering Economy or BUAD 301: Technical Entrepreneurship
- CHE 443: Chemical Reactor Analysis
- CHE 445: Viscous Flows
- CHE 444bL: Chemical Engineering Lab
- CHE 445: Heat Transfer in CHE Processes
- CHE 446L: Mass Transfer in CHE Processes
- CHE 450: Sustainable Energy
- CHE 460L: Chemical Process Dynamics & Control
- CHE 480: Chem. Process and Plant Design

## SUSTAINABLE ENERGY ELECTIVE (3):

- Biofuel (CHE 301 or CHEM 488 or CHE 489)
- Solar (CHE 487 or EE 513)
- Geothermal (PTE 463L)

## SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your academic advisor for detailed assistance.

- OPTIONALELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

- *Must have 49 engineering units to be able to take BUAD 301.
MAJORS & AREAS OF EMPHASIS

» Civil Engineering
  Optional Track: Construction
  Optional Track: Water Resources
» Civil Engineering (Building Science)
» Civil Engineering (Structural Engr.)
» Environmental Engineering

LEARN MORE: viterbi.usc.edu/cee
Civil and Environmental Engineers address many of the vital needs of our modern society. They improve quality of life, promote economic growth, and protect people from hazards of natural and human origins.

Civil and Environmental Engineers create, construct, and manage the infrastructure systems we use in our everyday lives: transportation, water, power distribution, waste disposal, environment, and residential, industrial & commercial structures.

Civil and Environmental engineers support the global economy, secure the health and security of diverse communities, and enhance environmental quality worldwide. They design, build and operate our nation’s infrastructure – highways, bridges, wharf and harbor structures, industrial facilities – and address the challenges of ground water and air pollution as well as industrial and hazardous waste management. They monitor the quality of the air, water and land, and enhance the protection of our environment.

**EMPHASES & OPTIONS**
The Bachelor’s degree in Civil Engineering provides a broad base of core Civil Engineering courses and prepares students for both engineering practice and graduate studies. Students explore structural engineering, geotechnical engineering, construction, transportation, environmental engineering, and water resources. The Structural Engineering emphasis focuses on the design of safe and efficient structural systems. Students will be prepared to design structures such as bridges, buildings, and offshore structures that can resist a variety of forces such as earthquakes and wind loadings. Building Science is a joint architecture/engineering program. Students will learn all aspects of building technology from site selection to building construction, in addition to gaining a holistic perspective of building design from architectural design to structural design, and from the artistic to the functional. The Bachelor’s degree in Environmental Engineering program covers engineering approaches required to provide safe drinking water, maintain air quality, and protect the environment.

**RESEARCH HIGHLIGHTS**
» Sustainable Development: Long-term viability of natural resources and engineered civil systems.
» Water Quality, Access, and Distribution: Providing an adequate supply of potable water, considering population growth and climate variability.
» Disasters and Extreme Events: Both natural (e.g. earthquakes, tsunamis, floods, climate change) and man-made (e.g. terrorist attacks, engineering failures, industrial accidents) disasters. Research and education in this area includes all aspects of an event, from a fundamental understanding of the physical processes controlling its evolution to the resulting environmental and social reaction.
» Coupling of Complex Systems: Most natural and engineered systems are known to be complex, defined as systems characterized by their display of patterns of structure or behavior at one level of system organization that are diagnostic of interactions among parts of the system at other levels.

**COMPANIES THAT HIRE CEE STUDENTS**
Campbell Concrete, CH2M Hill, Chevron, City/County of Los Angeles, Kiewit Pacific Company, Leighton Group, PPG Industries, Rudolph & Sletten, The Reynolds Group...

And many more!

**CAREER OPTIONS**
» Become a structural engineer and build sustainable buildings
» Develop land and mitigate risks of natural and manmade disasters
» Manage civil infrastructure
» Design and build roads, bridges, dams, tunnels and airports
» Develop environmental public policy
» Create waste removal systems and treatment processes
» Design transportation systems
# 2017-18 MAJOR COURSE PLAN

## CIVIL ENGINEERING

### FIRST YEAR

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<th>Semester</th>
<th>Course</th>
<th>Units</th>
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<tr>
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<td>CE 106L</td>
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<td>CE 205</td>
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<td>SPRING</td>
<td>GEOL 305L</td>
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</tr>
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<td>EE 202L or EE 326Lx</td>
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### THIRD YEAR

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<td>CE 358</td>
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<td>ISE 460</td>
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<tr>
<td>SPRING</td>
<td>GE B</td>
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<td>DESIGN KERNEL</td>
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<td></td>
<td>EE 202L or EE 326Lx</td>
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### FOURTH YEAR

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<tr>
<td>SPRING</td>
<td>WRIT 340</td>
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<tr>
<td></td>
<td>GE C</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CE 402</td>
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</tr>
<tr>
<td></td>
<td>CE ELECTIVE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CE 471</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CE 465 or CE 480</td>
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</tr>
</tbody>
</table>

### MATHEMATICS (16 UNITS)

- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

### PHYSICS (8 UNITS)

- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

### OTHER SCIENCE (8 UNITS)

- CHEM 105AL: General Chemistry
- GEOL 305L: Intro. to Engineering Geology

### GENERAL EDUCATION (32 UNITS)

- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)
- GE F: Quantitative Reasoning (1 Course)
- GE G, H: Global Perspectives (2 Courses)*
- GESM: General Education Seminar (1 Course)*

### WRITING (7 UNITS)

- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### ENGINEERING (70 UNITS)

- CE 106L: Design & Planning of CE Systems
- CE 108: Intro. to CE Computer Methods
- CE 205: Statics
- CE 207L: Intro. to Design of Structural Systems
- CE 225: Mechanics of Deformable Bodies
- CE 235: Dynamics
- CE 309: Fluid Mechanics
- CE 334L: Mechanical Behavior of Materials
- CE 358: Theory of Structures I
- CE 402: Computer Methods in Civil Engr.
- CE 408: Risk Analysis in Civil Engr.
- CE 451: Water Resources Engineering
- CE 453: Water Quality Control
- CE 456: Design of Steel Structures
- CE 457L: Geotechnical Engineering
- CE 471: Principles of Transportation Engr.
- CE 485: Water Supply & Sewage System Design
- EE 202L: Linear Circuits
- EE 326LX: Essentials of Electrical Engr
- ENGR 102: Engineering Freshman Academy
- ISE 460: Engineering Economy

### DESIGN KERNELS

- Ce ELECTIVES

### SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

CE 205, 225, 309, and 235: Minimum grade of “C” is required.

EE 326LX: CE students are encouraged to take EE 326Lx in the spring term.

DESIGN KERNELS: Choose six units from CE 457, 465, 466, 476, 478, 482, 484, or 485. If CE 480 is chosen as senior capstone course, 1 Design Kernel course must be CE 482. If CE 465 is chosen as senior capstone course, 1 Design Kernel course must be either CE 466 or 476.

CE ELECTIVES: Choose six units of upper-division CE course that is not already required.
# 2017-18 MAJOR COURSE PLAN

## CIVIL TRACK: CONSTRUCTION

### FIRST YEAR

#### FALL SEMESTER

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<tbody>
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<td>MATH 125 (GE F)</td>
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#### SPRING SEMESTER

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<td>CE 480</td>
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### MATHEMATICS (16 UNITS)

- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 220 or MATH 223: Calculus III
- MATH 243: Mathematics of Phys. and Engr.

### PHYSICS (8 UNITS)

- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

### OTHER SCIENCE (8 UNITS)

- CHEM 105AL: General Chemistry
- GEOL 305L: Intro. to Engineering Geology

### GENERAL EDUCATION (32 UNITS)

- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)
- GE F: Quantitative Reasoning (1 Course)
- GE G, H: Global Perspectives (2 Courses)*
- GESM: General Education Seminar (1 Course)*

### WRITING (7 UNITS)

- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### ENGINEERING (70 UNITS)

- CE 106L: Design & Planning of CE Systems
- CE 108: Intro. to CE Computer Methods
- CE 205L: Statics
- CE 207L: Intro. to Design of Structural Systems
- CE 225: Mechanics of Deformable Bodies
- CE 309: Fluid Mechanics
- CE 235: Dynamics
- CE 334L: Mechanical Behavior of Materials
- CE 358: Theory of Structures I
- CE 402: Computer Methods in Civil Engr.
- CE 408: Risk Analysis in Civil Engr.
- CE 451: Water Resources Engineering
- CE 456: Design of Steel Structures
- CE 460: Construction Engineering
- CE 467L: Geotechnical Engineering
- CE 471: Principles of Transportation Engr.
- CE 480: Structural Systems Design
- CE 482: Foundation Design
- EE 202L: Linear Circuits or EE 326Lx: Essentials of Electrical Engr.
- ENGR 102: Engineering Freshman Academy
- ISE 460: Engineering Economy

### DESIGN KERNEL

Choose one from CE 457, 465, 465L, 478, 484, or 485.

### CE ELECTIVES

One course must be: CE 462, CE 469, CE 470, or ARCH 413. The other course can be any upper-division CE course that is not already required.

### SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

CE 205, 225, 309, and 235: Minimum grade of "C" is required.

EE 326LX: CE students are encouraged to take EE 326Lx in the spring.

DESIGN KERNEL: Choose one from CE 457, 465, 465L, 478, 484, or 485.
# 2017-18 MAJOR COURSE PLAN

## CIVIL TRACK: WATER RESOURCES

### FIRST YEAR

#### FALL SEMESTER

<table>
<thead>
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<th>GE A</th>
<th>WRIT 150</th>
<th>MATH 125 (GE F)</th>
<th>CE 106L</th>
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#### SPRING SEMESTER

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### SECOND YEAR

#### FALL SEMESTER

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<th>GE C</th>
<th>GE D</th>
<th>MATH 226 or MATH 229</th>
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<th>CE 205</th>
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#### SPRING SEMESTER

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### THIRD YEAR

#### FALL SEMESTER

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#### SPRING SEMESTER

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### FOURTH YEAR

#### FALL SEMESTER

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#### SPRING SEMESTER

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### MATHEMATICS (16 UNITS)

- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

### PHYSICS (8 UNITS)

- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

### OTHER SCIENCE (8 UNITS)

- CHEM 105AL: General Chemistry
- GEOL 305L: Intro. to Engineering Geology

### GENERAL EDUCATION (32 UNITS)

- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)
- GE F: Quantitative Reasoning (1 Course)
- GE G, H: Global Perspectives (2 Courses)*
- GESM: General Education Seminar (1 Course)*

### WRITING (7 UNITS)

- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### ENGINEERING (70 UNITS)

- CE 106L: Design & Planning of CE Systems
- CE 108: Intro. to CE Computer Methods
- CE 205: Statics
- CE 207L: Intro. to Design of Structural Systems
- CE 225: Mechanics of Deformable Bodies
- CE 309: Fluid Mechanics
- CE 235: Dynamics
- CE 334L: Mechanical Behavior of Materials
- CE 358: Theory of Structures I
- CE 402: Computer Methods in Civil Engr.
- CE 408: Risk Analysis in Civil Engr.
- CE 451: Water Resources Engineering
- CE 453: Water Quality Control
- CE 456: Design of Steel Structures
- CE 467L: Geotechnical Engineering
- CE 471: Principles of Transportation Engr.
- CE 465: Water Supply & Sewage System Design
- EE 202L: Linear Circuits
- EE 326Lx: Essentials of Electrical Engr.
- ENGR 102: Engineering Freshmen Academy
- ISE 460: Engineering Economy

### DESIGN KERNELS

- One must be CE 466 or 476. The other course can be CE 457, 465, 466, 476, 478, 482, 484, or 485.

### CE ELECTIVES

- Take six units from CE 466, 476, 477, or 480.

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### SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

CE 205, 225, 309, AND 235: Minimum grade of “C” is required.

EE 326LX: CE students are encouraged to take EE 326Lx in the spring.

DESIGN KERNELS: One must be CE 466 or 476. The other course can be CE 457, 465, 466, 476, 478, 482, 484, or 485.

CE ELECTIVES: Take six units from CE 466, 476, 477, or 480.
# CIVIL (BUILDING SCIENCE) Major Course Plan

## First Year

### Fall Semester
- **CE 106L** 3
- **WRIT 150** 4
- **MATH 125 (GE F)** 4
- **ARCH 114** 2
- **ENGR 102** 2

### Spring Semester
- **GE B** 4
- **CHEM 105aL (GE E)** 4
- **MATH 126 or MATH 129** 4
- **PHYS 151L (GE E)** 4
- **CE 108** 2

## Second Year

### Fall Semester
- **GE C** 4
- **ARCH 205aL** 4
- **MATH 226 or MATH 229** 4
- **PHYS 152L** 4
- **CE 205** 2

### Spring Semester
- **GE 207L** 2
- **ARCH 205bL** 2
- **MATH 245** 4
- **CE 225** 3
- **CE 235** 3

## Third Year

### Fall Semester
- **CE 309** 3
- **ARCH 305aL** 4
- **CE 358** 3
- **GE D** 4
- **OPTIONAL ELECTIVE** 2

### Spring Semester
- **GEOL 305L** 4
- **ARCH 305bL** 4
- **CE 457** 3
- **ARCH 405bL** 3

## Fourth Year

### Fall Semester
- **GE B** 4
- **ARCH 405aL** 4
- **CE 408** 3
- **CE 334L** 3
- **ARCH 214b** 3

### Spring Semester
- **WRIT 340** 3
- **ARCH 405bL** 4
- **GE C** 4
- **CE ELECTIVE** 3
- **GE A** 4

---

### Mathematics (16 Units)
- **MATH 125**: Calculus I
- **MATH 126 or MATH 129**: Calculus II
- **MATH 226 or MATH 229**: Calculus III
- **MATH 245**: Mathematics of Phys. and Engr.

### Science (16 Units)
- **CHEM 105AL**: General Chemistry
- **GEOL 105AL**: Intro. to Engineering Geology
- **PHYS 151L**: Mechanics and Thermodynamics
- **PHYS 152L**: Electricity and Magnetism

### General Education (32 Units)
- **GE A**: The Arts (1 Course)
- **GE B**: Humanistic Inquiry (2 Courses)
- **GE C**: Social Analysis (2 Courses)
- **GE D**: Life Sciences (1 Course)
- **GE E**: Physical Sciences (1 Course)
- **GE F**: Quantitative Reasoning (1 Course)
- **GE G, H**: Global Perspectives (2 Courses)*
- **GESM**: General Education Seminar (1 Course)*

### Writing (7 Units)
- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

### Architecture (28 Units)
- **ARCH 114**: Architecture: Culture and Comm.
- **ARCH 214B**: History of Architecture

### Engineering (45 Units)
- **CE 106L**: Design & Planning of CE Systems
- **CE 108**: Intro. to CE Computer Methods
- **CE 205**: Statics
- **CE 207L**: Intro. to Design of Structural Systems
- **CE 225**: Mechanics of Deformable Bodies
- **CE 309**: Fluid Mechanics
- **CE 235**: Dynamics
- **CE 334L**: Mechanical Behavior of Materials
- **CE 358**: Theory of Structures I
- **CE 408**: Risk Analysis in Civil Engr.
- **CE 456**: Design of Steel Structures
- **CE 457**: Reinforced Concrete Design
- **CE 458**: Theory of Structures II
- **CE 467L**: Geotechnical Engineering
- **ENGR 102**: Engineering Freshman Academy
- **CE ELECTIVE**

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* SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

**GE**: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

**OPTIONAL ELECTIVES**: Consult with your academic advisor to explore optional elective courses. These courses are not required.

**CE 205, 225, 309, AND 235**: Minimum grade of “C” is required.

**ARCH 205AL, ARCH 305AL, AND ARCH 405AL**: Minimum grade of “C” is required in order to continue in the Building Science sequence.

**CE ELECTIVE**: Choose one from CE 451, 453, 460, or 471.
**FIRST YEAR**

**FALL SEMESTER**
- **GE A**
  - WRIT 150: 4
  - MATH 125 (GE F): 4
  - CE 106L: 3
  - ENGR 102: 2

**SPRING SEMESTER**
- **GB**
  - CHEM 105aL (GE E): 4
  - MATH 126 or MATH 129: 4
  - PHYS 151L (GE E): 4
  - CE 108: 2

**SECOND YEAR**

**FALL SEMESTER**
- **CE 210L**
  - CHEM 105bL: 4
  - MATH 226 or MATH 229: 4
  - PHYS 152L: 4
  - CE 225: 3

**SPRING SEMESTER**
- **AME 310**
  - ENE 200: 3
  - MATH 245: 4

**THIRD YEAR**

**FALL SEMESTER**
- **CE 309**
  - CE 408: 3
  - CE 358: 3
  - CE 453: 3
  - ISE 460: 3

**SPRING SEMESTER**
- **GE B**
  - DESIGN KERNEL: 3
  - BISC 220L (GE D): 4

**FOURTH YEAR**

**FALL SEMESTER**
- **GE C**
  - DESIGN KERNEL: 3
  - WRIT 340: 3
  - CE 334L: 3
  - OPTIONAL ELECTIVE: 5

**SPRING SEMESTER**
- **GE C**
  - CE 467L: 4
  - CE 485: 3
  - ENE 426: 3
  - OPTIONAL ELECTIVE: 3

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### MATHEMATICS (16 UNITS)
- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

### PHYSICS (8 UNITS)
- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

### OTHER SCIENCE (12 UNITS)
- CHEM 105aL: General Chemistry
- CHEM 105bL: General Chemistry
- BISC 220L: Cell Biology and Physiology

### GENERAL EDUCATION (32 UNITS)
- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)
- GE F: Quantitative Reasoning (1 Course)
- GE G: Global Perspectives (2 Courses)*
- GESM General Education Seminar (1 Course)*

### WRITING (1 UNIT)
- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### ENGINEERING (67 UNITS)
- AME 310: Engineering Thermodynamics I
- CE 106L: Design & Planning of CE Systems
- CE 108: Intro. to CE Computer Methods
- CE 205: Statics
- CE 205L: Intro. to Env. Engr. Microbiology
- CE 225: Mechanics of Deformable Bodies
- CE 309: Fluid Mechanics
- CE 334L: Mechanical Behavior of Materials
- CE 358: Theory of Structures I
- CE 408: Risk Analysis in Civil Engr.
- CE 451: Water Resources Engineering
- CE 453: Water Quality Control
- CE 463L: Water Chemistry and Analysis
- CE 467L: Geotechnical Engineering
- CE 485: Wastewater Treatment Design
- ENE 200: Environmental Engr. Principles
- ENE 426: Particulate Air Pollutants: Properties/ Behavior/ Measurement
- ENE 428: Air Pollution Fundamentals
- ENGR 102: Engineering Freshman Academy
- ISE 460: Engineering Economy

### DESIGN KERNEL
Choose two from CE 465, 466, 476, 482, 484, or ENE 486.

---

**SPECIAL NOTES**
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.
- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

**OPTIONAL ELECTIVES:** Consult with your academic advisor to explore optional elective courses. These courses are not required.

**CE 205, 225, 309, AND 235:** Minimum grade of “C” is required.

**DESIGN KERNEL:** Choose two from CE 465, 466, 476, 482, 484, or ENE 486.
**FIRST YEAR**

**FALL SEMESTER**

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<td>CE 106L</td>
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**SPRING SEMESTER**

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<td>CHEM 105aL (GE E)</td>
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**SECOND YEAR**

**FALL SEMESTER**

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**SPRING SEMESTER**

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**THIRD YEAR**

**FALL SEMESTER**

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**SPRING SEMESTER**

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**FOURTH YEAR**

**FALL SEMESTER**

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**SPRING SEMESTER**

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**MATHEMATICS (16 UNITS)**

- **MATH 125:** Calculus I
- **MATH 126 or MATH 129:** Calculus II
- **MATH 226 or MATH 229:** Calculus III
- **MATH 245:** Mathematics of Phys. and Engr.

**PHYSICS (8 UNITS)**

- **PHYS 151L:** Mechanics and Thermodynamics
- **PHYS 152L:** Electricity and Magnetism

**OTHER SCIENCE (8 UNITS)**

- **CHEM 105AL:** General Chemistry
- **GEOL 305L:** Intro. to Engineering Geology

**GENERAL EDUCATION (32 UNITS)**

- **GE A:** The Arts (1 Course)
- **GE B:** Humanistic Inquiry (2 Courses)
- **GE C:** Social Analysis (2 Courses)
- **GE D:** Life Sciences (1 Course)
- **GE E:** Physical Sciences (1 Course)
- **GE F:** Quantitative Reasoning (1 Course)
- **GE G, H:** Global Perspectives (2 Courses)*
- **GESM:** General Education Seminar (1 Course)*

**WRITING (7 UNITS)**

- **WRIT 150:** Writing and Critical Reasoning
- **WRIT 340:** Advanced Writing

**ENGINEERING (70 UNITS)**

- **CE 106L:** Design & Planning of CE Systems
- **CE 107L:** Intro. to Design of Structural Systems
- **CE 205:** Statics
- **CE 243:** Materials Science of Engineering
- **CE 309:** Fluid Mechanics
- **CE 356:** Design of Steel Structures
- **CE 402:** Reinforced Concrete Design
- **CE 458:** Theory of Structures II
- **CE 459:** Intro. to Structural Dynamics
- **CE 460:** Foundation Design
- **CE 202L:** Linear Circuits

**SPECIAL NOTES**

Courses with this symbol may be satisfied with AP, IB, or A-Level exams. See page 22 for more information.

**GE:** Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

**OPTIONAL ELECTIVES:** Consult with your academic advisor to explore optional elective courses. These courses are not required.

**CE 205, 225, 309, AND 235:** Minimum grade of “C” is required.

**EE 326Lx:** CE students are encouraged to take EE 326Lx in the spring.
# Environmental Engineering

## First Year

### Fall Semester
- **GE A**
- **WRIT 150**
- **MATH 125** (GE F)
- **CE 110**
- **ENGR 102**

### Spring Semester
- **GE B**
- **CHEM 105aL** (GE E)
- **MATH 126 or MATH 129**
- **PHYS 151L** (GE E)
- **CE 108**

## Second Year

### Fall Semester
- **CE 205**
- **CHEM 105bL**
- **MATH 226 or MATH 229**
- **PHYS 152L**
- **CE 210L**

### Spring Semester
- **GE C**
- **BISC 220L** (GE D)
- **MATH 245**
- **ENE 200**
- **OPTIONAL ELECTIVE**

### Third Year

### Fall Semester
- **CE 309**
- **CE 408**
- **CE 453**
- **WRIT 340**
- **ISE 460**

### Spring Semester
- **ENE 428**
- **CHEM 322aL**
- **DESIGN KERNEL**
- **CE 451**
- **OPTIONAL ELECTIVE**

## Fourth Year

### Fall Semester
- **GE B**
- **CHE 330**
- **CE 484**
- **DESIGN KERNEL**
- **PTE 463L**

### Spring Semester
- **GE C**
- **GEOL 305L**
- **CE 465**
- **ENE 426**
- **OPTIONAL ELECTIVE**

## Mathematics (16 Units)
- **MATH 125**: Calculus I
- **MATH 126** or **MATH 129**: Calculus II
- **MATH 226** or **MATH 229**: Calculus III
- **MATH 245**: Mathematics of Phys. and Engr.

## Physics (8 Units)
- **PHYS 151L**: Mechanics and Thermodynamics
- **PHYS 152L**: Electricity and Magnetism

## Chemistry (12 Units)
- **CHEM 105AL**: General Chemistry
- **CHEM 105BL**: General Chemistry
- **CHEM 322AL**: Organic Chemistry

## Other Science (8 Units)
- **BISC 220L**: Cell Biology and Physiology
- **GEOL 305L**: Intro to Engr. Geology

## General Education (32 Units)
- **GE A**: The Arts (1 Course)
- **GE B**: Humanities Inquiry (2 Courses)
- **GE C**: Social Analysis (2 Courses)
- **GE D**: Life Sciences (1 Course)
- **GE E**: Physical Sciences (1 Course)
- **GE F**: Quantitative Reasoning (1 Course)
- **GE G,H**: Global Perspectives (2 Courses)*
- **GESM**: General Education Seminar (1 Course)*

## Writing (7 Units)
- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

## Engineering (62 Units)
- **CE 110**: Intro. to Environmental Engr.
- **CE 108**: Intro. to CE Computer Methods
- **CE 205**: Statics
- **CE 210L**: Intro. to Engr. Microbiology
- **CE 309**: Fluid Mechanics
- **CE 408**: Risk Analysis in Civil Engr.
- **CE 451**: Water Resources Engineering
- **CE 453**: Water Quality Control
- **CE 463L**: Water Chemistry and Analysis
- **CE 484**: Water Treatment Design
- **CE 485**: Wastewater Treatment Design
- **CHE 330**: Chemical Engr. Thermodynamics
- **ENE 200**: Environmental Engr. Principles
- **ENE 426**: Particulate Air Pollutants: Properties/ Behavior/ Measurement
- **ENE 428**: Air Pollution Fundamentals
- **ENGR 102**: Engineering Freshman Academy
- **ISE 460**: Engineering Economy
- **PTE 463L**: Intro. to Transport Processes

## Special Notes
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.
- **GE**: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.
- **OPTIONAL ELECTIVES**: Consult with your academic advisor to explore optional elective courses. These courses are not required.
- **ENE 200, 426, 428, 486, and CE 309**: Minimum grade of “C” is required.
- **DESIGN KERNEL**: Choose from CE 443, 466, 476, or CHE 442.
MAJORS & AREAS OF EMPHASIS

» Computer Science
» Computer Science (Games)
» Computer Science / Business Administration
» Computer Engineering & Computer Science

LEARN MORE: viterbi.usc.edu/cs
Computer scientists and computer engineers design and implement efficient software and hardware solutions to computer-solvable problems. They are involved in the development of areas such as high-speed networks, multimedia and creative technologies, systems design, virtual reality and robotics.

The Computer Science (CSCI) program prepares students to work in the areas of software design, development, application and maintenance. It provides intensive study in algorithmic design and analysis as well as the theory of computing.

The Computer Science (Games) degree (CSGM) offers technical and creative training for the Video Game industry. The curriculum brings numerous core areas of advanced computer science - including artificial intelligence, graphic interfaces, modeling, algorithm design - together with creative and artistic training from the School of Cinematic Arts and the Roski School of Fine Arts. The combination of the creative and technical training along with industry exposure prepares students for key leadership positions in this dynamic field.

The Computer Science / Business Administration program (CSBA) is a combined degree program that allows students to study both Computer Science and Business in four years. In addition to the core computer science courses, students will take courses from the Marshall School of Business such as Organizational Behavior, Marketing Fundamentals, Business Finance, and Strategic Management.

The Computer Engineering & Computer Science program (CECS) trains students to integrate hardware and software processes to form solutions to problems arising from complex systems such as atomic reactors, guidance systems and manufacturing systems. These students graduate ready to design and build computers and computer networks.

**RESEARCH HIGHLIGHTS**

- Artificial intelligence
- Robotics
- Mobile and cloud computing
- Multimedia and immersive technology
- Networks and distributed systems
- Security, data science and analytics
- Theoretical computer science
- Software engineering and applications

**COMPANIES THAT HIRE CSCI STUDENTS**

Amazon, Apple, Blizzard, Cisco, Conexant, DIRECTV, Disney Interactive, eBay, Electronic Arts, Facebook, Garmin, Google, Heavy Iron Studios, Hewlett-Packard, IBM, Intel Corporation, Lockheed Martin, Microsoft, NASA-JPL, NBCUniversal, Raytheon, Samsung, Sony Online Entertainment, SpaceX, Square, Yahoo!, Zynga...

And many more!

**CAREER OPTIONS**

- Build new computer circuits, microchips, and other electronic components
- Conduct research on artificial intelligence capabilities
- Create new computer and operating systems
- Design logic devices for everyday appliances
- Improve video game consoles and devices
- Integrate hardware and software processes
- Launch high tech entrepreneurial projects and ventures
- Invent intelligent robots
- Develop advanced data analytics
# 2017-18 Major Course Plan

## First Year

### Fall Semester
- **WRIT 150**: Writing and Critical Reasoning (4 units)
- **MATH 125 (GE F)**: Calculus I (4 units)
- **CSCI 103L**: Introduction to Programming (4 units)
- **CSCI 109**: Discrete Methods in Computer Science (2 units)
- **ENGR 102**: Engineering Freshmen Academy (2 units)

### Spring Semester
- **GEB**: General Education Seminar (4 units)
- **MATH 129** or **MATH 126**: Calculus II (4 units)
- **CSCI 104**: Introduction to Computing (2 units)
- **CSCI 170**: Intro. to Algorithms & Theory of Computing (4 units)
- **OPTIONAL ELECTIVE**: 2 units

## Second Year

### Fall Semester
- **GE C**: General Education Seminar (4 units)
- **EE 109**: Introduction to Embedded Systems (4 units)
- **CSCI 270**: Intro. to Algorithms & Theory of Computing (4 units)
- **CSCI 201L**: Capstone: Design and Construction of Large Software Systems (4 units)
- **OPTIONAL ELECTIVE**: 2 units

### Spring Semester
- **CSCI 310**: Intro. to Software Engineering (4 units)
- **MATH 225** or **MATH 226**: Linear Algebra & Diff. Equations (4 units)
- **WRIT 340**: Advanced Writing (3 units)
- **CSCI 356**: Intro. to Computer Systems (4 units)
- **OPTIONAL ELECTIVE**: 3 units

## Third Year

### Fall Semester
- **GE A**: General Education Seminar (4 units)
- **MATH 225**: Calculus II (4 units)
- **CSCI 350**: Data Structures & Object Oriented Design (4 units)
- **CSCI 360**: Intro. to Operating Systems (4 units)
- **OPTIONAL ELECTIVE**: 4 units

### Spring Semester
- **BASIC SCIENCE (GE D or E)**: 4 units
- **TECH. ELECTIVE I**: 3 units
- **TECH. ELECTIVE II**: 3 units
- **EE 364** or **MATH 407**: 4 units
- **GE B**: General Education Seminar (4 units)

## Fourth Year

### Fall Semester
- **BASIC SCIENCE II**: 4 units
- **TECH. ELECTIVE III**: 4 units
- **GE C**: General Education Seminar (4 units)
- **CSCI 401**: Capstone: Creating Your High-Tech Startup (4 units)
- **OPTIONAL ELECTIVE**: 2 units

### Spring Semester
- **GED or E**: 4 units
- **TECH. ELECTIVE IV**: 4 units
- **OPTIONAL ELECTIVE**: 2 units
- **REQUIRED ELECTIVE**: 4 units

## Mathematics (19-20 units)
- **MATH 125**: Calculus I
- **MATH 126** or **129**: Calculus II
- **MATH 226** or **229**: Calculus III
- **MATH 225**: Linear Algebra & Diff. Equations
- **EE 364**: Intro to Probability & Statistics

## Science Courses (8 units)
- **BASIC SCIENCE I**
- **BASIC SCIENCE II**

## General Education (32 units)
- **GE A**: The Arts (1 course)
- **GE B**: Humanistic Inquiry (2 courses)
- **GE C**: Social Analysis (2 courses)
- **GE D**: Life Sciences (1 course)
- **GE E**: Physical Sciences (1 course)
- **GE F**: Quantitative Reasoning (1 course)
- **GE G, H**: Global Perspectives (2 courses)*
- **GESM**: General Education Seminar (1 course)*

## Writing (7 units)
- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

## Engineering (60 units)
- **CSCI 103L**: Introduction to Programming
- **CSCI 104L**: Data Structures & Object Oriented Design
- **CSCI 109**: Introduction to Computing
- **CSCI 170**: Discrete Methods in Computer Science
- **CSCI 201L**: Capstone: Design and Construction of Large Software Systems
- **CSCI 310L**: Intro. to Software Engineering
- **CSCI 350**: Data Structures & Object Oriented Design
- **CSCI 356**: Intro. to Computer Systems
- **CSCI 360L**: Intro. to Operating Systems
- **CSCI 401**: Capstone: Creating Your High-Tech Startup
- **EE 109**: Introduction to Embedded Systems
- **ENGR 102**: Engineering Freshmen Academy

## Technical Electives
- **TECHNICAL ELECTIVES**: See approved tech elective list on CS webpage.

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* SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

**GE**: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

**GRADE QUALIFIER**: A grade of a C (2.0) or better is required for each of the core courses (CSCI 103, 170, 104 & 201). Courses with a grade of C- or below must be repeated; courses may only be retaken once with department approval.

**BASIC SCIENCE**: PHYS 151L and 152L; CHEM 105aL and CHEM 105bL; or BISC 120L and 220L

**TECHNICAL ELECTIVES**: See approved tech elective list on CS webpage.
**COMPUTER SCIENCE (GAMES)**

### FIRST YEAR

**FALL SEMESTER**
- CSCI 109
- CSCI 103L
- MATH 125 (GE F)
- CTIN 190
- ENGR 102

**SPRING SEMESTER**
- CSCI 170
- CSCI 104L
- MATH 129 or MATH 126
- GE B
- OPTIONAL ELECTIVE

### SECOND YEAR

**FALL SEMESTER**
- PHYS 151L (GE E)
- MATH 125 or 126 or 226
- CSCI 104L
- MATH 225 or EE 141L
- CSCI 281

**SPRING SEMESTER**
- CSCI 201L
- PHYS 151L (GE E)
- ITP 380
- WRIT 150
- OPTIONAL ELECTIVE

### THIRD YEAR

**FALL SEMESTER**
- CSCI 353
- CSCI 420
- ITP 485
- CTIN 488
- OPTIONAL ELECTIVE

**SPRING SEMESTER**
- CSCI 356L
- CSCI 423 or CSCI 426
- CTIN 489
- CTIN 484L
- GE C

### FOURTH YEAR

**FALL SEMESTER**
- CSCI 491aL
- CSCI 360
- GE A
- GE C
- OPTIONAL ELECTIVE

**SPRING SEMESTER**
- CSCI 491bL
- WRIT 340
- GE B
- GE D
- CTAN 452

### MATHEMATICS (12 UNITS)
- MATH 125: Calculus I
- MATH 126 or 129: Calculus II
- MATH 225 or EE 141L: Linear Algebra & Diff. Equations

### PHYSICS (4 UNITS)
- PHYS 151L: Mechanics and Thermodynamics

### GENERAL EDUCATION (32 UNITS)
- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)
- GE F: Quantitative Reasoning (1 Course)
- GE G,H: Global Perspectives (2 Courses)*
- GESM: General Education Seminar (1 Course)*

### WRITING (7 UNITS)
- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### COMPUTER SCIENCE (50 UNITS)
- CSCI 103L: Introduction to Programming
- CSCI 104L: Data Structures & Object Oriented Design
- CSCI 109: Introduction to Computing
- CSCI 170: Discrete Methods in Comp. Science
- CSCI 281: Pipelines for Games & Interactives
- CSCI 423: Native Console Multiplayer Game Development
- CSCI 426: Game Prototyping
- CTAN 452: Intro to Computer Animation
- ITP 380: Video Game Programming
- ITP 485: Programming Game Engines

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### SPECIAL NOTES
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.
- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

### GRADE QUALIFIER:
A grade of a C (2.0) or better is required for each of the core courses (CSCI 103, 170, 104 & 201). Courses with a grade of C- or below must be repeated; courses may only be retaken once with department approval.

### RECOMMENDED PREP:
- PHYS 151 with or before ITP 380
- CSCI 353 before CSCI 423
- ITP 485 before CSCI 423, 426

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* SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.

GRADE QUALIFIER: A grade of a C (2.0) or better is required for each of the core courses (CSCI 103, 170, 104 & 201). Courses with a grade of C- or below must be repeated; courses may only be retaken once with department approval.

RECOMMENDED PREP: It is recommended that students complete:
- PHYS 151 with or before ITP 380
- CSCI 353 before CSCI 423
- ITP 485 before CSCI 423, 426
## COMPUTER SCI. / BUSINESS ADMIN.

### FIRST YEAR

**FALL SEMESTER**
- GE B
- MATH 125 (GE F)
- WRIT 150
- BUAD 304
- ENGR 102

**SPRING SEMESTER**
- CSCI 103L (CSCI 109)
- MATH 126 or 129
- ECON 351
- GE C
- CSCI 109

### SECOND YEAR

**FALL SEMESTER**
- CSCI 170
- MATH 225 or EE 141L
- ECON 352
- CSCI 104L
- OPTIONAL ELECTIVE

**SPRING SEMESTER**
- PHYS 151 or CHEM 105AL or BISC 120 (GE D or E)
- CSCI 201L
- CSCI 270
- ACCT 410x
- OPTIONAL ELECTIVE

### THIRD YEAR

**FALL SEMESTER**
- BUAD 310 or EE 354 or MATH 407
- BUAD 302
- GE A
- BUAD 307
- OPTIONAL ELECTIVE

**SPRING SEMESTER**
- CSCI ELECTIVE
- CSCI 310L
- GE C
- BUAD 306
- CSCI/BUAD ELECTIVE

### FOURTH YEAR

**FALL SEMESTER**
- WRIT 340
- BUAD ELECTIVE
- CSCI 401
- BUAD 311
- OPTIONAL ELECTIVE

**SPRING SEMESTER**
- GE E or D
- GE B
- BUAD 497
- CSCI/BUAD ELECTIVE
- OPTIONAL ELECTIVE

### MATHEMATICS (15-16 UNITS)
- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 225: Linear Algebra & Diff. Equations
- MATH 225: Applied Linear Algebra for Engineering
- MATH 310: Applied Business Statistics
- or MATH 364: Intro to Probability & Statistics
- or MATH 407: Probability Theory

### SCIENCE COURSES (4 UNITS)
- PHYS 151L, CHEM 105AL or BISC 120L
- GENERAL EDUCATION (32 UNITS)
  - GE A: The Arts (1 Course)
  - GE B: Humanistic Inquiry (2 Courses)
  - GE C: Social Analysis (2 Courses)
  - GE D: Life Sciences (1 Course)
  - GE E: Physical Sciences (1 Course)
  - GE F: Quantitative Reasoning (1 Course)
  - GE G, H: Global Perspectives (2 Courses)*
  - GESM: General Education Seminar (2 Courses)

### WRITING (7 UNITS)
- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### BUSINESS & ECONOMICS (36 UNITS)
- ACCT 410X: Accounting for Non-Business Majors
- BUAD 302: Communication Strategy in Business
- BUAD 304: Organizational Behavior
- BUAD 306: Business Finance
- BUAD 307: Marketing Fundamentals
- BUAD 311: Business Analysis
- BUAD 497: Capstone: Creating Your High-Tech Startup

### ENGINEERING (32 UNITS)
- CSCI 103L: Introduction to Programming
- CSCI 104L: Data Structures & Obj. Orient. Design
- CSCI 109: Introduction to Computing
- CSCI 170: Discrete Methods in Comp. Science
- CSCI 201L: Princ. of Software Development
- CSCI 207: Intro. to Algorithms & Theory of Comp.
- CSCI 310L: Intro. to Software Engineering
- CSCI 401: Capstone: Design & Construction of Large Software Systems
- or CSCI 404: Capstone: Creating Your High-Tech Startup
- ENGR 102: Engineering Freshmen Academy

### CSCI/BUAD ELECTIVES (12 UNITS)
- CSCI 360L: Introduction to Artificial Intelligence
- CSCI 430: Security Systems
- CSCI 485: File and Database Management
- BAEP 452: Feasibility Analysis
- BAEP 453: Venture Management

### SPECIAL NOTES
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.
- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.
- GRADE QUALIFIER: A grade of a C (2.0) or better is required for each of the core courses (CSCI 103, 170, 104 & 201). Courses with a grade of C- or below must be repeated; courses may only be retaken once with department approval.
- CSCI/BUAD ELECTIVES: Students must take one course from the Computer Science selection and one from the Business selection and a third course from either one.
## FIRST YEAR

### FALL SEMESTER
- **WRIT 150**: Writing and Critical Reasoning 4
- **MATH 125 (GE F)**: Calculus I 4
- **EE 109L**: Fundamentals of Digital Logic 4
- **CSCI 103L**: Introduction to Programming 4
- **ENGR 102**: Engineering Freshman Academy 2

### SPRING SEMESTER
- **PHYS 151L (GE E)**: Mechanics and Thermodynamics 4
- **MATH 126 or MATH 129**: Calculus II or Calculus III 4
- **CSCI 109L**: Data Structures & Object Oriented Design 4
- **CSCI 170**: Discrete Methods in Comp. Science 4
- **OPTIONAL ELECTIVE**: 2

## SECOND YEAR

### FALL SEMESTER
- **PHYS 152L**: Mechanics and Thermodynamics 4
- **MATH 226 or MATH 229**: Calculus III or Calculus III 4
- **CSCI 201L**: Introduction to Algorithms & Theory of Computing 4
- **EE 209**: Fundamentals of Digital Logic 4
- **OPTIONAL ELECTIVE**: 2

### SPRING SEMESTER
- **MATH 225**: Linear Algebra & Diff. Equations 4
- **CSCI 270**: Introduction to Operating Systems 4
- **EE 354L**: Introduction to Digital Circuits 4
- **OPTIONAL ELECTIVE**: 4

## THIRD YEAR

### FALL SEMESTER
- **GE A**: The Arts (1 Course) 4
- **EE 364**: Fundamentals of Digital Logic 4
- **WRIT 340**: Advanced Writing 4
- **EE 457**: Computer Systems Organization 4
- **OPTIONAL ELECTIVE**: 2

### SPRING SEMESTER
- **GE B**: Technical Elective I 4
- **CSCI 350**: Capstone: Design of Large Software Systems 4
- **GE D**: Technical Elective II 4
- **OPTIONAL ELECTIVE**: 2

## FOURTH YEAR

### FALL SEMESTER
- **GE B**: Technical Elective I 4
- **CSCI 353**: Introduction to Operating Systems 4
- **EE 451L**: Senior Design Project 4
- **OPTIONAL ELECTIVE**: 2

### SPRING SEMESTER
- **GE C**: Optional Elective 3-4
- **CSCI 401**: Capstone: Creating Your High-Tech Startup 4
- **OPTIONAL ELECTIVE**: 2

### MATHEMATICS (19-20 UNITS)
- **MATH 125**: Calculus I 4
- **MATH 126 or 129**: Calculus II 4
- **MATH 226 or 229**: Calculus III 4
- **MATH 225**: Linear Algebra & Diff. Equations 4
- **EE 364**: Intro to Probability & Statistics 3-4

### PHYSICS (8 UNITS)
- **PHYS 151L**: Mechanics and Thermodynamics 4
- **PHYS 152L**: Electricity and Magnetism 4

### GENERAL EDUCATION (32 UNITS)
- **GE A**: The Arts (1 Course) 4
- **GE B**: Humanistic Inquiry (2 Courses) 4
- **GE C**: Social Analysis (2 Courses) 4
- **GE D**: Life Sciences (1 Course) 4
- **GE E**: Physical Sciences (1 Course) 4
- **GE F**: Quantitative Reasoning (1 Course) 4
- **GE G,H**: Global Perspectives (2 Courses) 4
- **GESM**: General Education Seminar (1 Course) 4

### WRITING (7 UNITS)
- **WRIT 150**: Writing and Critical Reasoning 4
- **WRIT 340**: Advanced Writing 4

### ENGINEERING (64-66 UNITS)
- **CSCI 103L**: Introduction to Programming 4
- **CSCI 104L**: Data Structures & Object Oriented Design 4
- **CSCI 170**: Discrete Methods in Comp. Science 4
- **CSCI 201L**: Princ. of Software Development 4
- **CSCI 270**: Intro. to Algorithms & Theory of Computing 4
- **CSCI 350**: Introduction to Operating Systems 4
- **CSCI 401**: Capstone: Design of Large Software Systems 4
- **CSCI 404**: Capstone: Creating Your High-Tech Startup 4
- **EE 451**: Parallel and Distributed Computation 4
- **EE 454L**: Intro. to Systems Using Microprocessors 4
- **EE 477L**: MOS VLSI Circuit Design 4
- **ENGR 102**: Engineering Freshman Academy 4

### SPECIAL NOTES
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.
- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.
- GRADE QUALIFIER: A grade of C (2.0) or better is required for each of the core courses (CSCI 103, 170, 104 & 201). Courses with a grade of C- or below must be repeated; courses may only be retaken once with department approval.
- SENIOR DESIGN PROJECT: CSCI 401 or EE 459L
- TECHNICAL ELECTIVES: See approved tech elective list on CS webpage.
MAJORS & AREAS OF SPECIALIZATION

- Electrical Engineering
  Specializations:
  - Computer Engineering
  - Circuits, Signals & Systems
  - Electrical Sciences

LEARN MORE: viterbi.usc.edu/ee
Electrical Engineering (EE) is the enabling technology driving many of today's most crucial industries and a critical field in advancing the future. It is a diverse discipline encompassing computer and information systems, digital media, telecommunications and wireless technologies, nanoelectronics, lasers, robotics, display technologies, circuit design, and more.

In particular, it is a vital part of every industry, from biomedical engineering and health applications to telecommunications, aerospace, and information technology.

The department offers an exciting, diverse curriculum that prepares students with significant breadth and depth. Core sets of classes prepare students for one of three areas of emphasis: circuit, signals and systems, computer engineering and energy and electrical sciences. As freshmen and sophomores, students are introduced to the concepts of digital and analog electronics and computer programming, as well as core courses in math and physics. Students then choose courses that pertain to their chosen area of specialization. Computer Engineering contains courses that focus on software engineering, digital hardware, embedded systems, and VLSI design. Circuits, Signals, and Systems covers areas in VLSI design, media and audio systems, wireless communications, adaptive control, and mixed-signal integrated circuits. Courses in the Electrical Sciences area cover communications hardware, integrated-circuit technology, energy sources and management, and mixed-signal integrated circuits.

Design courses permeate the class schedule allowing students to apply the knowledge they have gained as well as prepare them to address the specific needs of industry when they graduate. One EE senior design course recently challenged students to design “smart” surfing equipment. Design options included a new “sustainable surfboard,” a “wireless lifejacket” and a programmable “interactive surfboard.”

**EE RESEARCH**
Research in the Ming Hsieh department is revolutionizing information processing, telecommunications, medical diagnosis and treatment, energy and green initiatives, computer systems, and new media, among other areas. Partnerships with off-campus research institutes like the Information Sciences Institute (ISI) and the Institute for Creative Technologies (ICT) create unparalleled opportunities for students to work at the cutting-edge of technology.

**RESEARCH HIGHLIGHTS**
- Nanoelectronics and nanobiology
- Wireless communication & sensor networks
- Biological interface circuits and devices
- Laser interactions with materials
- Speech and image recognition & compression
- Computer architecture and parallel processing
- Photonics and integrated optics
- Plasma science and technology
- Quantum computing and communication
- Robust, adaptive learning control
- Communications theory and coding

**COMPANIES THAT HIRE EE STUDENTS**
3Com Corporation, Accenture, Apple, BAE Systems, The Boeing Co., CapGemini, Disney, Edwards Lifesciences, Garmin, General Electric, Google, IBM, Intel Corporation, Microsoft, Northrop Grumman, Nvidia, Qualcomm, Raytheon, SpaceX, Teradata, Teradyne, Verizon...

And many more!

**CAREER OPTIONS**
- Develop alternative energy and green power sources
- Develop semiconductors and consumer electronics
- Develop wireless communication systems
- Design new media and imaging systems (HDTV, satellite radio, etc.)
- Design robots and other embedded systems
- Architect novel computer processors and networking systems
- Build lasers used for medical, manufacturing and military purposes
- Develop airborne and satellite electronic systems
- Develop new biomedical imaging devices
The Electrical Engineering major provides a broad curriculum that covers topics from a variety of areas. Through the Core Curriculum taken during the first two years, students will gain exposure to broader topics and the areas of specialization. Within an area of specialization, students will choose Entry-Level Electives as well as Advanced Electives based on their interests.

The EE degree offers three areas of specialization: Computer Engineering; Circuits, Signals, and Systems; and Electrical Sciences.

Computer Engineering contains courses that focus on software engineering, digital hardware, embedded systems, and VLSI design.

Circuits, Signals, and Systems covers areas in VLSI design, media and audio systems, wireless communications, adaptive control, and mixed-signal integrated circuits.

Courses in the Electrical Sciences area cover communications hardware, integrated-circuit technology, energy sources and management, and mixed-signal integrated circuits.

The diagram below shows the paths for each area of specialization. You should use the diagram and the suggested course plan on the following page to develop your individual course plan.

**CORE CURRICULUM** All courses are required for an electrical engineering degree.

<table>
<thead>
<tr>
<th>EE 105</th>
<th>EE 109</th>
<th>EE 141</th>
<th>EE 155</th>
<th>EE 202</th>
<th>EE 250</th>
<th>EE 301</th>
<th>EE 330</th>
<th>EE 355</th>
<th>EE 364</th>
</tr>
</thead>
</table>

**EE ELECTIVES**: Take minimum 16.0 units of Advisor approved, upper-division EE electives

**COMPUTER ENGINEERING**

- EE 209
- EE 354
- EE 450
- EE 445
- EE 454
- EE 457
- EE 477
- EE 460
- EE 451

**CIRCUITS, SIGNALS & SYSTEMS**

- EE 322
- EE 348
- EE 477
- EE 482
- EE 483
- EE 484
- EE 467
- EE 479
- EE 448

**ELECTRICAL SCIENCES**

- EE 348
- EE 337
- EE 338
- EE 448
- EE 471
- EE 472
- EE 479
- EE 480
- EE 443
- EE 447
- EE 423
- EE 484
- EE 434
- EE 447
- EE 442

**CAPSTONE**: Take 1 course from your chosen specialization

- EE 459
- EE 423
- EE 434
- EE 447

2017-18 MAJOR COURSE PLAN
## Electrical Engineering

### First Year

**Fall Semester**
- **MATH 125 (GE F)**
- **EE 141**
- **EE 155**
- **EE 105**
- **ENGR 102**

**Spring Semester**
- **MATH 126 or MATH 129**
- **CHEM 105AL or MASC 110L**
- **WRIT 150**
- **GE A**
- **Optional Elective**

### Second Year

**Fall Semester**
- **MATH 225 or MATH 229**
- **PHYS 151L (GE E)**
- **EE 109**
- **GE B**
- **Optional Elective**

**Spring Semester**
- **MATH 245**
- **PHYS 152L**
- **EE 250L**
- **GE C**
- **Optional Elective**

### Third Year

**Fall Semester**
- **WRIT 340**
- **EE 202L**
- **PHYS 153L**
- **EE 355**
- **EE Elective**

**Spring Semester**
- **EE 330**
- **EE 364**
- **EE 301L**
- **GE D**
- **Optional Elective**

### Fourth Year

**Fall Semester**
- **EE Elective**
- **EE Elective**
- **EE Elective**
- **GE B**
- **Optional Elective**

**Spring Semester**
- **EE Elective**
- **CAPSTONE DESIGN**
- **GE C**
- **Optional Elective**
- **Optional Elective**

### Mathematics (12 Units)
- MATH 125: Calculus I
- MATH 129: Calculus II
- MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr. I

### Physics (12 Units)
- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism
- PHYS 153L: Optics and Modern Physics

### Chemistry / Materials Science (4 Units)
- CHEM 105AL: General Chemistry
- MASC 110L: Materials Science

### General Education (32 Units)
- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)
- GE F: Quantitative Reasoning (1 Course)
- GE G, H: Global Perspectives (2 Courses)*
- GESM: General Education Seminar (1 Course)*

### Writing (7 Units)
- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### Engineering (15 Units)
- EE 105: Intro. to Electrical Engineering
- EE 109: Intro. to Embedded Systems
- EE 141L: Applied Linear Algebra for Engineering
- EE 155: Intro. to Comp. Programming for EE
- EE 202L: Linear Circuits
- EE 250L: TBA
- EE 301L: Linear Systems
- EE 330: Electromagnetics I
- EE 355: Software Design for Engineers
- EE 364: Intro to Probability & Statistics
- ENGR 102: Engineering Freshman Academy

### Other Courses (7 Units)
- Required Elective
- CAPSTONE

### Special Notes
- *Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.*
- *GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See page 21 for more information and consult your advisor for detailed assistance.*
- *Required Elective:* Required electives are needed to meet minimum unit requirement and can be met with AP/IB and transfer credit.
- *Optional Electives:* Consult with your academic advisor to explore optional elective courses. These courses are not required.
- *EE Electives:* Minimum 16 units of advisor approved, upper-division EE Electives. Refer to the diagram on the facing page.
- *CAPSTONE:* Take one Capstone Course. Refer to the diagram on the facing page.
MAJORS & AREAS OF EMPHASIS

» Industrial & Systems Engineering
  Track: Information Systems
  Track: Operations

LEARN MORE: viterbi.usc.edu/epstein
Industrial and Systems Engineers (ISE) use engineering and business principles to formulate rigorous approaches to problem solving and the management of complex systems. They are productivity catalysts, managing innovation and the combination of physical, capital, and human resources needed to produce and deliver valuable goods and services.

Industrial and Systems engineers are consummate economic competitors who focus on developing and controlling manufacturing, production, inventory, distribution, service, and management information systems to ensure their companies’ success in the global marketplace.

On the job, these engineering professionals optimize the use of scarce resources by integrating people and technology to maximize productivity, minimize cost, improve processes, and maintain high standards of quality.

The Epstein Department’s Information Systems Engineering option gives extra emphasis to enterprise resource planning, software, and data mining techniques. USC’s undergraduate ISE curricula prepare students for careers in a wide-range of industries, consulting, or professional engineering practice, and are also an excellent intellectual foundation for advanced degrees in fields as diverse as Engineering, Logistics, Business Administration, Finance, Medicine, Law, or Public Policy.

**RESEARCH HIGHLIGHTS**

- Rapid prototyping and automated construction
- Agile, flexible manufacturing and production systems
- Human-computer interaction
- Management of technology
- Economic impacts of terrorism
- Port operations and the supply chain
- Green logistics and industrial ecology
- Renewable energy systems
- Transportation and logistics
- Optimization and logistics
- Collaborative engineering design
- Rapid prototyping and automated construction
- Health systems improvement

**COMPANIES THAT HIRE ISE STUDENTS**


And many more!

**CAREER OPTIONS**

- Implement enterprise resource planning systems
- Consult on business practices
- Design efficient manufacturing and service systems
- Optimize assembly and distribution systems
- Develop ergonomically correct systems and interfaces
- Improve hospital operations and schedules
- Make systems safe by reducing errors and accidents
- Manage business operations
- Develop quality control and assurance systems
### FIRST YEAR

**FALL SEMESTER**

<table>
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**SPRING SEMESTER**

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### SECOND YEAR

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**SPRING SEMESTER**

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### THIRD YEAR

**FALL SEMESTER**

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**SPRING SEMESTER**

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### FOURTH YEAR

**FALL SEMESTER**

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**SPRING SEMESTER**

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<td>GE C</td>
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### MATHEMATICS (16 UNITS)

- MATH 125: Calculus I
- MATH 126 or 129: Calculus II
- MATH 226 or 229: Calculus III
- MATH 225: Linear Algebra and Diff. Equations

### SCIENCE (12 UNITS)

- CHEM 105AL: General Chemistry or CHEM 115AL: Advanced General Chemistry or MASC 110L: Materials Science
- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

### GENERAL EDUCATION (32 UNITS)

- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)
- GE F: Quantitative Reasoning (1 Course)
- GE G, H: Global Perspectives (2 Courses)*
- GESM General Education Seminar (1 Course)*

### WRITING (7 UNITS)

- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### ENGINEERING (54 UNITS)

- CSCI 101L: Fund. of Comp. Programming
- DSOSM: Enterprise Data Architecture
- ENGR 102: Engineering Freshman Academy
- ISE 105: Intro. to Industrial Engineering
- ISE 225: Engineering Statistics I
- ISE 315L: Engineering Project Management
- ISE 330: Intro. to Operations Research I
- ISE 331: Introduction to Operations Research: Stochastic Models
- ISE 410: Prod. Planning and Scheduling
- ISE 435: Discrete Systems Simulation
- ISE 440: Work, Technology and Organization
- ISE 460: Engineering Economy
- ISE 470: Human/Computer Interface Design
- ISE 495A: Senior Design Project
- ITP 320: Enterprise information Systems

### OTHER COURSES (8 UNITS)

- INFO SYSTEMS COURSES:
  - DSO 433: Business Process Design
  - ITP 482: Database Applications
  - ITP 487: Data Warehouse and Business Intel.
- ISE 350: Principles of Systems Engineering

### APPROVED ENGINEERING ELECTIVES

- CSCI 101: Fund. of Comp. Programming
- DSOSM: Enterprise Data Architecture
- ENGR 102: Engineering Freshman Academy
- ISE 105: Intro. to Industrial Engineering
- ISE 225: Engineering Statistics I
- ISE 315L: Engineering Project Management
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### *SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 22 for more information.

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OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

INFO SYSTEMS COURSES: Select at least 8 units among the following courses: DSO 431 (4), DSO 433 (4), ISE 350* (3), ITP 482* (3), ITP 487* (3).

Also select at least 5 units among the following courses: AME 341a, AME 341b, CE 408, CE 460, CE 471, DSO 467, EE 326, ENGR 345, ENGR 401, ISE 230L, ISE 310L, ISE 357, ISE 358L, ISE 334L, ISE 350L, ISE 375L, ISE 426, ITP 215L, ITP 320L, ITP 325L, ITP 421L, ITP 422L, ITP 454L, ITP 457, ITP 466, ITP 482*, ITP 486L, ITP 487*, ITP 488L, NSC 335, NSC 337

Classes noted with a * will count for Info Systems course requirement and Approved Engineering Electives.
# FIRST YEAR

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<thead>
<tr>
<th>SEMESTER</th>
<th>COURSES</th>
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<tr>
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- ISE 335L: Supply Chain Design
- ISE 370: Human Factors in Work Design
- ISE 375L: Facilities Design
- ISE 382L: Database Systems: Concept, Design and Implementation
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- ISE 426L: Statistical Quality Control
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- ISE 495B: Senior Design Project

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OPERATIONS ELECTIVES: Select at least one among ISE 232L, ISE 327, ISE 350, or ACCT 410

BIOLOGY ELECTIVE: Select one among BISC 103, BISC 104, BISE 230, or HBIO 205
GET THE STUDENT PERSPECTIVE:

VITERBIVOICES.USC.EDU