

# USC Viterbi

School of Engineering

## Undergraduate Handbook

*2019-20 ACADEMIC YEAR*

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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 2019 or the spring of 2020 are bound by the requirements set forth in this booklet and the 2019-20 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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# Your Undergrad Experience

**BUILD COMMUNITY, ESTABLISH YOUR FUTURE**

*As part of your undergraduate experience at Viterbi, we encourage you to Build Community, Find Your “PLUS”, Engineer for Social Good, Experience Engineering, and Build Your Future. Making connections with faculty, peers, and mentors is an important first step in your journey at Viterbi. You will learn in and outside the classroom as you define your “Engineering +” where the plus can be any cross-disciplinary study, subject, or activity.*

*When you “Experience Engineering” and participate in myriad activities you will have opportunities for development of self, leadership, social and global awareness, and more. Within design teams, internships, and research projects with faculty, you will create, innovate, and build your future to make significant contributions to our global society.*

*There is in no “one” way to be a successful Viterbi student or successful global citizen. Make sure to check-out the various ways you can shape your undergraduate experience.*

## GRAND CHALLENGES SCHOLARS PROGRAM

At Viterbi, you have the opportunity to participate and compete in the National Academy of Engineering (NAE) Grand Challenges Scholars Program (GCSP). Via GCSP, students create their own educational experiences through discovering, exploring, and working on potential solutions to one of the NAE Grand Challenges. The National Academy of Engineering (NAE) Grand Challenges Scholars Program provides a framework to promote the quality of life worldwide, advance health, and build a more secure and sustainable future around five competencies listed below.

### GCSP Competencies

We encourage all students to participate in programs and activities related to the competencies in the NAE Grand Challenges Scholars Program. We hope the vision of the Grand Challenges will inspire you to think about the undergraduate experience you want to create at Viterbi.

**Check-out the icons throughout the following pages to see how you can meet the GCSP competencies.**



**Research**



**Multidisciplinary**



**Entrepreneurship**



**Multicultural Competence**



**Social Consciousness**

## LINKS & RESOURCES



Viterbi Community & News  
[viterbiundergrad.usc.edu](http://viterbiundergrad.usc.edu)



Get Involved  
[campusactivities.usc.edu/](http://campusactivities.usc.edu/)



Study Abroad  
[viterbiundergrad.usc.edu/overseas](http://viterbiundergrad.usc.edu/overseas)



Entrepreneurship & Innovation  
[viterbiinnovation.usc.edu](http://viterbiinnovation.usc.edu)



Internships, Co-ops, & Jobs  
[viterbicareers.usc.edu/gateway](http://viterbicareers.usc.edu/gateway)



## BUILD COMMUNITY

An important part of your undergraduate experience will be the relationships you build as you engage in activities available to you at USC. These experiences will allow for self-exploration, leadership, and service, interpersonal and professional growth. Time and time again, it has been shown that involved students are the most satisfied and successful. As you begin your journey at Viterbi and USC, we encourage you to build a strong community and network of faculty, peers, and staff who will help guide and support you throughout your undergraduate career. So make sure to get connected early.

### Freshmen Academy

All first-year students in Viterbi are invited to become a part of Freshmen Academy (ENGR 102) their first semester in Viterbi. [viterbiundergrad.usc.edu/academy](http://viterbiundergrad.usc.edu/academy) Students starting in the spring semester can participate in Spring Academy. Freshmen Academy provides a birds-eye view of the field of engineering by tackling the ethical, societal, and political impact of engineering and technology use, focusing on the NAE Grand Challenges.

The academy class meets once a week and is taught by engineering faculty across all disciplines. The seminar focuses on building community through collaborative projects while using case studies, discussions, and group projects to explore how engineering intersects with other areas in society, including education, the environment, new technologies, the community, and more. Each Academy section is also facilitated by upper-division, undergraduate, student coaches who, along with being student leaders in their respective majors, also serve as resources and mentors to first-year Viterbi students.

### Center for Engineering Diversity

The Center for Engineering Diversity promotes an inclusive community of engineering scholars who are historically underrepresented in engineering. Through partnerships with Viterbi student affairs professionals, faculty, alumni, and corporate representatives, The Center advances initiatives and provides programming to enhance students' academic, personal, and professional experiences.

### Women in Engineering

The Women in Engineering (WIE) program offers professional, academic and social opportunities for all women in Viterbi. Programs such as the WIE Mentor Program, Faculty Student Luncheons, and WIE Meets Women Industry, are just a few 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), Athena Hacks, and Girls in Tech for students to get involved and meet fellow female engineers.

## BRING IT ALL TOGETHER AS A GRAND CHALLENGES SCHOLAR



*Each year, top seniors who successfully complete the GCSP components will be named National Academy of Engineering Grand Challenges Scholars, recognized at USC at graduation and by the NAE.*

[viterbiundergrad.usc.edu/gcsp](http://viterbiundergrad.usc.edu/gcsp)

## Student Organizations

Student organizations are a great way for you to get involved and connect with your fellow students. Many student organizations actively sponsor a number of professional, social, and service programs. To learn more visit EngageSC at [campusactivities.usc.edu](http://campusactivities.usc.edu).



### GET CONNECTED FAIRS

*Make sure to check out the Viterbi Get CONNECTED involvement fairs during Welcome Week in fall and spring to meet student leaders from 50+ Viterbi student organizations and design teams.*

## The Klein Institute for Undergraduate Engineering Life (KIUEL)

KIUEL provides Viterbi students a variety of personal and professional activities to enhance your experience 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. Events include the Viterbi President's Council leadership retreat, Engineers Week, Senior Design Expo, and more!

## FIND YOUR "PLUS"

Central to Dean's Yortos vision is the transformative idea of Engineering + (subject). Where "+" will take you beyond the traditional engineering degree programs, and allow you to explore your interests outside engineering while simultaneously preparing you to address some of today's most pressing challenges. We encourage you to find your Engineering+ (insert activity here). Whether that is in a minor, a second major, pursuing the Grand Challenge program, or just fun classes!



## 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, including Music, Astronomy, Global Health, Business, and Musical Theatre.

## Just for Fun

Maybe you don't want to add a minor, and just want to take a variety of classes for fun. Many students choose to fill their elective spaces with just one class from many different subjects to develop a diverse set of skills. Take classes like yoga, film symposium, psychology, business communications, and more!

### GET RECOGNIZED AS A RENAISSANCE SCHOLAR

*Take your double major or minor experience and apply to be a USC Renaissance Scholar in 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](http://ahf.usc.edu)*



## ENGINEER FOR SOCIAL GOOD

USC Viterbi cares about its community, inside our campus, throughout Los Angeles, and our society at large. The Viterbi challenge from Dean Yortos is to have students collectively contribute 100,000 hours of volunteer community outreach every year: "Such outreach would cultivate in all of them a mindset of societal consciousness, a mindset of societal impact of engineering." Tied closely to this growth mindset, is the need for engineers to develop cultural and global competencies in order to bring forth the best and most diverse ideas, as well as to meet the needs of companies with an ever-growing international scope. Programs around service learning and globalization foster a community that recognizes the importance of connecting and contributing to both the surrounding community and beyond.

### CAISS++

The Center for AI in Society's Student Branch or CAIS++ (pronounced "case plus plus") is a USC Viterbi-affiliated undergraduate student organization that serves as the student branch of the USC Center for Artificial Intelligence in Society (CAIS). In brief, our students work to promote the development of AI applications for social good.



### 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 Guatemala and Kenya. To learn more, visit [www.uscewb.org](http://www.uscewb.org).



## Innovation in Engineering Design

The Innovation in Engineering Design for Global Grand Challenges class allows USC students over the course of one year, to form a task-force to seek life-saving or life-improving innovations aimed at the most vulnerable and hardest-to-reach people.



## Maymester

Maymester courses are stand-alone offerings that provide exceptional opportunities for research and experiential learning off campus, throughout the United States, or even abroad.

## Problems Without Passports

USC's Problems Without Passports provides opportunities for coursework that combines problem-based or inquiry learning research exercises with study in a foreign country.

## 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 iPodia Program

iPodia 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.



## Viterbi Exchange Program

Gain firsthand international experience by participating in an exchange program for an excellent opportunity to learn from peers and faculty in other countries.



## Viterbi Impact Program (VIP)

The Viterbi Impact Program connects undergraduate Viterbi students with service and volunteer opportunities in 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.



## Viterbi Summer Overseas Program

Viterbi Summer Overseas program is a seven week program offered each summer in 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, Rome, London, Madrid, and Paris.



## 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](https://campusactivities.usc.edu/volunteer).



## EARN A GLOBAL SCHOLAR DISTINCTION



*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](https://ahf.usc.edu)*



## EXPERIENCE ENGINEERING

At Viterbi you can take advantage of a number of co-curricular activities all designed to provide you with out of the classroom hands-on opportunities that connect you with real-world experiences. These experiences will lead you to further discover your interests, develop your skills, and enhance your problem-solving and analytical skills. From internships, design teams, research, and more - you can take advantage of all of these opportunities starting your first year!

### Design Teams

Design teams are student run groups that work collaboratively to design and build a variety of projects. Examples of projects include steel bridge, solar car, rockets, airplane, robotics and more! Design teams may compete regionally, nationally, and at times globally. Design teams provide hand-on experiences and help build skills (teamwork, problem-solving, project management, budgeting, fundraising, etc.) that you can then leverage with prospective employers and graduate school.

### W.V.T. Rusch Honors Program

The W.V.T. Rusch Undergraduate Engineering Honors Program (EHP) allows students to choose between two thematic tracks: Innovation or Entrepreneurship and Research, with each track culminating into an experience similar to that of a senior thesis. The dynamic academic structure of the EHP provides a unique opportunity for you to focus on the National Academy of Engineering's Grand Challenges. Participants also enroll in the Honors Colloquium, a seminar where students can attend weekly lectures and network with leaders in the field of engineering. The program may also feature an annual fall retreat, additional lunches with guest speakers, and special events including the end of semester BBQ, a senior symposium, and senior brunch. Students can apply to the EHP at the end of their first semester at USC.





## Undergraduate Research

At USC Viterbi we encourage all students to participate in undergraduate research. Through research you will gain a practical application of your classroom knowledge to solving real-world problems. Other benefits of doing research include gaining relevant knowledge and skills for graduate school and/or industry, creation of new knowledge and contributions to the field, which may also include co-authoring papers and/or attending conferences. Research can be for a summer, a semester, or year-long. 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 ways including formal USC and non-USC programs, volunteering in a lab, design teams and challenges, and through coursework. Read below for other examples.



### **Viterbi Merit Research Programs**

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 they make satisfactory academic progress towards the engineering degree, maintain a “B” average overall, and complete a short renewal form by March 1st.

### **Provost and Rose Hills**

The Office of the Provost provides fellowships for undergraduate research each academic year in the fall, spring, and summer 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.

### **Tsinghua Summer Research Opportunity**

This six 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.



### **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. WISE

## Technology Innovation and Entrepreneurship (TIE)

The Viterbi School of Engineering promotes, encourages, and nurtures entrepreneurship and innovation from both its students and faculty. Closely linked to Silicon Beach, Viterbi has many opportunities for students to learn entrepreneurial skills, innovate, and build a start-up.



### **Viterbi Student Entrepreneurship Education (VSEE)**

The VSEE program teaches entrepreneurial skills to engineering freshman during two-week sessions in all sections of ENGR 102: Engineering Freshman Academy during the fall semester. Students learn about value propositions, customer discovery, and the lean canvas business model. Each group of approximately three students creates a solution to a problem and pitches it to the rest of the class. A winning group for each section is chosen.

### **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 generation engineering entrepreneur.

### **Viterbi Startup Garage**

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

### **Synchotron**

Have an idea? Take it to Synchotron, an 8-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.

### **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.

### **ABC Program**

USC Viterbi offers USC undergraduate students an opportunity to use innovation to develop solutions in: Atoms – engineering hardware products; Bits – digital projects, such as mobile and web apps, including AI, ML applications; and Cells – biomedical or bioengineering projects. Check out [viterbiinnovation.usc.edu/abc](http://viterbiinnovation.usc.edu/abc) for more information.

## Internships and Co-Ops

Viterbi Career Services - offers professional development support to prepare you for professional learning experiences with employers as an intern or trainee during your undergraduate career. Typically offered over the summer, internships are 8 to 12 weeks of on the job training in a particular field. Co-ops, on the other hand, offer more in-depth and extensive work experience over the course of two semesters, usually lasting a minimum six months. Starting in your first semester, take advantage of the extensive career and internship programs specifically designed for engineering students.



### RESUMES IN SEPTEMBER

About 70% of summer internship recruitment takes place in the fall semester. Have your resume ready by mid-September.

#### ➔ 1:1 Career Advising

Meet with a careers staff person to discuss your resume, internship search strategies, interview skills, and more. Drop-in hours are hosted Monday – Thursday 2:00 – 4:00 in RTH 218.

#### ➔ VMock

With 24-7 access, this online resume-review tool leverages data-science, machine learning, and natural language processing to provide instant personalized feedback on your resume based on criteria gathered from employers and global best practices.

#### ➔ Information Sessions & Trojan Talks

Company representatives hold presentations to give you more in-depth information about companies and opportunities offered. They allow you to build relationships with employers to be potentially considered for interviews.

#### ➔ Workshops

Workshops hosted by Career Services and employers give comprehensive information about career-related topics and help prepare you to be more successful in your job search process: *Writing Effective Resumes, How to Write a Cover Letter, Interviewing Strategies & Techniques, Navigating the Internship & Job Search Process, Making Professional Connections, Maximizing Your Linked In Profile*

#### ➔ Spotlight Programs

If you're not sure about which field of engineering you want to pursue or just want to learn more about the different majors, we host a panel of alumni and industry representatives who share their experiences of how they utilized their education after graduation. You'll also get the opportunity to mingle with the panelists.

#### ➔ Online Tool Kit

Don't have time to schedule an appointment or attend a workshop? View and download resources to assist you with internship & industry exploration and career readiness materials. [viterbicareers.usc.edu/toolkit](https://viterbicareers.usc.edu/toolkit)

### LOGIN TO JOIN VITERBI CAREER GATEWAY ASAP

This system allows you to search for engineering internship/co-op and full time jobs and gives you access to information about Viterbi-specific events and resources.

Go to [viterbicareers.usc.edu/gateway](https://viterbicareers.usc.edu/gateway)



## BUILD YOUR FUTURE: CAREERS, GRAD SCHOOL, AND BEYOND

Viterbi Career Connections is committed to helping you achieve your future career goals through self-evaluation exercises, future planning, goal setting, and career advising. Start planning your future job, graduate school, or career path by focusing on what you can do now to achieve future success.

### Viterbi Link

Succeed before, during, and after college through connections and community. Link with Viterbi alumni to get advice on everything from classes to landing your first job. This flash mentoring program allows you to ask a quick question or develop a mentoring relationship with an alumnus.

### Viterbi Career & Internship Fairs

The Viterbi Career & Internship Fair happens each semester and allows you to talk directly with recruiters about employment opportunities.

### On-Campus Interviews

Submit your resume on Viterbi Career Gateway to participate in on-campus interviews. If selected, you can sign up for interviews in the Career Connections office.

### ONLINE JOB BOARDS?

Viterbi Career Gateway has jobs, events, and services exclusive to engineering students. ConnectSC has jobs, events, and services for the entire USC population.



### 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 and before you complete 96 units in your junior year. A 3.2 GPA is required for consideration.

### Applying to Graduate School

USC Viterbi students applying for a USC Viterbi Masters or Ph.D have a number of benefits which include:

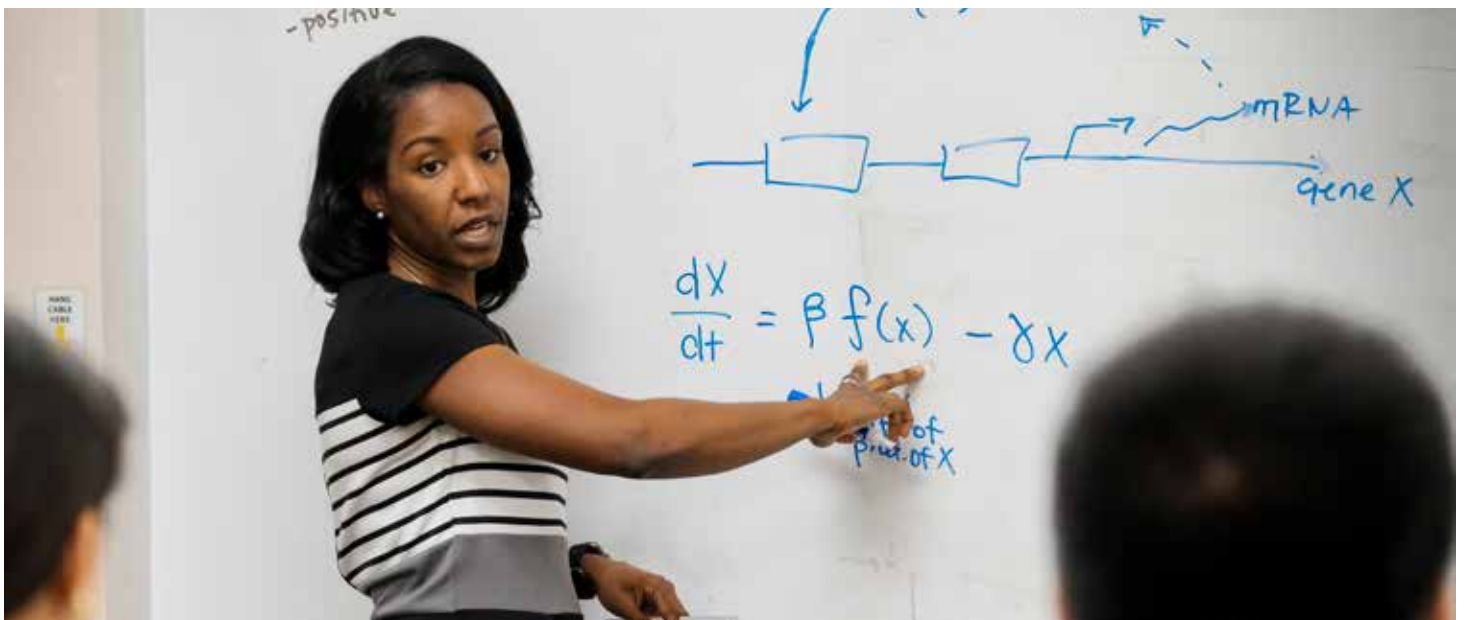
- ✍ USC students are eligible for an application fee waiver
- ✍ USC Viterbi Undergraduate students with a GPA of 3.2 or higher do not need to take a GRE test when applying to a USC Viterbi Masters

To learn more visit [viterbigradadmission.usc.edu](https://viterbigradadmission.usc.edu)

### PRO TIP

Interested in two different fields of Engineering? Consider pursuing one field as a B.S. and one as an M.S. in the PDP program.

[viterbiundergrad.usc.edu/future/pdp](https://viterbiundergrad.usc.edu/future/pdp)



Academic advising at USC Viterbi is more than choosing classes and looking at degree requirements. Your advisor is your coach, advocate and resource in helping you define and accomplish your goals, both for your USC experience and for life after graduation. Your advisor will help you design a personalized academic plan that reflects your academic, career and co-curricular goals.

As specialists in student development and engagement, we view student success through the cumulative outcome of academics and personal growth. At the end of your undergraduate Viterbi journey, our goal is that students have not only excelled in their academic pursuits but also challenged themselves as leaders and mentors as well as fostered an engaged community of their peers, faculty and advisors.

## ORIENTATION & WELCOME WEEK

Orientation marks a new beginning for your Viterbi journey and serves as the foundation for the USC and Viterbi student experience. This is your time to prepare for your first semester, from meeting fellow and current Trojans to registering for courses with your academic advisor.



### NEW STUDENT WELCOME AUGUST 22, 2019

Food, faculty, games, and more as a kick-off to your undergraduate experience before classes begin.





Viterbi invites all new undergraduate students to our annual **New Student Welcome on August 22nd** during Welcome Week, which begins with move-in day and continues through the first week of classes. This is your chance to connect with current students, faculty and staff at a classic Trojan event and learn about getting involved in student organizations, meeting faculty from all departments, and being part of your class photo!

## ACADEMIC ADVISING

### First Year Advisors

As a first-year student, you will begin working with your First Year Advisor at Orientation and continue through the end of your second semester at USC. Your First Year Advisor's role is to help with academic planning and career goals along with supporting your transition to college and acclimating to life at USC.

### LINKS & RESOURCES

-  Advising Home:  
[viterbiundergrad.usc.edu/advising](http://viterbiundergrad.usc.edu/advising)
-  Appointments & Academic Records:  
[my.usc.edu](http://my.usc.edu)
-  Freshman Academy:  
[viterbiundergrad.usc.edu/academy](http://viterbiundergrad.usc.edu/academy)
-  Tutoring & Support:  
[viterbiundergrad.usc.edu/varc](http://viterbiundergrad.usc.edu/varc)

### Department Advisors

As a transfer or sophomore student, you will begin working directly with an advisor specific to your major. As you begin to take more major-related coursework, department advisors will continue to help you build on the academic, co-curricular and career goals you started your first year.

# ADVISING TIMELINE

## Mandatory Advisement

All USC Viterbi students are required to meet with their academic advisor at least once per semester for a mandatory academic advisement. Your appointment should take place before your assigned registration date and time since you will not be able to register for the following semester until you meet with an advisor.

Mandatory advisement helps to ensure that you are working towards your goals, meeting your degree requirements, and staying on track for graduation. You can also use this time to delve into your ideas of how to you want to enact your Engineering+ experience.



# Your Academic Resources



*The University and USC Viterbi offer a wide range of programs and services to use for academic support.*

*These resources can help you more deeply engage with faculty, students and staff to help you further define your academic interests and get connected with the USC and Viterbi communities.*

## GRADUATE SCHOOL

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 if 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!

***See page 13 for more information regarding your future, including graduate school.***



# Degree Requirements

## GENERAL EDUCATION & UNIVERSITY POLICIES

*Student success is one of USC Viterbi's highest priorities and advisors and faculty are invaluable resources as you craft and monitor your own academic progress by using your STARS report through OASIS on my.usc.edu. University policies can be found in this handbook and in other university publications such as the USC Catalogue. The USC Catalogue and official addenda should be considered the documents of authority for all University students.*

### 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 GE program is 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. USC Viterbi 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 first-year students 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. Ask your advisor for help in identifying these seminars and to determine which semester you need to satisfy this requirement.

### LINKS & RESOURCES

-  **USC Catalogue**  
[usc.edu/catalogue](https://usc.edu/catalogue)
-  **Articulation (AP/IBs & Transfer Courses)**  
[usc.edu/articulation](https://usc.edu/articulation)
-  **Your Degree Progress (STARS) on OASIS**  
[my.usc.edu](https://my.usc.edu)

### Meeting Your GE Requirements

Although 11 general education requirements must be met, USC 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](https://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.



## 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 USC Office of Articulation website specifies how your advanced work in high school can help with USC degree requirements: [usc.edu/articulation](https://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, B, 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 of Africa & the Middle East → **GE-H**

History of Asia/Oceania → **GE-H**

History of the Americas → **GE-H**

History of Europe → **GE-H**

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**

### INTERESTED IN MEDICAL SCHOOL?



*Many medical schools do not accept AP, IB, or A-Level credit in lieu of college-level course credit to fulfill medical school requirements.*

### Special Physics Note for Computer Science Students

AP, IB, and A-Level physics exams are not equivalent to PHYS 151. However, AP Physics C (Mechanics and Electricity/Magnetism) with a 4 or 5 score can fulfill basic science requirements for Computer Science (CSCI), Computer Science/ Business Administration (CSBA), and Computer Science (Games) (CSGM). Please note the following for these specific majors:

**CSCI:** AP Physics C (Mechanics) + AP Physics C (Electricity & Magnetism) or PHYS 151 + AP Physics C (Electricity & Magnetism) satisfies the Basic Science I & II requirement.

**CSBA:** AP Physics C (Mechanics) or AP Physics C (Electricity & Magnetism) satisfies the Basic Science requirement.

**CSGM:** AP Physics C (Mechanics) satisfies the PHYS 151 requirement.

**CECS:** Students pursuing the Embedded Systems emphasis with the Electrical & Computer Engineering Department must take PHYS 151 or 161 or 171 and PHYS 152 or 162 or 172 for the one year physics requirement. Students pursuing the Computing Systems emphasis with the Computer Science department may satisfy the one year physics requirement with AP Physics C (Mechanics) and AP Physics C (Electricity & Magnetism).

A score of 6 or 7 on the IB Higher Level Physics exam and a score of B or better on the A-level Physics exam satisfies the basic science requirement for CSCI, CSBA, and CSGM.

## MAJOR COURSE PLANS

In the following pages you will find Major Course Plans for each USC Viterbi major. These plans provide a general layout of how your next four years may look depending on the major. These suggested course plans are your guide to use with your academic advisor in customizing an academic plan tailored to your individual needs and interests

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 the major.

### 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. The diagram below illustrates how to read the course requirements on the course plans.

### Helpful terms to keep in mind:

**OPTIONAL ELECTIVE:** Although they do not satisfy major requirements, you can enroll in optional electives that 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.

Remember, your academic advisor is here to help when you have questions about the Major Course Plans.

### EXAMPLE COURSE LAYOUT

COURSE NUMBER, OR CATEGORY IS IN BOLD AT THE TOP OF EACH LISTING.

COURSE CREDIT MAY BE GIVEN FOR ADVANCED PLACEMENT, INT'L BACCALAUREATE OR A-LEVEL EXAMS.

#### COURSE

PRE-REQUISITE,  
(CO-REQUISITE),  
{CONCURRENT ENROLLMENT}



#

#### PHYS 152L

PHYS 151L, (MATH 226)

4

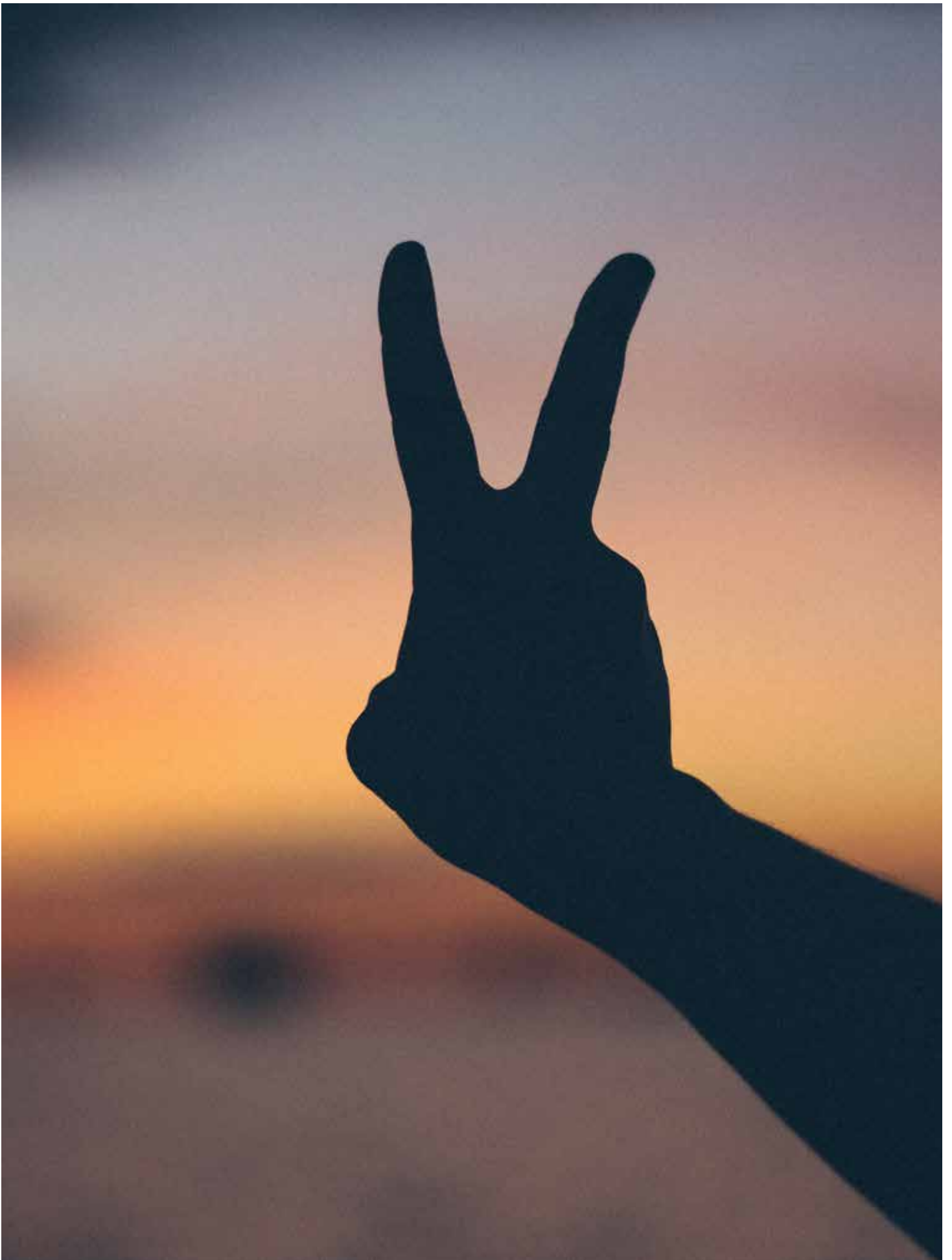
COURSES LISTED HERE AS PREREQUISITES MUST BE FULFILLED PRIOR TO ENROLLING IN THIS PARTICULAR COURSE.

COURSES LISTED IN PARENTHESES MUST BE TAKEN WITHIN THE SAME SEMESTER OR PRIOR TO THE PARTICULAR COURSE.

COURSES LISTED IN BRACKETS MUST BE TAKEN WITHIN THE SAME SEMESTER AS THE PARTICULAR COURSE.

UNIT VALUE OF THE PARTICULAR COURSE LISTED.

**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






*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.*

Aerospace and Mechanical Engineering (AME) students conduct basic and applied research within and across the usual disciplinary boundaries. AME students develop core and valuable problem-solving skills in the areas of aerodynamics, mechanics, thermodynamics, fluid mechanics, heat transfer, materials and design. Our graduates are at the leading edge of academia and industry, tackling innovative, important and exciting challenges.

AME students have the opportunity to work with the world-renowned faculty on research projects including turbulence control, emerging fuel cell technologies, computational fluid mechanics, combustion, heat transfer, automatic control systems, biomechanics, robotics, nonlinear dynamics, and advanced manufacturing. Recent undergraduate research and student projects include the design of fixed and flapping wing systems for small unmanned aircraft, the search for low drag solutions for the global cargo shipping industry, sports injury and helmet design for shock reduction, and optimal control of wheelchairs for humans and hovering flight for animals. As an example, AME senior John Hochschild was an undergraduate research assistant in the aerodynamics lab, engaging in hands-on work alongside doctoral students on fascinating projects ranging from bio-inspired morphing aircraft to a novel wing design that could significantly reduce aircraft drag.

## MAJORS & AREAS OF EMPHASIS

-  Aerospace Engineering
-  Mechanical Engineering
-  Mechanical (Petroleum) Engineering

## RESEARCH HIGHLIGHTS

Aero/Fluid Dynamics, Aerospace Controls, Design and Structures, Novel Combustion/Engine Technology, Autonomous Systems, Bio-Inspired Systems and Design, High Performance Computation, Nonlinear Dynamical Systems.

## LEARN MORE:

-  [viterbi.usc.edu/ame](http://viterbi.usc.edu/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, advanced 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.

## COMPANIES HIRING YOU

Aerospace Corporation, Aerovironment, Aerotek, Boeing, Honeywell, Jet

Propulsion Laboratory, Lockheed Martin, NASA Facilities, Scaled Composites, SpaceX, US National Labs (Livermore, Sandia), Northrop Grumman, U.S. government agencies, Virgin Galactic... And many more!

## CAREER OPTIONS

-  Imagine/design and build piloted or autonomous craft for land, air, sea, and space
-  Develop entirely new devices including satellites, robots, micro-scale measurement and monitoring platforms
-  Develop control and planning systems for robots, automated machinery and fleets of devices
-  Join the exciting world of modern engineering where the power of smart technology is harnessed and focused to improve the human condition



## FIRST YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>AME 105</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL or MASC 110L</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>WRIT 150</b> 4	<b>GE A</b> 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>ITP 168</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>AME 201</b> MATH 125, PHYS 151 3	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>AME 261</b> 4	<b>AME 204</b> AME 201 or CE 205 3	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>AME 231L</b> (AME 204) 3	<b>ASTE 280</b> MATH 226, PHYS 152 3	<b>OPTIONAL ELECTIVE</b> 1
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## THIRD YEAR

### FALL SEMESTER

<b>GE D</b> 4	<b>AME 301</b> AME 201 or CE 205 3	<b>AME 310</b> MATH 226 3	<b>AME 308</b> AME 204 (AME 301) 3	<b>AME 341aL</b> PHYS 152L, MATH 126 3	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE C</b> 4	<b>AME 302</b> MATH 245 3	<b>AME 309</b> (MATH 245) 4	<b>PHYS 153L</b> PHYS 152 4	<b>AME 341bL</b> AME 341aL 3	<b>OPTIONAL ELECTIVE</b> 1
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## FOURTH YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>AME 404</b> 3	<b>TECHNICAL ELECTIVE</b> 3	<b>TECHNICAL ELECTIVE</b> 3	<b>AME 441aL</b> AME 341bL 3	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>AME 436</b> AME 310 (AME 309 or CE 309) 3	<b>AME 451</b> AME 302, MATH 245 3	<b>AME 481</b> 4	<b>OPTIONAL ELECTIVE</b> 3	<b>OPTIONAL ELECTIVE</b> 2
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### 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 (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 (67 UNITS)

**AME 105:** Intro. to Aerospace Engineering

**AME 201:** New Statics Course

**AME 204:** Strength of Materials

**AME 231L:** Mechanical Behavior of Materials

**AME 261:** Basic Flight Mechanics

**AME 301:** Dynamics

**AME 302:** Dynamic Systems

**AME 308:** Comp.-Aided Analysis for Design

**AME 309:** Dynamics of Fluids

**AME 310:** Engineering Thermodynamics I

**AME 341AL:** Mechoptronics Laboratory I

**AME 341BL:** Mechoptronics Laboratory II

**AME 404:** Comp. Solutions to Engr. Problems

**AME 436:** Energy and Propulsion

**AME 441AL:** Senior Projects Laboratory

**AME 451:** Linear Control Systems I

**AME 481:** Aircraft Design

**ASTE 280:** Astronautics & Space Environment I

**ENGR 102:** Engineering Freshman Academy

**ITP 168:** Introduction to MATLAB

### TECHNICAL ELECTIVES

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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. 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 more specific courses.

**AEROSPACE ENGINEERING OFFERS THE FOLLOWING TRACKS:** Aeronautics, Structures, Controls, Thermal Systems and Design.

### AERONAUTICS

Fourth Year: FALL SEMESTER

<b>GEB</b> 4	<b>AME 459</b> 3	<b>AME 451</b> AME 302, MATH 245 3	<b>AME 457 or AME 443</b> AME 310, (AME 309 or CE 309) or AME 420 or 431 3	<b>AME 441a</b> AME 341bL 3	<b>OPTIONAL ELECTIVE</b> 2
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Fourth Year: SPRING SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>AME 436</b> AME 310, (AME 309 or CE 309) 3	<b>AME 481</b> 4	<b>AME 460</b> AME 309 3	<b>OPTIONAL ELECTIVE</b> 5	
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### STRUCTURES

Fourth Year: FALL SEMESTER

<b>GEB</b> 4	<b>AME 451</b> AME 302, MATH 245 3	<b>AME 485 or CE 358</b> AME 204 or CE 225 3	<b>AME 441a</b> AME 341bL 3	<b>OPTIONAL ELECTIVE</b> 5	
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Fourth Year: SPRING SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>AME 436</b> AME 310, (AME 309 or CE 309) 3	<b>AME 481</b> 4	<b>AME 403 or AME 420</b> AME 204 or MATH 245 3	<b>AME 408 or CE 458</b> AME 204 or CE 225 or CE 108, CE 358 or (ITP 168, AME 353) 3	<b>OPTIONAL ELECTIVE</b> 2
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### CONTROLS

Fourth Year: FALL SEMESTER

<b>GEB</b> 4	<b>AME 451</b> AME 302, MATH 245 3	<b>AME 459 or ASTE 480</b> 3	<b>AME 441a</b> AME 341bL 3	<b>OPTIONAL ELECTIVE</b> 5	
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Fourth Year: SPRING SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>AME 436</b> AME 310, (AME 309 or CE 309) 3	<b>AME 481</b> 4	<b>AME 443</b> AME 420 or AME 451 or EE 482 3	<b>AME 453 or AME 420</b> MATH 245 or MATH 245 3	<b>OPTIONAL ELECTIVE</b> 3
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### THERMAL SYSTEMS

Third Year: SPRING SEMESTER

<b>GEC</b> 4	<b>AME 302</b> MATH 245 3	<b>AME 309</b> (MATH 245) 3	<b>AME 331</b> AME 310, (AME 309 or CE 309) 3	<b>AME 341b</b> AME 341aL 3	<b>OPTIONAL ELECTIVE</b> 2
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Fourth Year: FALL SEMESTER

<b>GEB</b> 4	<b>AME 451</b> AME 302, MATH 245 3	<b>AME 430</b> AME 331 3	<b>AME 441a</b> AME 341bL 3	<b>OPTIONAL ELECTIVE</b> 3	
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Fourth Year: SPRING SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>AME 436</b> AME 310, (AME 309 or CE 309) 3	<b>AME 481</b> 4	<b>PHYS 153</b> PHYS 152 4	<b>AME 312 or PHYS 316</b> AME 310 or (PHYS 151, MATH 226) 3 or 4	
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### DESIGN

Fourth Year: FALL SEMESTER

<b>GEB</b> 4	<b>AME 451</b> AME 302, MATH 245 3	<b>AME 459 or ASTE 480</b> 3	<b>AME 441a</b> AME 341bL 3	<b>AME 430</b> AME 331 3	<b>OPTIONAL ELECTIVE</b> 2
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Fourth Year: SPRING SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>AME 436</b> AME 310, (AME 309 or CE 309) 3	<b>AME 481</b> 4	<b>AME 408</b> AME 204 or CE 225 3	<b>OPTIONAL ELECTIVE</b> 5	
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## FIRST YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>AME 101L</b> 3	<b>MATH 125 (GE F)</b>  4	<b>CHEM 105aL or MASC 110L</b>  4	<b>ENGR 102</b> 2
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### SPRING SEMESTER


<b>WRIT 150</b> 4	<b>GE A</b>  4	<b>MATH 126 or MATH 129</b>  MATH 125 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>ITP 168</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>AME 201</b> MATH 125, PHYS 151 3	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE D</b>  4	<b>AME 204</b> AME 201 or CE 205 3	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>PHYS 153L</b> PHYS 152L 4	<b>AME 310</b> MATH 226 3
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## THIRD YEAR

### FALL SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>AME 301</b> AME 201 or CE 205 3	<b>AME 308</b> AME 204, (AME 301) 3	<b>MASC 310</b> 4	<b>AME 341aL</b> PHYS 152L, MATH 126 3	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE B</b> 4	<b>AME 302</b> MATH 245 3	<b>AME 309</b> (MATH 245) 4	<b>AME 331</b> AME 310, (AME 309 or CE 209) 3	<b>AME 341bL</b> AME 341aL 3	<b>OPTIONAL ELECTIVE</b> 1
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## FOURTH YEAR

### FALL SEMESTER

<b>AME 451</b> AME 302, MATH 245 3	<b>AME CORE</b> 3	<b>AME DESIGN ELECTIVE</b> 3	<b>AME 441aL</b> AME 341bL 3	<b>AME CORE</b> 3	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE C</b> 4	<b>AME CORE</b> 3	<b>AME CAPSTONE ELECTIVE</b> 3 or 4	<b>AME CORE</b> 3	<b>OPTIONAL ELECTIVE</b> 3-6
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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 (66-67 UNITS)

**AME 101L:** Intro. to Mech. Engr. & Graphics  
**AME 201:** Statics  
**AME 204:** Strength of Materials  
**AME 301:** Dynamics  
**AME 302:** Dynamic Systems  
**AME 308:** Comp.-Aided Analysis for Design  
**AME 309:** Fluid Dynamics  
**AME 310:** Engineering Thermodynamics I  
**AME 331:** Heat Transfer  
**AME 341AL:** Mechoptronics Laboratory I  
**AME 341BL:** Mechoptronics Laboratory II  
**AME 441AL:** Senior Projects Laboratory  
**AME 451:** Linear Control Systems I  
**AME CORE**  
**AME DESIGN ELECTIVE**  
**AME CAPSTONE ELECTIVE**  
**ENGR 102:** Engineering Freshman Academy  
**ITP 168:** Introduction to MATLAB  
**MASC 310:** Mechanical Behavior of Materials

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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



## 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

Fourth Year: FALL SEMESTER

<b>ITP 165</b> 2	<b>AME 404</b> 3	<b>AME 415</b> 3	<b>EE 141L</b> 4	<b>AME 441a</b> AME 341b 3	<b>OPTIONAL ELECTIVE</b> 3
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Fourth Year: SPRING SEMESTER

<b>GEC</b> 4	<b>MATH 445</b> MATH 245 or 225 4	<b>CSCI 455</b> 4	<b>AME 408</b> AME 204 3	<b>OPTIONAL ELECTIVE</b> 3
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#### DESIGN

Fourth Year: FALL SEMESTER

<b>AME 305</b> AME 204 or CE 225 3	<b>AME 451</b> 3	<b>AME 410</b> 3	<b>AME 441a</b> AME 341bL 3	<b>OPTIONAL ELECTIVE</b> 5
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Fourth Year: SPRING SEMESTER

<b>GEC</b> 4	<b>AME 403</b> AME 204 3	<b>AME 409</b> 4	<b>AME 408</b> AME 204 or CE 225 3	<b>AME 420</b> MATH 245 3
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#### DYNAMICS & CONTROLS

Fourth Year: FALL SEMESTER

<b>GEC</b> 4	<b>AME 451</b> AME 302, MATH 245 3	<b>TECH ELECTIVE</b> 2	<b>AME 303</b> AME 301, CE 235 3	<b>AME 441a</b> AME 341bL 3	<b>OPTIONAL ELECTIVE</b> 3
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Fourth Year: SPRING SEMESTER

<b>AME 423</b> (EE 301 or AME 302) and PHYS 152 3	<b>AME 420</b> MATH 245 3	<b>AME 443</b> AME 420 or AME 451 or EE 482 3	<b>AME 453</b> MATH 245 3	<b>TECH ELECTIVE</b> 3	<b>OPTIONAL ELECTIVE</b> 3
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#### THERMO & FLUIDS

Fourth Year: FALL SEMESTER

<b>TECH ELECTIVE</b> 3	<b>AME 415</b> 3	<b>AME 430</b> AME 331 3	<b>AME 457</b> AME 310 and (AME 309 or CE 309) 3	<b>AME 441aL</b> AME 341bL 3	<b>OPTIONAL ELECTIVE</b> 3
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Fourth Year: SPRING SEMESTER

<b>GEC</b> 4	<b>AME 312</b> AME 310 3	<b>AME 436</b> AME 310 and (AME 309 or CE 309) 3	<b>TECH ELECTIVE</b> 3	<b>TECH ELECTIVE</b> 2	<b>OPTIONAL ELECTIVE</b> 3
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## FIRST YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>AME 101L</b> 3	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL or MASC 110L</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>WRIT 150</b> 4	<b>GE A</b> 4	<b>MATH 126 or MATH 129 (MATH 125)</b> 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>ITP 168</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>AME 201 (MATH 125)</b> 3	<b>MATH 226 or MATH 229 (MATH 126 or MATH 129)</b> 4	<b>PHYS 152L (PHYS 151L, (MATH 226))</b> 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE B</b> 4	<b>AME 204 (AME 201 or CE 205)</b> 3	<b>MATH 245 (MATH 226 or MATH 229)</b> 4	<b>PHYS 153L (PHYS 152L)</b> 4	<b>AME 310 (MATH 226)</b> 3
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## THIRD YEAR

### FALL SEMESTER

<b>WRIT 340 (WRIT 150)</b> 3	<b>AME 301 (AME 201 or CE 205)</b> 3 3	<b>PTE 463 (CHEM 105aL, MATH 245, PHYS 151L)</b> 3	<b>MASC 310</b> 4	<b>AME 341aL (PHYS 152L, MATH 126)</b> 3	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>AME 302 (MATH 245)</b> 3	<b>AME 308 (AME 204, (AME 301))</b> 3	<b>AME 309 (MATH 245)</b> 4	<b>PTE 464 (PTE 463)</b> 3	<b>AME 341bL (AME 341aL)</b> 3	<b>OPTIONAL ELECTIVE</b> 2
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## FOURTH YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>PTE 461 (PTE 464)</b> 3	<b>PTE 465 (PTE 464)</b> 3	<b>AME 408 (AME 204 or CE 225)</b> 3	<b>AME 441aL (AME 341aL)</b> 3	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE D</b> 4	<b>AME 331 (AME 310, (AME 309 or CE 309))</b> 3	<b>AME 409</b> 4	<b>TECHNICAL ELECTIVE</b> 4	<b>OPTIONAL ELECTIVE</b> 3
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### 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 (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-67)

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

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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 Engineering

THE ASTRONAUTICAL ENGINEERING DEPARTMENT

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 AND DEFENSE INDUSTRIES, SPACE RESEARCH, DEVELOPMENT, AND OPERATIONS IN INDUSTRY AND GOVERNMENT CENTERS AND LABORATORIES, AS WELL AS FOR GRADUATE STUDY.

## MAJOR

 Astronautical Engineering

## RESEARCH HIGHLIGHTS

Space Science and Technology, Spacecraft and Mission Design, Space Instrumentation and Sensors, Spacecraft Propulsion, Space Environment and Spacecraft Interaction, Atomic and Molecular Interactions

## LEARN MORE:

 [viterbi.usc.edu/aste](http://viterbi.usc.edu/aste)

The Astronautical Engineering (ASTE) program provides the fundamentals of science and engineering, specialized courses in astronautics, 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.

## 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.

Astronautical engineering students can engage in research under faculty guidance as early as 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. 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 above). The Liquid Propulsion Laboratory is focused on designing increasingly sophisticated liquid-propellant rocket engines.

## COMPANIES HIRING YOU

Aerospace Corporation, The Boeing Company, Lockheed Martin, Northrop Grumman, Raytheon, Jet Propulsion Laboratory (JPL), NASA Research Centers (Glenn, Marshall, Johnson), various government agencies, 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

## FIRST YEAR

### FALL SEMESTER

<b>WRIT 150</b> 4	<b>ASTE 101L</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL or MASC 110L</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>GEB</b> 4	<b>GE A</b> 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>ITP 168</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>GEC</b> 4	<b>AME 201</b> MATH 125, PHYS 151L 3	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GED</b> 4	<b>AME 204</b> AME 201 or CE 205 3	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>PHYS 153L</b> PHYS 152L 4	<b>ASTE 280</b> MATH 226, PHYS 151L or PHYS 161L 3
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## THIRD YEAR

### FALL SEMESTER

<b>GEC</b> 4	<b>AME 301</b> AME 201 or CE 205 3	<b>AME 310</b> MATH 226 OR MATH 227 OR MATH 229 3	<b>ASTE 331a</b> PHYS 153L, ASTE 280 3	<b>AME 341aL</b> PHYS 152L, MATH 126 3	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>ASTE 331b</b> ASTE 330a 3	<b>WRIT 340</b> WRIT 150 3	<b>AME 309</b> AME 201 (MATH 245) 3	<b>AME 308</b> AME 204, (AME 301) 3	<b>AME 341bL</b> AME 341aL 3	<b>OPTIONAL ELECTIVE</b> 3
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## FOURTH YEAR

### FALL SEMESTER

<b>AME 441a</b> 3	<b>TECHNICAL ELECTIVE</b> 3	<b>ASTE 470</b> 3	<b>AME 404</b> 3	<b>TECHNICAL ELECTIVE</b> 3	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GEB</b> 4	<b>ASTE 421</b> ASTE 330 3	<b>ASTE 480</b> 3	<b>TECHNICAL ELECTIVE</b> 3	<b>OPTIONAL ELECTIVE</b> 4
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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 (68 UNITS)

**AME 201:** Statics

**AME 204:** Strength of Materials

**AME 301:** Dynamics

**AME 308:** Comp.-Aided Analysis for Design

**AME 309:** Fluid Dynamics

**AME 310:** Engineering Thermodynamics I

**AME 341AL:** Mechoptronics Laboratory I

**AME 341BL:** Mechoptronics Laboratory II

**AME 404:** Comp. Solutions to Engr. Problems

**AME 441AL:** Senior Projects Laboratory

**ASTE 101L:** Intro. to Astronautics

**ASTE 280:** Astronautics & Space Environment I

**ASTE 301B:** Thermal and Statistical Systems II

**ASTE 330:** Astronautics & Space Environment II

**ASTE 421:** Space Mission Design

**ASTE 470:** Spacecraft Propulsion

**ASTE 480:** Spacecraft Dynamics

**ENGR 102:** Engineering Freshman Academy

**ITP 168:** Introduction to MATLAB

**TECHNICAL ELECTIVES**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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, Mathematics, or Math 225 except CE 404, 412, and ISE 440. No more than 3 units of ASTE 490 or ASTE 491 course work can be used for Technical Electives.

# Biomedical Engineering

**THE BIOMEDICAL ENGINEERING DEPARTMENT**

*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, 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 to your education in three separate emphasis programs: Molecular-Cellular (BMCE), Electrical (BMEN), and Mechanical (BMEL).

Biomedical (Molecular-Cellular) Engineering (BMCE) is for students interested in engineering molecular- to systems-level tools to probe human biology and develop new therapies for complex diseases. Examples include developing nano- to micro-scale particles and scaffolds, engineering cell and tissue constructs, and understanding gene and protein networks through experimental and computational means. As a BMCE student, you will take additional coursework in areas like Biomaterials and Tissue Engineering, Systems Biology, Introduction to Bioengineering in Medicine, and Nanomedicine.

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, Electromag-

netics 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.

## COMPANIES HIRING YOU

Abbott Laboratories, Advanced Bionics, Alfred E. Mann Institute, Amgen, Edwards Lifesciences, House Ear Institute, Lifescan, Medtronic, Neutrogena, Nike... And many more!

## MAJORS & AREAS OF EMPHASIS

- ✔ Biomedical Engineering
- ✔ Biomedical (Molecular-Cellular) Engr.
- ✔ Biomedical(Electrical) Engr.
- ✔ Biomedical(Mechanical) Engr.

## RESEARCH HIGHLIGHTS

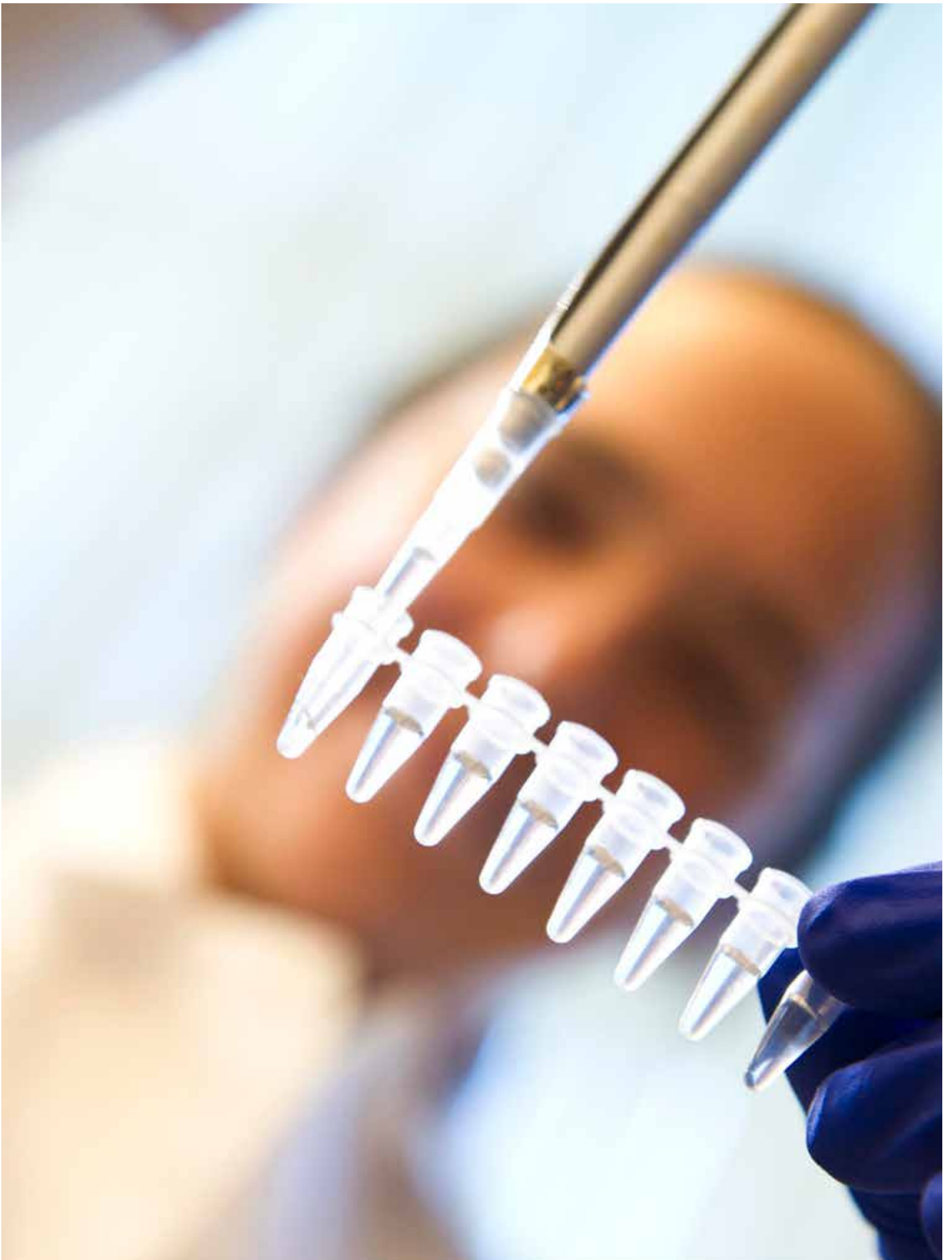
System Modeling And Simulation, Systems Biology, Systems Pharmacology, Microphysiological Systems, Tissue Engineering, Biomaterials, Nanomedicine, Cancer Microenvironment, Sensory Neurophysiology, Sensorimotor Control, Cardio-Respiratory Control And Dynamics, Computational Neurobiology, Mechanisms Of Memory And Learning, Ultrasonic Imaging, Laser Scanning And Light Sheet Imaging, Medical Imaging, Multimodal Imaging, Biomedical Photonics, Implantable And Wearable Biomedical Devices, Neural Prostheses, Retinal Prostheses, Cortical Prostheses.

## LEARN MORE:

- ✔ [bme.usc.edu](http://bme.usc.edu)

## CAREER OPTIONS

- ✔ Build advanced therapeutic & surgical devices > Create safe implantable artificial materials
- ✔ Become physicians or pharmacists
- ✔ Conduct biomedical research
- ✔ Develop artificial organs
- ✔ Design prosthetics
- ✔ Improve medical imaging devices



## FIRST YEAR

### FALL SEMESTER

<b>BME 101 or GE B</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>BME 101 or GE B</b> 4	<b>GE A</b> 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>BME 202</b> MATH 126 or MATH 129 4	<b>GE C</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>BISC 220L</b> 4	<b>BME 210</b> (MATH 245) 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 2
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## THIRD YEAR

### FALL SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>EE 202L</b> PHYS 152L, (MATH 245) 4	<b>BME 423</b> MATH 245 4	<b>CHEM 322aL</b> CHEM 105bL 4	<b>BME ANCHOR COURSE</b> 3
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### SPRING SEMESTER

<b>TECHNICAL ELECTIVE</b> 3	<b>BME 302L</b> EE 202L 4	<b>GE C</b> 4	<b>CHEM 322bL or 400-Level BME COURSE</b> 4	<b>OPTIONAL ELECTIVE</b> 3
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## FOURTH YEAR

### FALL SEMESTER

<b>TECHNICAL ELECTIVE</b> 3	<b>BISC 320L</b> CHEM 105bL 4	<b>BME 403L</b> BISC 320L, MATH 245, (EE 202L) <b>or 405L</b> BME 210, EE 202L 4	<b>TECHNICAL ELECTIVE</b> 3	<b>BME 413</b> PHYS 152L 4
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### SPRING SEMESTER

<b>TECHNICAL ELECTIVE</b> 2	<b>GE B</b> 4	<b>BME 405L</b> BME 210, EE 202L <b>or 403L</b> BISC 220L, MATH 245, (EE 202L) 4	<b>BME 410</b> CHEM 322aL 3	<b>OPTIONAL ELECTIVE</b> 5
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### 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 or additional 400-level BME course

### 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 (55 UNITS)

**BME 101:** Intro. to Biomedical Engineering

**BME 202:** Control & Comm. in Nerv. System

**BME 210:** Biomed. Comp. Simulation Methods

**BME 302L:** Medical Electronics

**BME 403L:** Physiological Systems

**BME 405L:** Senior Projects: Meas. and Inst.

**BME 410:** Intro. to Biomaterials & Tissue Engr.

**BME 413:** Bioengineering Signals & Systems

**BME 423:** Statistical Methods in BME

**EE 202L:** Linear Circuits

**ENGR 102:** Engineering Freshman Academy

**BME ANCHOR COURSE:** BME 404 or BME 430 or BME 451 or BME 452

### TECHNICAL ELECTIVES

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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, or C 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.

**TECHNICAL ELECTIVES:** At least 11 units, taken from ONE of the following three areas of specialization:  
Bioelectronics/Computers : (BME 201, BME 416, BME 425, BME 430, BME 451, BME 452, BME 453, CSCI 445, EE 109L, EE 209, EE 338, EE 348L, EE 352L, EE 354L, EE 454L, EE 483, ENGR 345 or ITP 308) or Biomechanics: (AME 201, AME 204, AME 301, AME 302, AME 308 or ITP 308, AME 309, BME 201, BME 404, BME 412, BME 414, BME 416, BME 453 or MASC 310) Biochemical Engineering: (BME 201, BME 406, BME 412, BME 414, BME 430, BME 453, BME 459, CHE 330, CHE 350, CHE 460L, CHE 489, ENGR 305, ITP 308, or MASC 310)



## FIRST YEAR

### FALL SEMESTER

<b>BME 101 or GEB</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>BME 101 or GEB</b> 4	<b>GE A</b> 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>BME 202</b> MATH 126 or MATH 129 4	<b>GE B</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>BISC 220L</b> 4	<b>BME 210</b> (MATH 245) 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 2
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## THIRD YEAR

### FALL SEMESTER

<b>BISC 320L</b> CHEM 105BL 4	<b>CHEM 322aL</b> CHEM 105BL 4	<b>BME 423</b> MATH 245 4	<b>FIRST PANEL COURSE</b> 3	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>EE 202L</b> PHYS 152L, (MATH 245) 4	<b>SECOND PANEL COURSE</b> 3	<b>CHEM 322bL</b> CHEM 322aL 4	<b>BISC 330L</b> CHEM 322aL 4	<b>TECHNICAL ELECTIVE</b> 3
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## FOURTH YEAR

### FALL SEMESTER

<b>THIRD PANEL COURSE</b> 3	<b>GE C</b> 4	<b>BME 405L</b> BME 210, EE 202L 4	<b>WRIT 340</b> WRIT 150 3	<b>BME 413</b> PHYS 152L 4
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### SPRING SEMESTER

<b>GE C</b> 4	<b>CHE 489</b> CHE 330, BISC 320L 4	<b>BME 403L</b> MATH 245, and BISC 110 or BISC 220 4	<b>BME 416</b> 3	<b>OPTIONAL ELECTIVE</b> 4
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### 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 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)

**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 202:** Control & Comm. in Nervous Sys.  
**BME 210:** Biomed. Comp. Simulation Meth.  
**BME 403L:** Physiological Systems  
**BME 405L:** Senior Projects Measurements & Instrumentation  
**\*BME 406:** Intro Bioengineering & Medicine  
**\*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  
**\*BME 459:** Nanomedicine and Drug Delivery

**CHE 489:** Biochemical Engineering

**EE 202L:** Linear Circuits

**ENGR 102:** Engineering Freshman Academy

### TECHNICAL ELECTIVES

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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, or C, 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.

**\* PANEL CLASSES:** Choose 3 out of 4 classes

**TECHNICAL ELECTIVES:** 5 units of engineering, at least 3 units upper-division

## FIRST YEAR

### FALL SEMESTER

<b>BME 101 or GE B</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>BME 101 or GE B</b> 4	<b>GE A</b> 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>ITP 165</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>BME 202</b> MATH 126 or MATH 129 4	<b>GE C</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>EE 109L</b> 4	<b>BME 210</b> (MATH 245) 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 2
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## THIRD YEAR

### FALL SEMESTER

<b>EE 202L</b> PHYS 152L, (MATH 245) 4	<b>EE 250L</b> 4	<b>BME 423</b> MATH 245 4	<b>TECHNICAL ELECTIVE</b> 3	<b>WRIT 340</b> WRIT 150 3
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### SPRING SEMESTER

<b>FIRST TRACK COURSE: EE 338 OR 354L</b> 4	<b>GE B</b> 4	<b>BISC 220L</b> 4	<b>BME 416</b> 3	<b>TECHNICAL ELECTIVE</b> 3
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## FOURTH YEAR

### FALL SEMESTER

<b>BISC 320L</b> CHEM 105bL 4	<b>GE C</b> 4	<b>BME 413</b> PHYS 152L 4	<b>BME 403L or 405L</b> BISC 220L, MATH 245, (EE 202L) BME 210, EE 202L 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>CHEM 322aL CHEM 105bL or 400-LEVEL BME COURSE</b> 4	<b>SECOND TRACK COURSE: EE 348L OR EE 454L</b> 4	<b>BME 405L BME 210, EE 202L or 403L</b> BISC 220L, MATH 245, (EE 202L) 4	<b>TECHNICAL ELECTIVE</b> 3	<b>OPTIONAL ELECTIVE</b> 2
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### 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

### 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 or additional 400-level BME course

### 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 (60 UNITS)

**BME 101:** Intro. to Biomedical Engineering  
**BME 202:** Control & Comm. in Nerv. System  
**BME 210:** Biomed. Comp. Simulation Methods  
**BME 403L:** Physiological Systems  
**BME 405L:** Measurements & Instrumentation  
**BME 413:** Bioengineering Signals & Systems  
**BME 416:** Development & Regulation of Med. Products  
**BME 423:** Statistical Methods in BME  
**EE 109L:** Introduction to Embedded Systems  
**EE 250L:** Distributed Systems for the Internet of Things  
**EE 202L:** Linear Circuits  
**ITP 165:** Introduction to C++ Programming  
**\* EE 354L:** Introduction to Digital Circuits  
**\* EE 454:** Introductions to System on Chip  
**\*\* EE 338L:** Physical Electronics  
**\*\* EE 348:** Electronic Circuits  
**ENGR 102:** Engineering Freshman Academy  
**TECHNICAL ELECTIVES**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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, or C, only. See page 21 for more information and consult your advisor for detailed assistance.

**DIGITAL/ANALOG TRACKS:** Choose between Digital or Analog tracks. The \* Digital track is composed of EE 354L and EE454 while the \*\* Analog Track is EE 338L and EE348.

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

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

## FIRST YEAR

### FALL SEMESTER

<b>BME 101 or GE B</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GEE)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>BME 101 or GE B</b> 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>GE A</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>BME 202</b> MATH 126 or MATH 129 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 151L (GEE)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>BISC 220L</b> 4	<b>BME 210</b> (MATH 245) 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 2
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## THIRD YEAR

### FALL SEMESTER

<b>EE 202L</b> PHYS 152L, (MATH 245) 4	<b>ITP 308</b> 3	<b>BME 423</b> MATH 245 4	<b>CHEM 322aL</b> (CHEM 105bL or 400-LEVEL BME COURSE) 4	<b>AME 201</b> PHYS 151L 3
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### SPRING SEMESTER

<b>GE C</b> 4	<b>MASC 310</b> 4	<b>AME 301</b> AME 201 or CE 205 3	<b>AME 204</b> AME 201 or CE 205 3	<b>TECHNICAL ELECTIVE</b> 3
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## FOURTH YEAR

### FALL SEMESTER

<b>BISC 320L</b> CHEM 105bL 4	<b>BME 413</b> PHYS 152L 4	<b>BME 403L</b> BISC 220L, MATH 245, (EE 202L) or 405L 4	<b>BME 404</b> PHYS 151L, MATH 245, AME 201 3	<b>WRIT 340</b> WRIT 150 3
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### SPRING SEMESTER

<b>BME 405L</b> (BME 210, EE 202L) or 403L BISC 220L, MATH 245, (EE 202L) 4	<b>AME 309</b> (MATH 245) 4	<b>GE C</b> 4	<b>BME 416</b> 3	<b>TECHNICAL ELECTIVE</b> 2
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### 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 or additional 400-level BME course

### 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 or **ITP 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 202L:** Linear Circuits

- ENGR 102:** Engineering Freshman Academy
- MASC 310:** Materials Behavior and Processing
- TECHNICAL ELECTIVES**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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, or C, 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 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.

## EMPHASES & OPTIONS

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

The biochemical option (CHEB) is a great option for students considering going on to Medical, Dental or Pharmacy Schools; and for students who wish to enter the growing biochemical industry (with companies such as Amgen, Genetech, Merck, etc.). The petroleum option (CHPE) is most appropriate for students interested in the exploration and production aspects of the energy industry. There is currently a great demand but limited supply of petroleum engineers because there are only a small number of universities training petroleum engineers. The nanotechnology option (CHEN) is for students who are interested in learning the properties of materials on the nanometer scale, and will study specialized probes capable of visualizing matter on these length scales. Nanotechnology involves

## MAJORS & AREAS OF EMPHASIS

-  Chemical Engr.
-  Chemical (Biochemical) Engr.
-  Chemical (Petroleum) Engr.
-  Chemical (Nanotechnology) Engr.
-  Chemical (Polymers/Materials Science) Engr.
-  Chemical (Environmental) Engr.
-  Chemical (Sustainable Energy) Engr.

## 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

## LEARN MORE:

 [viterbi.usc.edu/mork](http://viterbi.usc.edu/mork)

the study of matter at length scales that are intermediate between the molecular and the bulk. The polymers/materials option (CHPM) is most appropriate for students interested in the polymer industry (plastic companies like DuPont, Dow, Hercules, etc.); and for students interested in electronic materials, e.g., in microelectronics fabrication (Computer chip makers such as Intel, Motorola, etc. are typical employers). The environmental option (CHEE) is for students interested in a career in protecting the environment either through pollution control (by changing manufacturing processes for example) or in environmental remediation. The sustainable energy option provides students access to careers where a variety of energy sources are being developed, including biofuels, solar, geothermal, and clean hydrocarbons.

## 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.

#### **COMPANIES HIRING YOU**

Amgen, Baxter, CH2MHill, 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

## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>CHE 120</b> (MATH 125, CHEM 105aL) 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>CHE 330</b> (MATH 226) 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CHE 305</b> MATH 125, MATH 126 (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 322aL</b> CHEM 105bL 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CHE 444aL</b> CHE 120 (CHE 330 and CHE 350) 2	<b>CHE 350</b> CHEM 105bL or CHEM 115bL and CHE 330 4
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## THIRD YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>CHE ELECTIVE</b> 4	<b>CHEM 430</b> CHEM 300L or 322aL, MATH 226, PHYS 151L 4	<b>CHE 443</b> (CHE 350 or MATH 245) 4	<b>CHE 444bL</b> CHE 330 (CHE 443) 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHE 444cL</b> CHE 330 CHE 447 2	<b>ENGR ELECTIVE</b> 4	<b>CHE 442</b> MATH 245 and CHE 443 4	<b>CHE 447</b> MATH 245 and CHE 443 4
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## FOURTH YEAR

### FALL SEMESTER

<b>GE D</b> 4	<b>CHE 460L</b> CHE 120, (MATH 245) 4	<b>CHE 485</b> CHE 442, 443 4	<b>WRIT 340</b> WRIT 150 3	<b>OPTIONAL ELECTIVE</b> 2-3
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### SPRING SEMESTER

<b>GE C</b> 4	<b>CHE 480</b> CHE 485 4	<b>CHEMISTRY ELECTIVE</b> 4	<b>OPTION ELECTIVE</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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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 322AL:** Organic Chemistry  
**CHEM 430:** Physical Chemistry: Thermodynamics & Kinetics  
**CHEMISTRY ELECTIVE: CHEM 300L:** Analytical Chemistry  
 or **CHEM 322BL:** Organic Chemistry  
 or **CHEM 431:** 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)  
**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 (58 UNITS)

**CHE 120:** Intro. to Chemical Engineering  
**CHE 305:** Numerical & Statistical Analysis for Chemical Engineers  
**CHE 330:** Chemical Engr. Thermodynamics  
**CHE 350:** Intro. to Separation Processes  
**CHE 442:** Chemical Reactor Design  
**CHE 443:** Viscous Flow  
**CHE 444AL:** Chemical Engineering Lab  
**CHE 444BL:** Chemical Engineering Lab  
**CHE 444CL:** Chemical Engineering Lab  
**CHE 447:** Heat and Mass Transfer in Chemical Engineering Processes  
**CHE 460L:** Chem. Proc. Dynamics & Control  
**CHE 480:** Chem. Process and Plant Design  
**CHE 485:** Computer Aided Chemical Process Design  
**ENGR 102:** Engineering Freshman Academy

**CHE ELECTIVE**  
**ENGR ELECTIVE**  
**OPTION ELECTIVE**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

**CHE ELECTIVE** - Any upper-division CHE course

**ENGR ELECTIVE** - Any upper-division ENGR course (subject to advisor approval)

**OPTION ELECTIVE:** Any upper-division elective course in math, science or engineering (subject to advisors approval)

## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>CHE 120</b> (MATH 125, CHEM 105aL) 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>CHE 330</b> (MATH 226) 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CHE 305</b> MATH 125, MATH 126 (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CHEM 322aL</b> CHEM 105bL 4	<b>CHE 350</b> CHEM 105bL or CHEM 115bL and CHE 330 4	<b>CHE 444aL</b> CHE 120 (CHE 330 and CHE 350) 2
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## THIRD YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>BISC 320L (GE D)</b> CHEM 105bL 4	<b>CHEM 430</b> CHEM 300L or 322aL, MATH 226, PHYS 151L 4	<b>CHE 443</b> (CHE 350 or MATH 245) 4	<b>CHE 444bL</b> CHE 330 (CHE 443) 2
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### SPRING SEMESTER

<b>BISC 300L</b> BISC 320L, CHEM 322aL 4	<b>CHE 442</b> MATH 245 and CHE 443 4	<b>CHE 489</b> CHE 330, 350, 442, (443) 4	<b>CHE 444cL</b> CHE 350 (CHE 447) 2	<b>CHE 447</b> MATH 245 and CHE 443 2
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## FOURTH YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>WRIT 340</b> WRIT 150 3	<b>CHE 460L</b> CHE 120, (MATH 245) 4	<b>CHE 485</b> CHE 442, 443 3	<b>OPTIONAL ELECTIVE</b> 4-5
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### SPRING SEMESTER

<b>GE C</b> 4	<b>BISC 330L</b> CHEM 322a or CHEM 325a 4	<b>CHE 480</b> CHE 485 4	<b>BME 410</b> CHEM 322aL 3	<b>OPTIONAL ELECTIVE</b> 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

### CHEMISTRY (16 UNITS)

**CHEM 105AL:** General Chemistry

**CHEM 105BL:** General 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)

**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 410:** Intro. to Biomaterials and Tissue Engineering

**CHE 120:** Intro. to Chemical Engineering

**CHE 305:** Numerical & Statistical Analysis for Chemical Engineers

**CHE 330:** Chemical Engr. Thermodynamics

**CHE 350:** Intro. to Separation Processes

**CHE 442:** Chemical Reactor Design

**CHE 443:** Viscous Flow

**CHE 444AL:** Chemical Engineering Lab

**CHE 444BL:** Chemical Engineering Lab

**CHE 444CL:** Chemical Engineering Lab

**CHE 447:** Heat and Mass Transfer in Chemical Engineering Processes

**CHE 460L:** Chemical Process Dynamics & Control

**CHE 480:** Chem. Process and Plant Design

**CHE 485:** Computer-Aided Chemical Plant Design

**CHE 489:** Biochemical Engineering

**ENGR 102:** Engineering Freshman Academy

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>CHE 120</b> (MATH 125, CHEM 105aL) 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>CHE 330</b> (MATH 226) 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CHE 305</b> MATH 125, MATH 126 (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 322aL</b> CHEM 105bL 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CHE 350</b> CHEM 105bL or CHEM 115bL and CHE 330 4	<b>CHE 444aL</b> CHE 120 (CHE 330 and CHE 350) 2
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## THIRD YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>CHEM 430</b> CHEM 300L or 322aL, MATH 226, PHYS 151L 4	<b>CHE 443</b> (CHE 350, MATH 245) 4	<b>CHE 486 or CHE 450 or PTE 463L</b> MATH 245, CHEM 105bL, PHYS 151L CHE 330, one of CHE 443, CHE 445, CHE 446 4	<b>CHE 444bL</b> CHE 330 (CHE 443) 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>ENE 428 or 429</b> 3	<b>CHE 442</b> MATH 245 and CHE 443 4	<b>CHE 447</b> MATH 245 and CHE 443 4	<b>CHE 444cL</b> CHE 330 (CHE 447) 2	<b>OPTIONAL ELECTIVE</b> 1
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## FOURTH YEAR

### FALL SEMESTER

<b>GE D</b> 4	<b>CHE 460L</b> CHE 120, (MATH 245) 4	<b>CHE 485</b> CHE 442, 443 4	<b>CE 453</b> (CE 309 or ENE 410) 3	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE C</b> 4	<b>CE 463L</b> CE 453, CHEM 105bL 3	<b>CHE 480</b> CHE 485 4	<b>WRIT 340</b> WRIT 150 3	<b>OPTIONAL ELECTIVE</b> 4
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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 (16 UNITS)

**CHEM 105AL:** General Chemistry  
**CHEM 105BL:** General Chemistry  
**CHEM 322AL:** Organic Chemistry  
**CHEM 430:** 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 (61 UNITS)

**CE 453:** Water Quality Control  
**CE 463L:** Water Chemistry and Analysis  
**CHE 120:** Intro. to Chemical Engineering  
**CHE 305:** Numerical & Statistical Analysis for Chemical Engineers  
**CHE 330:** Chemical Engr. Thermodynamics  
**CHE 350:** Intro. to Separation Processes  
**CHE 442:** Chemical Reactor Design  
**CHE 443:** Viscous Flow  
**CHE 444AL:** Chem. Engineering Laboratory  
**CHE 444BL:** Chem. Engineering Laboratory  
**CHE 444CL:** Chem. Engineering Laboratory  
**CHE 447:** Heat and Mass Transfer in Chemical Engineering Processes  
**CHE 460L:** Chemical Process Dynamics & Control  
**CHE 480:** Chem. Process and Plant Design  
**CHE 485:** Computer Aided Chemical Process Design  
**CHE 486:** Design of Environ. Benign Plants  
**OR CHE 450:** Sustainable Energy  
**OR PTE 463L:** Introduction to Trans. Processes in

Porous Media

**ENE 428:** Air Pollution Fundamentals  
**OR ENE 429:** Air Pollution Control  
**ENGR 102:** Engineering Freshman Academy

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.



## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>CHE 120</b> (MATH 125, CHEM 105aL) 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>CHE 330</b> (MATH 226) 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CHE 305</b> MATH 125, MATH 126 (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 322aL</b> CHEM 105bL 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CHE 350</b> CHEM 105bL or CHEM 115bL and CHE 330 4	<b>CHE 444aL</b> (CHE 120 (CHE 330 and CHE 350)) 2
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## THIRD YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>CHEM 430</b> CHEM 300L or 322aL, MATH 226, PHYS 151L 4	<b>CHE 443</b> (CHE 350 or MATH 245) 4	<b>CHE 487</b> CHEM 105aL or MASC 110L 4	<b>CHE 444bL</b> (CHE 330 (CHE 330 and CHE 350)) 2
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### SPRING SEMESTER

<b>CHE 442</b> MATH 245 and CHE 443 4	<b>MASC 350L</b> CHE 442 and CHE 443 4	<b>CHE 447</b> MATH 245 and CHE 443 4	<b>CHE 444cL</b> CHE 330 (CHE 447) 2	<b>GE D</b> 4
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## FOURTH YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>CHE 391</b> 2	<b>CHE 460L</b> CHE 120, (MATH 245) 4	<b>CHE 485</b> CHE 442, 443 4	<b>WRIT 340</b> WRIT 150 3	<b>OPTIONAL ELECTIVE</b> 1
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### SPRING SEMESTER

<b>GE C</b> 4	<b>CHEM 453</b> CHEM 105bL, 322aL 4	<b>CHE 480</b> CHE 485 4	<b>CHE 491</b> CHE 391 2	<b>OPTIONAL ELECTIVE</b> 4
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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 322AL:** Organic Chemistry

**CHEM 430:** Physical Chemistry: Thermodynamics & Kinetics

**CHEM 453:** Advanced Inorganic Chemistry

### 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)

**CHE 120:** Intro. to Chemical Engineering

**CHE 305:** Numerical & Statistical Analysis for Chemical Engineering

**CHE 330:** Chemical Engr. Thermodynamics

**CHE 350:** Intro. to Separation Processes

**CHE 391:** Intro. to Nanotechnology Research

**CHE 442:** Chemical Reactor Design

**CHE 443:** Viscous Flows

**CHE 444AL:** Chem. Engineering Laboratory

**CHE 444BL:** Chem. Engineering Laboratory

**CHE 444CL:** Chem. Engineering Laboratory

**CHE 447:** Heat and Mass Transfe in Chemical Engineering Processes

**CHE 460L:** Chemical Process Dynamics & Control

**CHE 480:** Chem. Process and Plant Design

**CHE 485:** Comp.-Aided Chemical Process Design

**CHE 487:** Nanotech and Nanoscale Engineering through Chemical Processes

**CHE 491:** Nanotech Research for Undergrads

**ENGR 102:** Engineering Freshman Academy

**MASC 350L:** Nanostructured Materials: Design, Synthesis, and Processing Design

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

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

## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>CHE 120</b> (MATH 125, CHEM 105aL) 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>CHE 330</b> (MATH 226) 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CHE 305</b> MATH 125, MATH 126 (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 322aL</b> CHEM 105bL 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CHE 350</b> CHEM 105bL or CHEM 155bL and CHE 330 4	<b>CHE 444aL</b> CHE 120 (CHE 330 and CHE 350) 2
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## THIRD YEAR

### FALL SEMESTER

<b>CHEM 430</b> CHEM 300L or 322aL, MATH 226, PHYS 151L 4	<b>CHE 443</b> (CHE 350 or MATH 245) 4	<b>PTE 461</b> 4	<b>PTE 463L</b> MATH 245, CHEM 105aL, PHYS 151L 4	<b>CHE 444bL</b> CHE 330 (CHE 443) 2
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### SPRING SEMESTER

<b>GE C</b> 4	<b>PTE 464L</b> PTE 463L 4	<b>CHE 442</b> MATH 245 and CHE 443 4	<b>CHE 447</b> MATH 245 and CHE 443 4	<b>CHE 444cL</b> CHE 330 (CHE 447) 2
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## FOURTH YEAR

### FALL SEMESTER

<b>GED</b> 4	<b>CHE 485</b> CHE 442, 443 4	<b>CHE 460L</b> CHE 120, (MATH 245) 4	<b>PTE 465L</b> PTE 464L 3	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE B</b> 4	<b>GE C</b> 4	<b>CHE 480</b> CHE 485 4	<b>WRIT 340</b> WRIT 150 3	<b>OPTIONAL ELECTIVE</b> 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

### CHEMISTRY (16 UNITS)

**CHEM 105AL:** General Chemistry  
**CHEM 105BL:** General Chemistry  
**CHEM 322AL:** Organic Chemistry  
**CHEM 430:** 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)

**CHE 120:** Intro. to Chemical Engineering  
**CHE 305:** Numerical & Statistical Analysis for Chemical Engineers  
**CHE 330:** Chemical Engr. Thermodynamics  
**CHE 350:** Intro. to Separation Processes  
**CHE 442:** Chemical Reactor Design  
**CHE 443:** Viscous Flow  
**CHE 444AL:** Chemical Engineering Lab  
**CHE 444BL:** Chemical Engineering Lab  
**CHE 444CL:** Chemical Engineering Lab  
**CHE 460L:** Chemical Process Dynamics & Control  
**CHE 447:** Heat and Mass Transfer in Chemical Engineering Processes  
**CHE 480:** Chem. Process and Plant Design  
**CHE 485:** Computer Aided Chemical Process Design  
**ENGR 102:** Engineering Freshman Academy  
**PTE 461:** Formation Data Sensing with Well Logs  
**PTE 463L:** Introduction to Trans. Processes in Porous Media

**PTE 464L:** Modeling and Simulation of Subsurface Flow Systems  
**PTE 465L:** Drill. Tech. & Subsurface Meth.

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>CHE 120</b> (MATH 125, CHEM 105aL) 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>CHE 330</b> (MATH 226) 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CHE 305</b> MATH 125, MATH 126 (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 322aL</b> CHEM 105bL 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CHE 350</b> CHEM 105bL or CHEM 115bL and CHE 330 3	<b>CHE 444aL</b> CHE 120 (CHE 330 and CHE 350) 2
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## THIRD YEAR

### FALL SEMESTER

<b>CHEM 430</b> CHEM 300L or 322aL, MATH 226, PHYS 151L 3	<b>CHE 443</b> (CHE 350 or MATH 245) 4	<b>CHE 472</b> 4	<b>GE C</b> 4	<b>CHE 444bL</b> CHE 330 (CHE 443) 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHE 476</b> (CHEM 322aL or <b>MASC 310</b> or <b>CHE 475</b> ) 4	<b>CHE 442</b> MATH 245 and CHE 443 4	<b>CHE 447</b> MATH 245 and CHE 443 4	<b>CHE 444cL</b> CHE 330 (CHE 447) 2
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## FOURTH YEAR

### FALL SEMESTER

<b>GE D</b> 4	<b>CHE 485</b> CHE 442, 443 4	<b>CHE 460L</b> CHE 120, (MATH 245) 4	<b>WRIT 340</b> WRIT 150 3	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE C</b> 4	<b>CHEMISTRY ELECTIVE</b> 4	<b>CHE 480</b> CHE 485 4	<b>OPTION ELECTIVE</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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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 322AL:** Organic Chemistry  
**CHEM 430:** Physical Chemistry: Thermodynamics & Kinetics  
**CHEMISTRY ELECTIVE: CHEM 300L:** Analytical Chemistry  
or **CHEM 322BL:** Organic Chemistry  
or **CHEM 431:** 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)

**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)

**CHE 120:** Intro. to Chemical Engineering  
**CHE 305:** CHE 305: Numerical & Statistical Analysis for Chemical Engineers  
**CHE 330:** Chemical Engr. Thermodynamics  
**CHE 350:** Intro. to Separation Processes  
**CHE 442:** Chemical Reactor Design  
**CHE 443:** Viscous Flow  
**CHE 444AL:** Chemical Engineering Lab  
**CHE 444BL:** Chemical Engineering Lab  
**CHE 444CL:** Chemical Engineering Lab  
**CHE 447:** Heat and Mass Transfer in Chemical Engineering Processes  
**CHE 460L:** Chemical Process Dynamics  
**CHE 472:** Polymer Science & Engineering  
**CHE 476:** Chemical Engineering Materials  
or **MASC 310:** Materials Behavior and Processing

or **CHE 475:** Physical Properties of Polymers

**CHE 480:** Chem. Process and Plant Design

**CHE 485:** Computer Aided Chemical Process Design

**ENGR 102:** Engineering Freshman Academy

**MASC 350L:** Nanostructured Materials: Design,

Synthesis, and Processing Design

**ENGR ELECTIVE:** CHE 476 OR MASC 310 OR CHE 475

**OPTION ELECTIVE:** CHE 475 OR BME 310

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>CHE 120</b> (MATH 125, CHEM 105aL) 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>CHE 330</b> (MATH 226) 3	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CHE 305</b> MATH 125, MATH 126 (MATH 226) 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 322aL</b> CHEM 105bL 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CHE 350</b> CHEM 105bL or CHEM 115bL and CHE 330 4	<b>CHE 444aL</b> CHE 120 (CHE 330 and CHE 350) 2
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## THIRD YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>CHEM 430</b> CHEM 300L or 322aL, MATH 226, PHYS 151L 4	<b>CHE 443</b> (CHE 350 or MATH 245) 4	<b>CHE 450</b> CHE 330, one of CHE 443, CHE 445, CHE 446 4	<b>CHE 444bL</b> CHE 330 (CHE 443) 2
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### SPRING SEMESTER

<b>GE D</b> 4	<b>CHE 442</b> MATH 245 and CHE 443 4	<b>SUSTAINABLE ENERGY ELECTIVE</b> 4	<b>CHE 447</b> MATH 245 and CHE 443 4	<b>CHE 444cL</b> CHE 330 (CHE 447) 2
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## FOURTH YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>CHE 485</b> CHE 442, 443 4	<b>CHE 460L</b> CHE 120, (MATH 245) 4	<b>WRIT 340</b> WRIT 150 3	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>CHEM TECH. ELECTIVE</b> 4	<b>CHE 476</b> CHEM 322a or <b>MASC 350L</b> CHE 442 and CHE 443 4	<b>CHE 480</b> CHE 485 4	<b>GE C</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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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 322AL:** Organic Chemistry  
**CHEM 430:** Physical Chemistry: Thermodynamics & Kinetics  
**CHEMISTRY TECH ELECTIVES:**  
**CHEM 300L:** Analytical Chemistry  
 or **CHEM 322BL:** Organic Chemistry  
 or **CHEM 431:** Physical Chemistry: Quantum Mechanics  
 or **CHEM 453:** Advanced Inorganic Chemistry

### 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)

**CHE 120:** Intro. to Chemical Engineering  
**CHE 305:** Numerical & Statistical Analysis for Chemical Engineers  
**CHE 330:** Chemical Engr. Thermodynamics  
**CHE 350:** Intro. to Separation Processes  
**CHE 442:** Chemical Reactor Design  
**CHE 443:** Viscous Flows  
**CHE 444AL:** Chemical Engineering Lab  
**CHE 444BL:** Chemical Engineering Lab  
**CHE 444CL:** Chemical Engineering Lab  
**CHE 447:** Heat and Mass Transfer in Chemical Engineering Processes  
**CHE 450:** Sustainable Energy  
**CHE 460L:** Chemical Process Dynamics & Control  
**CHE 476:** Chem. Engineering Materials

or **MASC 350L:** Nanostructured Materials: Design, Synthesis and Processing  
**CHE 480:** Chem. Process and Plant Design  
**CHE 485:** Comp.-Aided Chemical Process Design  
**ENGR 102:** Engineering Freshman Academy

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

**SUSTAINABLE ENERGY ELECTIVE:** One from CHE 301/488/489 (biofuel), PTE 436 (geothermal), CHE 486/ PTE 519 (hydrocarbon), or CHE 487/EE 513 (solar)



*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 covers engineering approaches required to provide safe drinking water, maintain air quality, and protect the environment.

## MAJORS & AREAS OF EMPHASIS

-  Civil Engineering
-  Civil Engineering (Building Science)
-  Civil Engineering (Construction)
-  Civil Engineering (Environmental)
-  Civil Engineering (Structural Engr.)
-  Civil Engineering (Water Resources)
-  Environmental Engineering

## 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.

## LEARN MORE:

 [viterbi.usc.edu/cee](http://viterbi.usc.edu/cee)



### **COMPANIES HIRING YOU**

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

## FIRST YEAR

### FALL SEMESTER

<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>WRIT 150</b> 4	<b>MATH 126 (GE F)</b> MATH 125 4	<b>CE 106</b> 2	<b>ENGR 102</b> 2	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CE 108</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>GED</b> 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CE 215</b> PHYS 151 4	<b>CE 119</b> CE 108, (MATH 226) 2
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### SPRING SEMESTER

<b>GEOL 305L</b> 4	<b>CE 107</b> 2	<b>GE A</b> 4	<b>CE 225</b> CE 215 4	<b>CE 309</b> MATH 226, (CE 225) 4
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## THIRD YEAR

### FALL SEMESTER

<b>CE 408</b> (MATH 245) 2	<b>CE 334L</b> CE 225, CHEM 105a, PHYS 152 4	<b>CE 358</b> CE 225 4	<b>CE 456</b> CE 225, (CE 358) 4	<b>ENGINEERING ELECTIVE</b> 3-4
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### SPRING SEMESTER

<b>DESIGN ELECTIVE</b> 4	<b>ENGINEERING ELECTIVE</b> 3-4	<b>CE 451</b> CE 309 4	<b>CE 467L</b> CE 225 4	<b>OPTIONAL ELECTIVE</b> 2-3
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## FOURTH YEAR

### FALL SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>DESIGN ELECTIVE</b> 4	<b>CE 471</b> MATH 226 4	<b>CE 453</b> CHEM 105a, (CE 309) 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE B</b> 4	<b>GE C</b> 4	<b>CE 480</b> 4	<b>CE ELECTIVE</b> 2-4	<b>OPTIONAL ELECTIVE</b> 2-4
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### MATHEMATICS (12 UNITS)

**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 (72-75 UNITS)

**CE 106:** Introduction to Civil Engineering  
**CE 107:** Intro. To Civil Engineering Graphics  
**CE 108:** Intro. to CE Computer Methods  
**CE 119:** Probability Concepts and Civil Engineering  
**CE 215:** Statics & Dynamics  
**CE 225:** Mechanics of Deformable Bodies  
**CE 309:** Fluid Mechanics  
**CE 334L:** Mechanical Behavior of Materials  
**CE 358:** Elementary Theory of Structures  
**CE 408:** Risk & Decision Analysis in Civil Engr.  
**CE 451:** Water Resources Engineering  
**CE 453:** Water Quality Science & Engineering  
**CE 456:** Structural Design I  
**CE 467L:** Geotechnical Engineering  
**CE 471:** Principles of Transportation Engr.  
**CE 480:** Civil & Environmental Engr. Capstone Design  
**ENGR 102:** Engineering Freshman Academy  
**CE ELECTIVE**  
**DESIGN ELECTIVES**  
**ENGINEERING ELECTIVES**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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 215, 225, AND 309:** Minimum grade of "C" is required.

**CE ELECTIVE:** Choose at least two units of upper-division CE coursework that is not already required.

**DESIGN ELECTIVES:** Choose eight units from CE 457, 465, 476, 482, or 485.

**ENGINEERING ELECTIVES:** Choose one course from each block: [ISE 460] and [AME 310 or EE 202L or EE 326L].



## FIRST YEAR

### FALL SEMESTER

<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>WRIT 150</b> 4	<b>MATH 126 (GE F)</b> MATH 125 4	<b>CE 106</b> 2	<b>ENGR 102</b> 2	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CE 108</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>GE D</b> 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CE 215</b> PHYS 151 4	<b>CE 119</b> CE 108, (MATH 226) 2
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### SPRING SEMESTER

<b>GEOL 305L</b> 4	<b>CE 107</b> 2	<b>GE A</b> 4	<b>CE 225</b> CE 215 4	<b>CE 309</b> MATH 226, (CE 225) 4
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## THIRD YEAR

### FALL SEMESTER

<b>CE 408</b> (MATH 245) 2	<b>CE 334L</b> CE 225, CHEM 105a, PHYS 152 4	<b>CE 358</b> CE 225 4	<b>CE 456</b> CE 225 4	<b>ENGINEERING ELECTIVE</b> 3-4
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### SPRING SEMESTER

<b>DESIGN ELECTIVE</b> 4	<b>ENGINEERING ELECTIVE</b> 3-4	<b>CE 451</b> CE 309 4	<b>CE 467L</b> CE 225 4	<b>OPTIONAL ELECTIVE</b> 2-3
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## FOURTH YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>CE 482</b> CE 467 4	<b>CE 471</b> MATH 226 4	<b>CE 460</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>WRIT 340</b> WRIT 150 4	<b>GE B</b> 4	<b>CE 480</b> 4	<b>CE ELECTIVE</b> 2-4	<b>OPTIONAL ELECTIVE</b> 2-4
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### MATHEMATICS (12 UNITS)

**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 (72-75 UNITS)

**CE 106:** Introduction to Civil Engineering

**CE 107:** Intro. To Civil Engineering Graphics

**CE 108:** Intro. to CE Computer Methods

**CE 119:** Probability Concepts and Civil Engineering

**CE 215:** Statics & Dynamics

**CE 225:** Mechanics of Deformable Bodies

**CE 309:** Fluid Mechanics

**CE 334L:** Mechanical Behavior of Materials

**CE 358:** Elementary Theory of Structures

**CE 408:** Risk & Decision Analysis in Civil Engr.

**CE 451:** Water Resources Engineering

**CE 456:** Structural Design I

**CE 460:** Construction Engineering

**CE 467L:** Geotechnical Engineering

**CE 471:** Principles of Transportation Engr.

**CE 480:** Civil & Environmental Engr. Capstone Design

**CE 482:** Subsurface Foundation Design

**ENGR 102:** Engineering Freshman Academy

**CE ELECTIVE**

**DESIGN ELECTIVES**

**ENGINEERING ELECTIVES**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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 215, 225, AND 309:** Minimum grade of "C" is required.

**CE ELECTIVE:** Choose one from CE 462, CE 469, CE 470, or ARCH 419.

**DESIGN ELECTIVES:** Choose one from CE 457, 465, 476, or 485.

**ENGINEERING ELECTIVES:** Choose one course from each block: [ISE 460] and [AME 310 or EE 202L or EE 326L].

## FIRST YEAR

### FALL SEMESTER

<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>WRIT 150</b> 4	<b>MATH 126 (GE F)</b> MATH 125 4	<b>CE 106</b> 2	<b>ENGR 102</b> 2	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CE 108</b> 2	
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## SECOND YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>GE D</b> 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CE 215</b> PHYS 151 4	<b>CE 119</b> CE 108, (MATH 226) 2	
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### SPRING SEMESTER

<b>GEOL 305L</b> 4	<b>CE 107</b> 2	<b>GE A</b> 4	<b>CE 225</b> CE 215 4	<b>CE 309</b> MATH 226, (CE 225) 4	
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## THIRD YEAR

### FALL SEMESTER

<b>CE 408</b> (MATH 245) 2	<b>CE 334L</b> CE 225, CHEM 105a, PHYS 152 4	<b>CE 358</b> CE 225 4	<b>CE 456</b> CE 225, (CE 358) 4	<b>CE 453</b> CHEM 105a, (CE 309) 4	
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### SPRING SEMESTER

<b>CE 465</b> CE 453 4	<b>ENGINEERING ELECTIVE</b> 3-4	<b>CE 451</b> CE 309 4	<b>CE 467L</b> CE 225 4	<b>OPTIONAL ELECTIVE</b> 2-3	
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## FOURTH YEAR

### FALL SEMESTER

<b>CE ELECTIVE</b> 4	<b>CE 476</b> CE 309 4	<b>CE 471</b> MATH 226 4	<b>ENGINEERING ELECTIVE</b> 3-4	<b>OPTIONAL ELECTIVE</b> 2-3	
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### SPRING SEMESTER

<b>GE B</b> 4	<b>GE C</b> 4	<b>CE 480</b> 4	<b>WRIT 340</b> WRIT 150 3	<b>OPTIONAL ELECTIVE</b> 3	
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### MATHEMATICS (12 UNITS)

**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 (70-71 UNITS)

**CE 106:** Introduction to Civil Engineering  
**CE 107:** Intro. To Civil Engineering Graphics  
**CE 108:** Intro. to CE Computer Methods  
**CE 119:** Probability Concepts and Civil Engineering  
**CE 215:** Statics & Dynamics  
**CE 225:** Mechanics of Deformable Bodies  
**CE 309:** Fluid Mechanics  
**CE 334L:** Mechanical Behavior of Materials  
**CE 358:** Elementary Theory of Structures  
**CE 408:** Risk & Decision Analysis in Civil Engr.  
**CE 451:** Water Resources Engineering  
**CE 453:** Water Quality Science & Engineering  
**CE 465:** Water Supply & Sewerage System Design  
**CE 467L:** Geotechnical Engineering  
**CE 471:** Principles of Transportation Engr.  
**CE 476:** Design of Hydraulic Systems  
**CE 480:** Civil & Environmental Engr. Capstone Design  
**ENGR 102:** Engineering Freshman Academy  
**CE ELECTIVE**  
**ENGINEERING ELECTIVES**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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 215, 225, AND 309:** Minimum grade of "C" is required.

**ENGINEERING ELECTIVES:** Choose one course from each block: [ISE 460] and [AME 310 or EE 202L or EE 326L].

**CE ELECTIVES:** Choose four units of upper-division CE coursework that is not already required.

## FIRST YEAR

### FALL SEMESTER

<b>GEA</b> 4	<b>WRIT 150</b> 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>CE 106</b> 2	<b>ARCH 114</b> 2	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 105aL (GEE)</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 151L (GEE)</b> MATH 125 or 126 or 226 4	<b>CE 108</b> 2	
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## SECOND YEAR

### FALL SEMESTER

<b>CE 119</b> CE 108, (MATH 226) 2	<b>ARCH 205aL</b> CE 106 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>PHYS 152L</b> PHYS 151, (MATH 226) 4	<b>CE 215</b> PHYS 151 4	
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### SPRING SEMESTER

<b>CE 309</b> MATH 226, (CE 225) 4	<b>ARCH 205bL</b> ARCH 205a 4	<b>GE C</b> 4	<b>CE 225</b> CE 215 4	<b>OPTIONAL ELECTIVE</b> 2	
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## THIRD YEAR

### FALL SEMESTER

<b>CE 408</b> (MATH 245) 2	<b>ARCH 305aL</b> ARCH 305b 4	<b>CE 358</b> CE 225 4	<b>CE 456</b> CE 225 4	<b>GED</b> 4	
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### SPRING SEMESTER

<b>CE 467L</b> CE 225 4	<b>ARCH 305bL</b> ARCH 305a 4	<b>CE 457</b> CE 358, CE 456 4	<b>CE 458</b> CE 358 4	<b>OPTIONAL ELECTIVE</b> 2	
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## FOURTH YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>ARCH 405aL</b> ARCH 305b 4	<b>WRIT 340</b> WRIT 150 3	<b>CE 334L</b> CE 225, CHEM 105a, PHYS 152 4	<b>ARCH 214b</b> 3	
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### SPRING SEMESTER

<b>GEOL 305L</b> 4	<b>ARCH 405bL</b> ARCH 405a 4	<b>GE C</b> 4	<b>CE 460</b> 4	<b>OPTIONAL ELECTIVE</b> 2	
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### MATHEMATICS (12 UNITS)

**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

### ARCHITECTURE (29 UNITS)

**ARCH 114:** Architecture: Culture and Comm.  
**ARCH 214B:** History of Architecture  
**ARCH 205AL:** Building Science I  
**ARCH 205BL:** Building Science I  
**ARCH 305AL:** Building Science II  
**ARCH 305BL:** Building Science II  
**ARCH 405AL:** Building Science III  
**ARCH 405BL:** Building Science III

### ENGINEERING (46 UNITS)

**CE 106:** Introduction to Civil Engineering  
**CE 108:** Intro. to CE Computer Methods  
**CE 119:** Probability Concepts and Civil Engineering  
**CE 215:** Statics & Dynamics  
**CE 225:** Mechanics of Deformable Bodies  
**CE 309:** Fluid Mechanics  
**CE 334L:** Mechanical Behavior of Materials  
**CE 358:** Elementary Theory of Structures  
**CE 408:** Risk & Decision Analysis in Civil Engr.  
**CE 456:** Structural Design I  
**CE 457:** Structural Design II  
**CE 458:** Computational Structural Analysis  
**CE 460:** Construction Engineering  
**CE 467L:** Geotechnical Engineering

**ENGR 102:** Engineering Freshman Academy

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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 215, 225, AND 309:** Minimum grade of "C" is required.

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

## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>WRIT 150</b> 4	<b>MATH 126 (GE F)</b> MATH 125 4	<b>CE 110</b> 2	<b>ENGR 102</b> 2	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or 129 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>CE 108</b> 2	
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## SECOND YEAR

### FALL SEMESTER

<b>ENE 215</b> 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CE 215</b> PHYS 151 4	<b>CE 119</b> CE 108, (MATH 226) 2	
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### SPRING SEMESTER

<b>CE 309</b> MATH 226, (CE 225) 4	<b>ENE 200</b> CHEM 105b, PHYS 152, MATH 226 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CE 225</b> CE 215 4	<b>OPTIONAL ELECTIVE</b> 2	
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## THIRD YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>CE 408</b> (MATH 245) 2	<b>CE 358</b> CE 225 4	<b>CE 456</b> CE 225 4	<b>ISE 460</b> 3	<b>OPTIONAL ELECTIVE</b> 1
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### SPRING SEMESTER

<b>CHE 330</b> (MATH 226) 4	<b>CE 402</b> CE 108, MATH 245 2	<b>BISC 220L (GED)</b> 4	<b>CE 451</b> CE 309 4	<b>CE 363L</b> ENE 200, CHEM 105b 4	
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## FOURTH YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>GE B</b> 4	<b>WRIT 340</b> WRIT 150 3	<b>CE 410L</b> BISC 220, CHEM 105b 4	<b>OPTIONAL ELECTIVE</b> 3	
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### SPRING SEMESTER

<b>CE 480</b> 4	<b>CE 467L</b> CE 225 4	<b>CE 485</b> CE 363 4	<b>ENE 428</b> MATH 245, PHYS 151, CHEM 105b 4	<b>OPTIONAL ELECTIVE</b> 2	
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### MATHEMATICS (12 UNITS)

**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,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 (75 UNITS)

**CE 108:** Intro. to CE Computer Methods  
**CE 110:** Intro. to Environmental Engineering  
**CE 119:** Probability Concepts and Civil Engineering  
**CE 215:** Statics & Dynamics  
**CE 225:** Mechanics of Deformable Bodies  
**CE 309:** Fluid Mechanics  
**CE 358:** Elementary Theory of Structures  
**CE 363L:** Water Chemistry and Analysis  
**CE 408:** Risk & Decision Analysis in Civil Engr.  
**CE 410L:** Introduction to Environmental Engineering Microbiology  
**CE 451:** Water Resources Engineering  
**CE 467L:** Geotechnical Engineering  
**CE 485:** Wastewater Treatment Design  
**ENE 200:** Environmental Engr. Principles  
**ENE 215:** Energy Systems and Environmental Tradeoffs  
**ENE 428:** Air Pollution Fundamentals  
**ENGR 102:** Engineering Freshman Academy  
**ISE 460:** Engineering Economy

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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 215, 225, AND 309:** Minimum grade of "C" is required.

## FIRST YEAR

### FALL SEMESTER

<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>WRIT 150</b> 4	<b>MATH 126 (GE F)</b> MATH 125 4	<b>CE 106</b> 2	<b>ENGR 102</b> 2	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or 129 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CE 108</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>GE D</b> 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>CE 215</b> PHYS 151 4	<b>CE 119</b> CE 108, (MATH 226) 2
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### SPRING SEMESTER

<b>GEOL 305L</b> 4	<b>CE 107</b> 2	<b>GE A</b> 4	<b>CE 225</b> CE 215 4	<b>CE 309</b> MATH 226, (CE 225) 4
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## THIRD YEAR

### FALL SEMESTER

<b>CE 334L</b> CE 225, CHEM 105a, PHYS 152 4	<b>CE 358</b> CE 225 4	<b>CE 456</b> CE 225, (CE 358) 4	<b>ENGINEERING ELECTIVE</b> 3-4	<b>OPTIONAL ELECTIVE</b> 2-3
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### SPRING SEMESTER

<b>CE 457</b> CE 225, (CE 358) 4	<b>ENGINEERING ELECTIVE</b> 3-4	<b>CE 458</b> CE 108, CE 358 4	<b>CE 467L</b> CE 225 4	<b>OPTIONAL ELECTIVE</b> 2-3
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## FOURTH YEAR

### FALL SEMESTER

<b>CE 471</b> MATH 226 4	<b>CE 408</b> (MATH 245) 2	<b>CE 459</b> (CE 458) 2	<b>CE 460</b> 4	<b>CE 482</b> CE 467 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>GE C</b> 4	<b>GE B</b> 4	<b>CE 480</b> 4	<b>OPTIONAL ELECTIVE</b> 3
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### MATHEMATICS (12 UNITS)

**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 (72-73 UNITS)

**CE 106:** Introduction to Civil Engineering

**CE 108:** Intro. to CE Computer Methods

**CE 119:** Probability Concepts and Civil Engineering

**CE 215:** Statics & Dynamics

**CE 225:** Mechanics of Deformable Bodies

**CE 309:** Fluid Mechanics

**CE 334L:** Mechanical Behavior of Materials

**CE 358:** Elementary Theory of Structures

**CE 408:** Risk & Decision Analysis in Civil Engr.

**CE 456:** Structural Design I

**CE 457:** Structural Design II

**CE 458:** Computational Structural Analysis

**CE 459:** Intro. to Structural Dynamics

**CE 460:** Construction Engineering

**CE 467L:** Geotechnical Engineering

**CE 471:** Principles of Transportation Engineering

**CE 480:** Civil & Environmental Engr. Capstone Design

**CE 482:** Subsurface Foundation Design

**ENGR 102:** Engineering Freshman Academy

**ISE 460:** Engineering Economy

ENGINEERING ELECTIVES

### SPECIAL NOTES

Courses with the AP/IB may be satisfied with AP, IB or A-Level exams. See page 17 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 215, 225, AND 309:** Minimum grade of "C" is required.

**ENGINEERING ELECTIVES:** Choose one course from each block: [ISE 460] and [AME 310 or EE 202L or EE 326L].

## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>WRIT 150</b> 4	<b>MATH 126 (GE F)</b> MATH 125 4	<b>CE 110</b> 2	<b>ENGR 102</b> 2	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 105aL (GE E)</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or 129 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>CE 108</b> 2	
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## SECOND YEAR

### FALL SEMESTER

<b>ENE 215</b> 4	<b>CHEM 105bL</b> CHEM 105aL 4	<b>MATH 245</b> MATH 226 or MATH 229 4	<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>CE 119</b> CE 108, (MATH 226) 2	
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### SPRING SEMESTER

<b>CHEM 322aL</b> CHEM 105bL 4	<b>ENE 200</b> CHEM 105b, PHYS 152, MATH 226 4	<b>ENE 410</b> MATH 245 3	<b>BISC 220L (GE D)</b> 4	<b>OPTIONAL ELECTIVE</b> 3	
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## THIRD YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>CE 408</b> MATH 245 2	<b>GEC</b> 4	<b>WRIT 340</b> WRIT 150 3	<b>ISE 460</b> 3	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>ENE 428</b> MATH 245, PHYS 151, CHEM 105b 4	<b>ENE 300</b> ENE 410 4	<b>CE 451</b> ENE 410 4	<b>CE 363L</b> ENE 200, CHEM 105b 4	<b>CE 402</b> CE 108, MATH 245 2	
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## FOURTH YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>CHE 330</b> (MATH 226) 4	<b>CE 410L</b> BISC 220, CHEM 105b 4	<b>ENE 400</b> ENE 215 4	<b>OPTIONAL ELECTIVE</b> 2	
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### SPRING SEMESTER

<b>SSCI 382L</b> 4	<b>CE 480</b> 4	<b>CE 485</b> CE 363 4	<b>ENE 426</b> ENE 200 4	<b>OPTIONAL ELECTIVE</b> 2	
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### MATHEMATICS (12 UNITS)

**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  
**SSCI 382L:** Principles of Geographic Information 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)

**CE 108:** Intro. to CE Computer Methods  
**CE 110:** Intro. to Environmental Engineering  
**CE 119:** Probability Concepts and Civil Engineering  
**CE 363L:** Water Chemistry and Analysis  
**CE 408:** Risk & Decision Analysis in Civil Engr.  
**CE 410L:** Introduction to Environmental Engineering Microbiology  
**CE 451:** Water Resources Engineering  
**CE 484:** Water Treatment Design  
**CE 480:** Civil & Environmental Engr. Capstone Design  
**CE 485:** Wastewater Treatment Design  
**CHE 330:** Chemical Engr. Thermodynamics  
**ENE 200:** Environmental Engr. Principles  
**ENE 215:** Energy Systems and Environmental Tradeoffs  
**ENE 300:** Contaminant Transport in the Environment  
**ENE 400:** Quantitative Sustainability  
**ENE 410:** Environmental Fluid Mechanics  
**ENE 426:** Particulate Air Pollutants: Properties/ Behavior/ Measurement

**ENE 428:** Air Pollution Fundamentals  
**ENGR 102:** Engineering Freshman Academy  
**ISE 460:** Engineering Economy

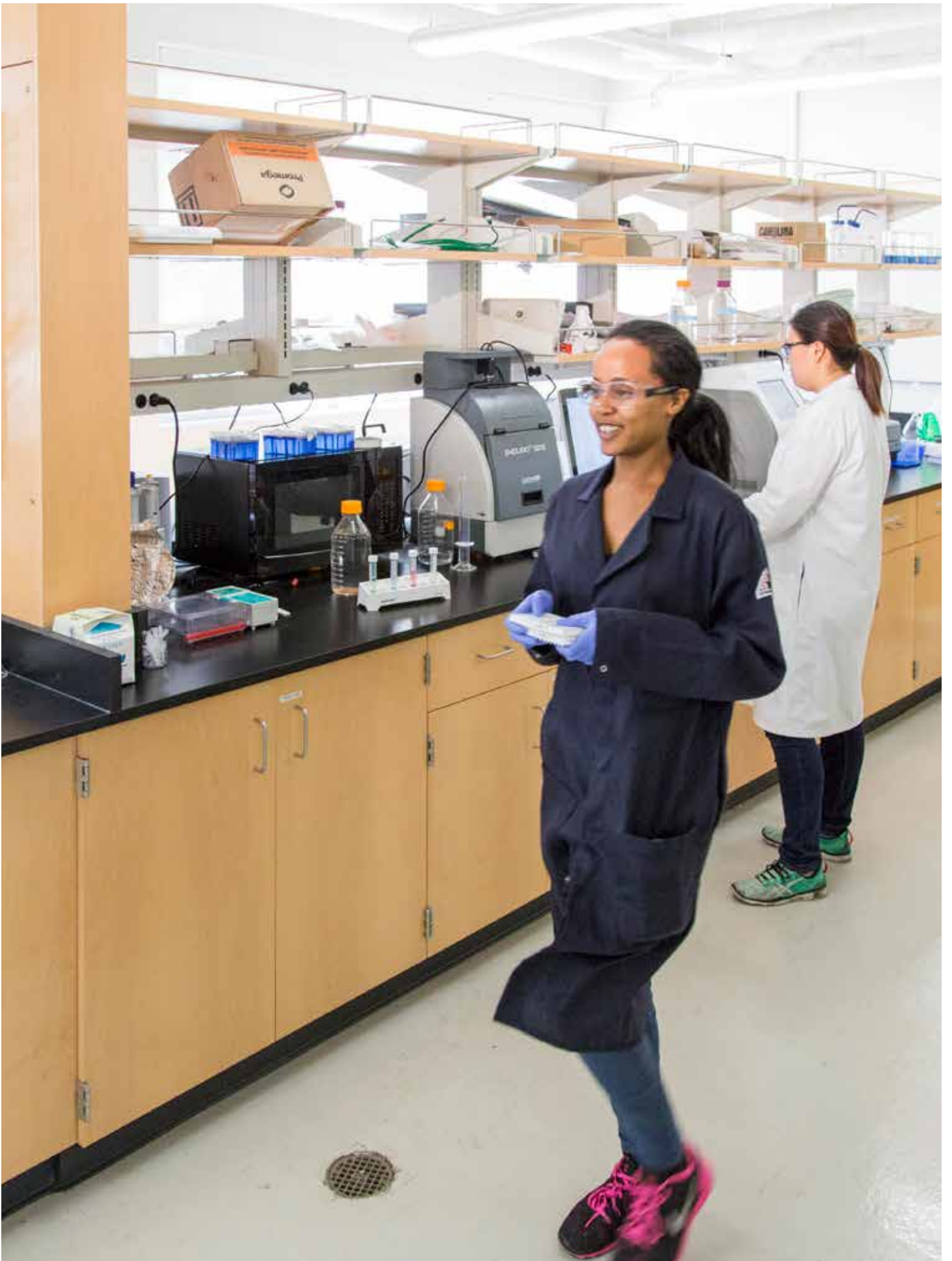
### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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 410:** Minimum grade of "C" is required.



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, DATA SCIENCE, ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, AND ROBOTICS.

### EMPHASES & OPTIONS





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, and algorithm design - together with creative and artistic training from the School of Cinematic Arts and the Roski School of Fine Arts and Design. 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 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 design solutions to problems arising in complex domains such as atomic reactors, guidance systems and manufacturing systems. These students graduate ready to design and build complex systems of hardware, software and networks.

### MAJORS & AREAS OF EMPHASIS

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

### RESEARCH HIGHLIGHTS

Artificial Intelligence, Machine Learning And Deep Learning, 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










### LEARN MORE:

-  [viterbi.usc.edu/cs](http://viterbi.usc.edu/cs)

### COMPANIES HIRING YOU

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
-  Launch high tech entrepreneurial projects and ventures
-  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
-  Invent intelligent robots
-  Develop advanced data analytics





## FIRST YEAR

### FALL SEMESTER

<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b>  4	<b>CSCI 103L</b> (CSCI 109) 4	<b>CSCI 109</b> 2	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>MATH 129 or MATH 126</b>  MATH 125 4	<b>CSCI 104</b> CSCI 103L, (CSCI 170) 4	<b>CSCI 170</b> CSCI 103L, 109 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>EE 109L</b> (CSCI 103) 4	<b>CSCI 270</b> CSCI 104L, 170 4	<b>CSCI 201L</b> CSCI 104L 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>CSCI 310</b> CSCI 201 4	<b>MATH 229 or MATH 226</b> MATH 129 or MATH 126 4	<b>WRIT 340</b> 3	<b>CSCI 356</b> CSCI 104L 4	<b>OPTIONAL ELECTIVE</b> 3
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## THIRD YEAR

### FALL SEMESTER

<b>GE A</b>  4	<b>MATH 225</b> MATH 126 or MATH 129 4	<b>CSCI 350</b> CSCI 201L and CSCI 356 or EE 354 4	<b>CSCI 360</b> CSCI 104L, CSCI 170 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>BASIC SCIENCE (GE D or E)</b>  4	<b>TECH. ELECTIVE I</b> 3	<b>TECH. ELECTIVE II</b> 3	<b>EE 364</b> MATH 225 or 245 or <b>MATH 407</b> MATH 226 4	<b>GE B</b> 4
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## FOURTH YEAR

### FALL SEMESTER

<b>BASIC SCIENCE II</b>  4	<b>TECH. ELECTIVE III</b> 4	<b>CSCI 401</b> CSCI 270, CSCI 310 or <b>CSCI 404</b> CSCI 201, CSCI 270, THP 480 4	<b>GE C</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE D or E</b>  4	<b>TECH. ELECTIVE IV</b> 4	<b>REQUIRED ELECTIVE</b>  4	<b>REQUIRED ELECTIVE</b>  3	<b>OPTIONAL ELECTIVE</b> 3
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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 & Diff. Equations

### STATISTICS AND PROBABILITY (4 UNITS)

**EE 364:** Intro to Probability & Statistics  
 or **MATH 407:** Probability Theory

### 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 (62 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 201L:** Princ. of Software Development  
**CSCI 270:** Intro. to Algorithms & Theory of Computing  
**CSCI 310L:** Intro. to Software Engineering  
**CSCI 350L:** Introduction to Operating Systems  
**CSCI 356:** Introduction to Computer Systems  
**CSCI 360L:** Introduction to Artificial Intelligence  
**CSCI 401:** Capstone: Design and Construction of Large Software Systems  
 or **CSCI 404:** Capstone: Creating Your High-Tech Startup  
**EE 109:** Introduction to Embedded Systems  
**ENGR 102:** Engineering Freshman Academy  
**TECHNICAL ELECTIVES**

### OTHER COURSES (7 UNITS)

**REQUIRED ELECTIVES**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

## FIRST YEAR

### FALL SEMESTER

<b>CSCI 109</b> 2	<b>CSCI 103L</b> (CSCI 109) 4	<b>CTIN 488</b> 4	<b>CTIN 190</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>CSCI 170</b> CSCI 103L, 109 4	<b>CSCI 104L</b> CSCI 103L, (CSCI 170) 4	<b>MATH 125 (GE F)</b>  4	<b>GE B</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER


<b>CSCI 201L</b> CSCI 104L 4	<b>MATH 129 or MATH 126</b>  MATH 125 4	<b>ITP 380</b> CSCI 104L 4	<b>WRIT 150</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>CSCI 270</b> CSCI 104L, 170 4	<b>CSCI 281</b> 4	<b>PHYS 151L (GE E)</b>  MATH 125 or 126 or 226 4	<b>CTIN 484L</b> CTIN 488 (CTIN 489) 2	<b>CTIN 489</b> CTIN 488 (CTIN 484L) 2	<b>OPTIONAL ELECTIVE</b> 2
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## THIRD YEAR

### FALL SEMESTER

<b>CSCI 353</b> CSCI 201L 4	<b>CSCI 356</b> CSCI 104L 4	<b>MATH 225 or EE 141L</b> MATH 126 or MATH 129 4	<b>GE D</b>  4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>CSCI 350L</b> CSCI 201L, CSCI 356 4	<b>CSCI 420</b> CSCI 104, MATH 225 or EE 141 and MATH 126/127/129 4	<b>GE C</b> 4	<b>ITP 485</b> ITP 380 4	<b>OPTIONAL ELECTIVE</b> 2
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## FOURTH YEAR

### FALL SEMESTER

<b>CSCI 491aL</b> 4	<b>CSCI 360</b> CSCI 104L, 170 4	<b>GE A</b>  4	<b>GE C</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>CSCI 491bL</b> 2	<b>WRIT 340</b> WRIT 150 3	<b>GE B</b> 4	<b>CSCI 423 or CSCI 426</b> ITP 380 4	<b>CTAN 452</b> 2	<b>REQUIRED ELECTIVE</b> 1
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### MATHEMATICS (12 UNITS)

**MATH 125:** Calculus I

**MATH 126 OR 129:** Calculus II

**MATH 225:** Linear Algebra & Diff. Equations

or **EE 141L:** Applied Linear Algebra for Engineering

### 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 201L:** Princ. of Software Development

**CSCI 270:** Intro. to Algorithms & Theory of Computing

**CSCI 350:** Introduction to Operating Systems

**CSCI 353:** Introduction to Internetworking

**CSCI 356:** Intro. to Computer Systems

**CSCI 360:** Intro. to Artificial Intelligence

**CSCI 420:** Computer Graphics

**CSCI 491AL:** Final Game Project

**CSCI 491BL:** Final Game Project

**ENGR 102:** Engineering Freshman Academy

### GAMES DEVELOPMENT (30 UNITS OUT OF 34)

**CSCI 281:** Pipelines for Games & Interactives

**CSCI 423:** Native Console Multiplayer Game Development

**CSCI 426:** Game Prototyping

**CTIN 190:** Intro to Interactive Entertainment

**CTIN 484L:** Intermediate Game Development

**CTIN 488:** Game Design Workshop

**CTIN 489:** Intermediate Game Design Workshop

**CTAN 452:** Intro to Computer Animation

**ITP 380:** Video Game Programming

**ITP 485:** Programming Game Engines

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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: CSCI 353 before CSCI 423


ITP 485 before CSCI 423, 426

## FIRST YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>MATH 125 (GE F)</b>  4	<b>WRIT 150</b> 4	<b>BUAD 304</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>CSCI 103L</b> (CSCI 109) 4	<b>MATH 126 or 129</b>  MATH 125 4	<b>ECON 351</b> MATH 125 or 126 or 226 4	<b>GE C</b> 4	<b>CSCI 109</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>CSCI 170</b> CSCI 103L, 109 4	<b>MATH 225</b> MATH 126 or MATH 125 or <b>EE 141L</b> 4	<b>ECON 352</b> (ECON 351) 4	<b>CSCI 104L</b> CSCI 103L, (CSCI 170) 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>BASIC SCIENCE (GE D or E)</b>  4	<b>CSCI 201L</b> CSCI 104L 4	<b>CSCI 270</b> CSCI 104L, 170 4	<b>ACCT 410x</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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## THIRD YEAR

### FALL SEMESTER

<b>BUAD 310 or EE 364</b> MATH 225 or <b>MATH 407</b> MATH 226 4	<b>BUAD 302</b> 4	<b>GE A</b>  4	<b>BUAD 307</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER


<b>CSCI ELECTIVE</b> 4	<b>CSCI 310L</b> CSCI 201L 4	<b>GE C</b> 4	<b>BUAD 306</b> ACCT 410x, ECON 351, (ECON 352, BUAD 310 or EE 364) 4	<b>OPTIONAL ELECTIVE</b> 2
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## FOURTH YEAR

### FALL SEMESTER

<b>WRIT 340</b> WRIT 150 3	<b>BUAD ELECTIVE</b> 4	<b>CSCI 401</b> CSCI 270, CSCI 310 or <b>CSCI 404</b> CSCI 201, CSCI 270, THP 480 4	<b>BUAD 311</b> BUAD 310 or EE 364 or MATH 407 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE E or D</b>  4	<b>GE B</b> 4	<b>BUAD 497</b> ACCT 410 or BUAD 302, 304, 306, and 307 (BUAD 311) 4	<b>CSCI/BUAD ELECTIVE</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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### MATHEMATICS (12 UNITS)

**MATH 125:** Calculus I

**MATH 126 OR MATH 129:** Calculus II

**MATH 225:** Linear Algebra & Diff. Equations

or **EE 141:** Applied Linear Algebra for Engineering

### STATISTICS AND PROBABILITY (4 UNITS)

**BUAD 310:** Applied Business Statistics or

or **EE 364:** Intro to Probability & Statistics

or **MATH 407:** Probability Theory

### SCIENCE COURSES (4 UNITS)

**BASIC SCIENCE:** 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 (1 Course)\*

### 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:** Operations Management

**BUAD 497:** Strategic Management

**ECON 351:** Microeconomics for Business

**ECON 352:** Macroeconomics for Business

### 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 270:** Intro. to Algorithms & Theory of Comp.

**CSCI 310L:** Intro. to Software Engineering

**CSCI 401:** Capstone: Design & Construction of Large Software Systems

or **404:** Capstone: Creating Your High-Tech Startup

**ENGR 102:** Engineering Freshman Academy

**CSCI/BUAD ELECTIVES (9-12 UNITS)**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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:** See advisor for current list. Students must take one course from the Computer Science listings, one from the Business listings, and a third course from either one.



## FIRST YEAR

### FALL SEMESTER

<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b>  4	<b>EE 109L</b> 4	<b>CSCI 103 (EE 109)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>MATH 126 or MATH 129</b>  MATH 125 4	<b>CSCI 104L</b> CSCI 103L, (CSCI 170) 4	<b>CSCI 170</b> CSCI 103L, 109 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>CSCI 201L</b> CSCI 104 4	<b>EE 250</b> EE 109 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER


<b>GE C</b> 4	<b>MATH 225</b> MATH 126 or MATH 129 4	<b>CSCI 270</b> CSCI 104L, 170 4	<b>EE 354L</b> EE 109 4	<b>OPTIONAL ELECTIVE</b> 2
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## THIRD YEAR

### FALL SEMESTER

<b>GE A</b>  4	<b>EE 364</b> MATH 225 or 245 or <b>MATH 407</b> MATH 226 4	<b>WRIT 340</b> WRIT 150 3	<b>EE 457</b> EE 354 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE B</b> 4	<b>TECH. ELECTIVE I</b> 4	<b>CSCI 350</b> CSCI 201, EE 354, or CSCI 356 4	<b>GED</b>  4	<b>OPTIONAL ELECTIVE</b> 2
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## FOURTH YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>TECH. ELECTIVE II</b> 4	<b>CSCI 353</b> CSCI 201 4	<b>EE 451L</b> CSCI 201 or <b>EE 454L</b> EE 354 or <b>EE 477L</b> EE 354 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>EE 451L</b> CSCI 201 or <b>EE 454L</b> EE 354 or <b>EE 477L</b> EE 354 4	<b>GE C</b> 4	<b>CSCI 401</b> CSCI 270, 310 or <b>CSCI 404</b> CSCI 201, 270, IIP 461 or <b>EE 459</b> EE 354 3-4	<b>REQUIRED ELECTIVE</b> 3-4	
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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 & Diff. Equations  
 Statistics and Probability (4 units)  
**EE 364:** Intro to Probability & Statistics  
 or **MATH 407:** Probability Theory

### PHYSICS (8 UNITS)

**PHYS 151L:** Mechanics and Thermodynamics  
**PHYS 152L:** Electricity and Magnetism  
 or **PHYS 161:** Advanced Principles of Physics I  
**PHYS 162:** Advanced Principles of Physics II  
 or **PHYS 171:** Applied Physics I: Mechanics  
**PHYS 172:** Applied Physics II: Electricity, Magnetism  
 and Optics

### 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** Quantative 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 (65-66 UNITS)

**CSCI 103L:** Introduction to Programming  
**CSCI 104L:** Data Structures & Object Oriented Design  
**CSCI 170:** Discrete Methods in Comp. Science  
**CSCI 201L:** Princ. of Software Development  
**CSCI 270:** Intro. to Algorithms & Theory of Computing  
**CSCI 350:** Introduction to Operating Systems  
**CSCI 353:** Introduction to Internetworking  
**CSCI 401:** Capstone: Design of Large Software Systems  
 or **404:** Capstone: Creating Your High-Tech Startup  
 or **EE 459L:** Embedded Systems Design Laboratory  
**EE 109:** Introduction to Embedded Systems  
**EE 250:** Distributed Systems for the Internet of Things  
**EE 354L:** Introduction to Digital Circuits  
**EE 457:** Computer Systems Organization  
**TWO OF THE FOLLOWING COURSES:**  
**EE 451:** Parallel and Distributed Computation  
 or **EE 454L:** Intro. to Sys. Using Microprocessors  
 or **EE 477L:** MOS VLSI Circuit Design  
**ENGR 102:** Engineering Freshman Academy

### TECHNICAL ELECTIVES (8 UNITS)

### FREE ELECTIVES (3-4 UNITS)

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

**SENIOR DESIGN PROJECT:** CSCI 401 or EE 459L.

**TECHNICAL ELECTIVES:** See approved tech elective list on CS webpage.

## FIRST YEAR

### FALL SEMESTER

<b>WRIT 150</b> 4	<b>MATH 125 (GE F)</b>  4	<b>EE 109L</b> 4	<b>CSCI 103 (EE 109)</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>MATH 126 or MATH 129</b>  MATH 125 4	<b>CSCI 104L</b> CSCI 103L, (CSCI 170) 4	<b>CSCI 170</b> CSCI 103L, 109 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER


<b>PHYS 152L</b> PHYS 151L, (MATH 226) 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>CSCI 270</b> CSCI 104L, 170 4	<b>EE 250</b> EE 109 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE C</b> 4	<b>MATH 225</b> MATH 126 or MATH 129 4	<b>EE 202L</b> PHYS 152 (MATH 245) 4	<b>EE 354L</b> EE 109 4	<b>OPTIONAL ELECTIVE</b> 2
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## THIRD YEAR

### FALL SEMESTER

<b>GE A</b>  4	<b>EE 364</b> MATH 225 or 245 or <b>MATH 407</b> MATH 226 4	<b>EE 301</b> EE 202 4	<b>EE 457</b> EE 354 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>TECH. ELECTIVE I</b> 4	<b>CSCI 350</b> CSCI 201, EE 354, or CSCI 356 4	<b>WRIT 340</b> WRIT 150 3	<b>REQUIRED ELECTIVE</b> 3
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## FOURTH YEAR

### FALL SEMESTER

<b>GE B</b> 4	<b>TECH. ELECTIVE II</b> 4	<b>CSCI 353</b> CSCI 201 4	<b>EE 453</b> EE 250 4	<b>REQUIRED ELECTIVE</b> 2
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### SPRING SEMESTER

<b>CSCI 430</b> CSCI 201 4	<b>GE C</b> 4	<b>EE 459</b> EE 354 3	<b>GE D</b>  4	<b>REQUIRED ELECTIVE</b> 3
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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 & Diff. Equations

### STATISTICS AND PROBABILITY (4 UNITS)

**EE 364:** Intro to Probability & Statistics  
or **MATH 407:** Probability Theory

### PHYSICS (8 UNITS)

**PHYS 151L:** Mechanics and Thermodynamics  
**PHYS 152L:** Electricity and Magnetism or  
**PHYS 161:** Advanced Principles of Physics I  
**PHYS 162:** Advanced Principles of Physics II or  
**PHYS 171:** Applied Physics I: Mechanics  
**PHYS 172:** Applied Physics II: Electricity, Magnetism and Optics

### 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 (65-66 UNITS)

**CSCI 103L:** Introduction to Programming  
**CSCI 104L:** Data Structures & Object Oriented Design  
**CSCI 170:** Discrete Methods in Comp. Science  
**CSCI 270:** Intro. to Algorithms & Theory of Computing  
**CSCI 430:** Introduction to Computer and Network Security  
**EE 109:** Introduction to Embedded Systems  
**EE 202:** Linear Circuits  
**EE 250:** Distributed Systems for the Internet of Things  
**EE 301:** Linear Systems  
**EE 354L:** Introduction to Digital Circuits  
**EE 453:** Computing Platforms & Paradigms  
**EE 457:** Computer Systems Organization  
**EE 459:** Embedded Systems Design Laboratory  
**ENGR 102:** Engineering Freshman Academy  
**TECHNICAL ELECTIVES (8 UNITS)**  
**FREE ELECTIVES (8 UNITS)**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

**SENIOR DESIGN PROJECT:** EE 459L.

**TECHNICAL ELECTIVES:** See approved tech elective list on CS webpage.

*ELECTRICAL AND COMPUTER ENGINEERS ARE INVENTING THE TECHNOLOGY THAT POWERS THE MODERN WORLD - FROM COMPUTING AND MOBILE COMMUNICATIONS PLATFORMS THROUGH BIOMEDICAL DEVICES AND SOLAR ENERGY CONVERSION. OUR GRADUATES ARE A DIVERSE GROUP OF ENGINEERS WHO DESIGN HARDWARE FROM NANODEVICES THROUGH EMBEDDED COMPUTING SYSTEMS AND DEVELOP INNOVATIVE APPROACHES TO IMAGING, COMMUNICATIONS, CONTROL AND NETWORK DESIGN PROBLEMS, AND MUCH MORE.*


Electrical and Computer Engineers are a vital part of every industry, from biomedical engineering and health applications to telecommunications, aerospace, and information technology.

### AREAS OF SPECIALIZATION

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, electronics, computer programming, embedded systems and the internet of things, as well as core courses in math and physics. Students then choose courses that pertain to their chosen area of specialization. Circuits, Signals, and Systems covers areas in signal processing, media and audio systems, wireless communications, adaptive control, and mixed-signal integrated circuits. Computer Engineering contains courses that focus on digital hardware, embedded systems, and VLSI design. Courses in the Energy and Electrical Sciences area cover nanoelectronics, integrated-circuit technology, energy sources and management, mixed-signal integrated circuits, and communications hardware.

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.”

### MAJORS & AREAS OF SPECIALIZATION

-  Electrical & Computer Engineering (Areas: Circuits, Systems, And Signals, Computer Engineering, Energy & Electrical Sciences)

### RESEARCH HIGHLIGHTS

Nanoelectronics And Nanobiology, Photonics And Integrated Optics, Neuromorphic Computing, Mixed Analog And Digital Circuits, Brain Computer Interfaces, Mobile Networks, Internet-Of-Things, Computer Architecture And Parallel Processing, Computer Vision, Machine Learning, Laser Interactions With Materials, Biomedical Imaging, Network Security, Plasma Science And Technology, Quantum Information Processing, Behavioral Signal Processing, Robust Adaptive Learning And Control, Sensor Networks.

### LEARN MORE:

-  [viterbi.usc.edu/ee](http://viterbi.usc.edu/ee)

### FACILITIES

The department’s instructional laboratories have been integrated into “studio” learning environments that combine traditional lectures with hands-on activities so that students learn by doing, not just listening. State-of-the-art instrumentation and computers support classes involving analog and digital electronics, microprocessor systems, and radio-frequency communications. Undergraduate students also engage in research with faculty in leading laboratories as well as regional and national research centers, including the Center for Energy Informatics (CEI), Center for Cyber-Physical Systems and the Internet of Things (CCI) Center for Advanced Software Technologies (CAST), Southern California Center for Advanced Transportation Technologies (SC-CATT), and Center for Quantum Information Science and Technology (CQIST).

### RESEARCH

Research in the Ming Hsieh Department of Electrical and Computer Engineering is revolutionizing nanoelectronics, 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.





### COMPANIES HIRING YOU

3Com Corporation, Accenture, Apple, BAE Systems, The Boeing Co., CapGemini, Disney, Edwards Lifesciences, Garmin, General Electric, Google, HP, IBM, Intel Corporation, Microsoft, Northrop Grumman, Nvidia, Qualcomm, Raytheon, SpaceX, Teradata, Teradyne, TI, 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

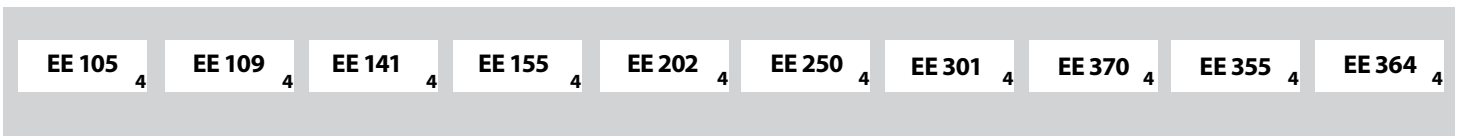
*Electrical Engineering provides a broad curriculum that covers topics from a variety of areas. Through the Core Curriculum taken during the first two years, students will gain exposure to broader topics and the areas of specialization. Within an area of specialization, students will choose Entry-Level 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.



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



## FIRST YEAR

### FALL SEMESTER

<b>EE 141</b> 4	<b>EE 155</b> 4	<b>EE 105</b> (MATH 125) 3	<b>WRIT 150</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>MATH 129</b> MATH 125 4	<b>PHYS 171L</b> (GE E) MATH 129 4	<b>EE 109</b> EE 155 4	<b>GE A</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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## SECOND YEAR

### FALL SEMESTER

<b>MATH 229</b> MATH 129 4	<b>PHYS 172L</b> PHYS 171L, (MATH 2269) 4	<b>EE 250L</b> EE 109L 4	<b>GE B</b> 4	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>MATH 245</b> MATH 229 4	<b>EE 370</b> PHYS 172L or PHYS 162L 4	<b>EE 202L</b> PHYS 171 4	<b>GE C</b> 4	<b>OPTIONAL ELECTIVE</b> 3
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## THIRD YEAR

### FALL SEMESTER

<b>EE 364</b> MATH 245 4	<b>PHYS 173L</b> PHYS 172L 4	<b>EE 301L</b> EE 202L 4	<b>WRIT 340</b> WRIT 150 3	<b>OPTIONAL ELECTIVE</b>
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### SPRING SEMESTER

<b>EE ELECTIVE</b> 3-4	<b>EE 355</b> EE 155 4	<b>EE ELECTIVE</b> 3-4	<b>GE D LIFE SCIENCES</b> 4	<b>OPTIONAL ELECTIVE</b> 2-4
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## FOURTH YEAR

### FALL SEMESTER

<b>EE ELECTIVE</b> 3-4	<b>GE B</b> 4	<b>REQUIRED ELECTIVE</b> 4	<b>REQUIRED ELECTIVE</b> 4	<b>OPTIONAL ELECTIVE</b> 2-3
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### SPRING SEMESTER

<b>CAPSTONE DESIGN ELECTIVE</b> 4	<b>GE C</b> 4	<b>REQUIRED ELECTIVE</b> 4	<b>REQUIRED ELECTIVE</b> 3	<b>OPTIONAL ELECTIVE</b> 2
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### MATHEMATICS (12 UNITS)

**EE 141:** Applied Linear Algebra for Engineering

**MATH 129:** Calculus II

**MATH 229:** Calculus III

**MATH 245:** Mathematics of Phys. and Engr. I

### PHYSICS (12 UNITS)

**PHYS 171:** Applied Physics I: Mechanics

**PHYS 172L:** Applied Physics II: Electricity, Magnetism and Optics

**PHYS 173L:** Applied Physics III: Topics in Modern Physics

### BIOLOGICAL SCIENCE (4 UNITS)

**ANY GE D WILL SATISFY THIS REQUIREMENT.**

### 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 (56 UNITS)

**EE 105:** Intro. to Electrical Engineering

**EE 109:** Intro. to Embedded Systems

**EE 155:** Intro. to Comp. Programming for EE

**EE 202L:** Linear Circuits

**EE 250L:** Distributed Systems for the Internet of Things

**EE 301L:** Linear Systems

**EE 370:** Electromagnetics for Engineering Systems

**EE 355:** Software Design for Engineers

**EE 364:** Intro to Probability & Statistics

**ENGR 102:** Engineering Freshman Academy

**EE ELECTIVES**

**CAPSTONE DESIGN ELECTIVE**

### OTHER COURSES (15 UNITS)

**REQUIRED ELECTIVES**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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, including the Capstone Design Elective. Refer to the diagram on the facing page.

**CAPSTONE:** Take one Capstone Course. Refer to the diagram on the facing page.

*INDUSTRIAL & SYSTEMS ENGINEERS (ISE) WORK TO IMPROVE PROCESSES, SYSTEMS, AND ORGANIZATIONS. AN INDUSTRIAL AND SYSTEMS ENGINEERING EDUCATION PROVIDES THE SKILLS AND FOUNDATIONS TO DESIGN, ANALYZE, AND, OPTIMIZE COMPLEX SYSTEMS. THEY ARE PRODUCTIVITY CATALYSTS, MANAGING 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.

### MAJORS & AREAS OF EMPHASIS

-  Industrial & Systems Engineering
-  Industrial & Systems Engineering (Information Systems)

### RESEARCH HIGHLIGHTS

Data-Driven Decision Making Under Uncertainty, Health Systems Improvement, Supply Chain Management, Transportation And Logistics, Large Scale Optimization, Stochastic Programming, Computer-Aided Design, 3D Printing, Risk Analysis, Information Theory, Financial Engineering, Health Informatics, And Human-Computer Interaction.










### LEARN MORE:

 [viterbi.usc.edu/epstein](http://viterbi.usc.edu/epstein)

### COMPANIES HIRING YOU

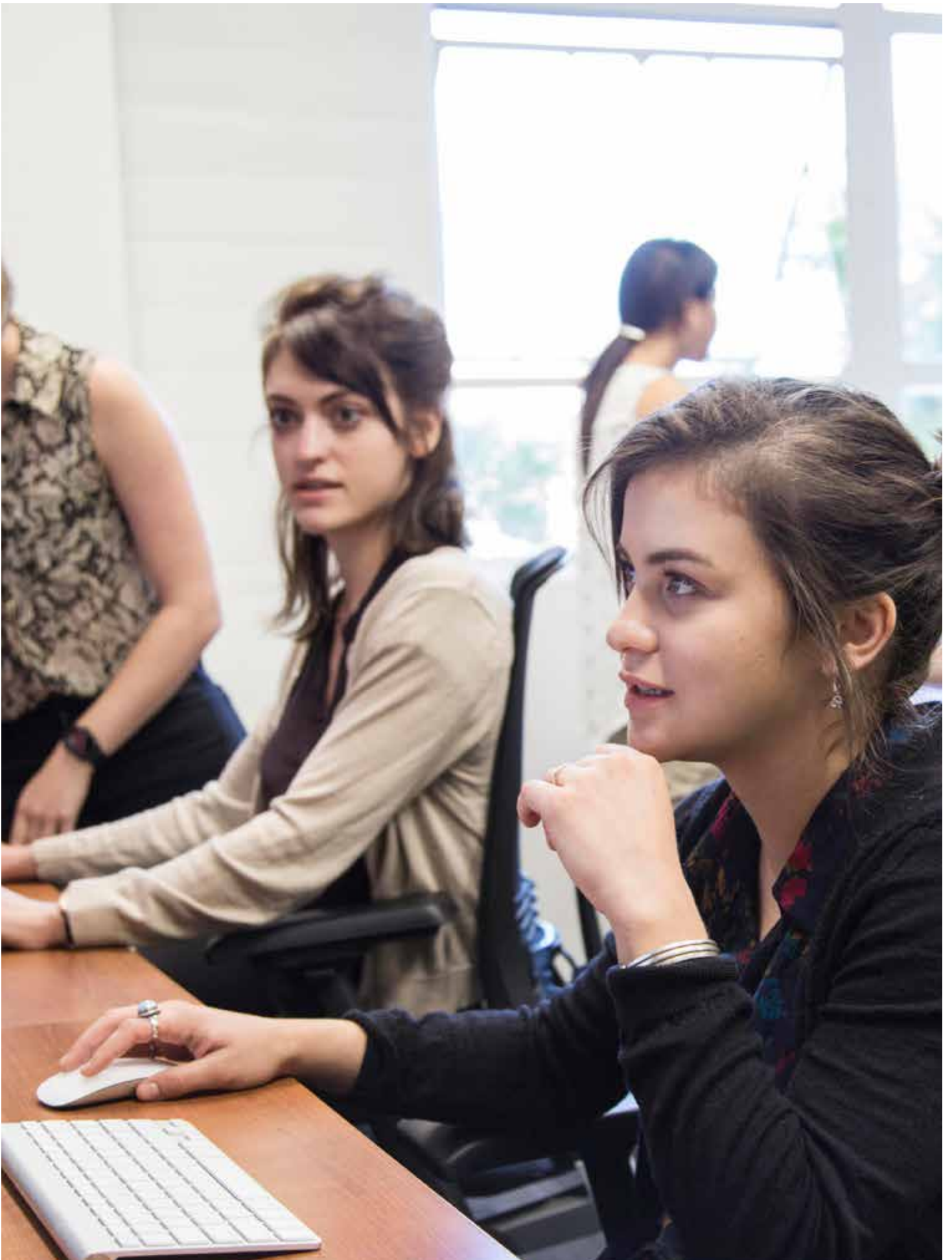
Accenture, Amazon, Boeing, Capgemini, Cisco Systems, Ernst & Young, The Disneyland Resort, Honeywell, Kaiser Permanente, KPMG, Microsoft, Northrop Grumman, Oracle, Pandora Media, PepsiCo, PriceWaterhouse Coopers, Protiviti, SpaceX, Uber, United Airlines... And many more!

### 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

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.



## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>ISE 105</b> 2	<b>MATH 125 (GE F)</b> 4	<b>WRIT 150</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 105aL or MASC 110L</b> 4	<b>MATH 126 or MATH 129</b> MATH 125 4	<b>ISE 150</b> 3	<b>OPTIONAL ELECTIVE</b> 3
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## SECOND YEAR

### FALL SEMESTER

<b>ISE 220</b> MATH 126 3	<b>ITP 320</b> 4	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE C</b> 4	<b>ISE 225</b> ISE 220 3	<b>ISE 331</b> ISE 220 3	<b>ISE 460</b> 3	<b>MATH 225</b> MATH 126 or MATH 129 4	<b>OPTIONAL ELECTIVE</b> 1
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## THIRD YEAR

### FALL SEMESTER

<b>ISE 330</b> MATH 225 3	<b>ISE 435</b> ISE 150 and ISE 225 3	<b>DSO 435</b> 4	<b>PHYS 152L</b> PHYS 151L 4	<b>APPROVED ENGINEERING ELECTIVE</b> 3-4
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### SPRING SEMESTER

<b>GE B</b> 4	<b>ISE 315L</b> ISE 225 and ISE 330 3	<b>ISE 470</b> 3	<b>ISE 495ax</b> ISE 225, ISE 460 and DSO 435 or ISE 382 2	<b>APPROVED ENGINEERING ELECTIVE</b> 3-4	<b>OPTIONAL ELECTIVE</b> 2
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## FOURTH YEAR

### FALL SEMESTER

<b>ISE 410</b> ISE 330 3	<b>ISE 495bx</b> ISE 315, ISE 435, ISE 495a and ISE 370 or ISE 470 2	<b>WRIT 340</b> WRIT 150 3	<b>INFO SYSTEMS OR APPROVED ENG ELECTIVE</b> 3-4	<b>INFO SYSTEMS ELECTIVE</b> 3-4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>BIOLOGY ELECTIVE (GE D)</b> 4	<b>GE C</b> 4	<b>ISE 440</b> 3	<b>INFO SYSTEMS ELECTIVE</b> 3-4	<b>INFO SYSTEMS ELECTIVE</b> 3-4	<b>OPTIONAL ELECTIVE</b> 1
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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 (16 UNITS)

**CHEM 105AL:** General Chemistry  
or **MASC 110L:** Materials Science  
**PHYS 151L:** Mechanics and Thermodynamics  
**PHYS 152L:** Electricity and Magnetism  
**BIOLOGY ELECTIVE**

### 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)

**DSO 435:** Enterprise Data Architecture  
**ENGR 102:** Engineering Freshman Academy  
**ISE 105:** Intro. to Industrial Engineering  
**ISE 150:** Solving Engr. Problems via Computer Programming  
**ISE 220:** Probability Concepts in Engr.  
**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  
**ISE 495B:** Senior Design Project  
**ITP 320:** Enterprise information Systems  
**APPROVED ENGINEERING ELECTIVES**  
**INFO SYSTEMS ELECTIVES**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

**BIOLOGY ELECTIVE:** Select one among BISC 103, BISC 104, BISC 230, or HBIO 205

**APPROVED ENGINEERING ELECTIVES:** See Advisor for current, approved list.

**INFO SYSTEMS ELECTIVES:** 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 of additional, approved coursework. A current approved class list is available from your advisor.

Please note some courses can fulfill both the Approved Engineering Electives and Info Systems Electives requirements. Discuss options with your advisor.

## FIRST YEAR

### FALL SEMESTER

<b>GE A</b> 4	<b>ISE 105</b> 2	<b>MATH 125 (GE F)</b> 4	<b>WRIT 150</b> 4	<b>ENGR 102</b> 2
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### SPRING SEMESTER

<b>GE B</b> 4	<b>CHEM 105aL or MASC 110L</b> 4	<b>MATH 126 or MATH 129</b> 4	<b>ISE 150</b> 3	<b>OPTIONAL ELECTIVE</b> 3
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## SECOND YEAR

### FALL SEMESTER

<b>GE C</b> 4	<b>ISE 220</b> MATH 126 3	<b>MATH 226 or MATH 229</b> MATH 126 or MATH 129 4	<b>PHYS 151L (GE E)</b> MATH 125 or 126 or 226 4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>ISE 225</b> ISE 220 3	<b>ISE 331</b> ISE 220 3	<b>ISE 460</b> 3	<b>MATH 225</b> MATH 126 or MATH 129 4	<b>APPROVED ENGINEERING ELECTIVE</b> 3-4	<b>OPTIONAL ELECTIVE</b> 1
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## THIRD YEAR

### FALL SEMESTER

<b>ISE 330</b> MATH 225 3	<b>ISE 435</b> ISE 150 and ISE 225 3	<b>ISE 382</b> 4	<b>APPROVED ENGINEERING ELECTIVE</b> 3-4	<b>WRIT 340</b> WRIT 150 3	<b>OPTIONAL ELECTIVE</b> 2
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### SPRING SEMESTER

<b>BIOLOGY ELECTIVE (GE D)</b> 4	<b>ISE 315L</b> ISE 225, ISE 330 3	<b>ISE 335</b> ISE 330, ISE 460 3	<b>ISE 370L</b> 4	<b>ISE 495ax</b> ISE 225, ISE 460 and DSO 435 or ISE 382 2	<b>OPTIONAL ELECTIVE</b> 2
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## FOURTH YEAR

### FALL SEMESTER

<b>ISE 410</b> ISE 330 3	<b>ISE 495bx</b> ISE 315, ISE 435, ISE 495a and ISE 370 or ISE 470 2	<b>PHYS 152L</b> PHYS 151L, MATH 126 4	<b>ISE 375L</b> ISE 331, ISE 460 3	<b>OPERATIONS ELECTIVE</b> 3-4	<b>OPTIONAL ELECTIVE</b> 3
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### SPRING SEMESTER

<b>GE C</b> 4	<b>GE B</b> 4	<b>ISE 426</b> ISE 225 3	<b>ISE 440</b> 3	<b>APPROVED ENGINEERING ELECTIVE</b> 3-4
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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 **MASC 110L:** Materials Science
- PHYS 151L:** Mechanics and Thermodynamics
- PHYS 152L:** Electricity and Magnetism
- BIOLOGY ELECTIVE**

### 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 (58 UNITS)

- ENGR 102:** Engineering Freshman Academy
- ISE 105:** Intro. to Industrial Engineering
- ISE 150:** Solving Engr. Problems via Computer Programming
- ISE 220:** Probability Concepts in Engr.
- 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 335L:** Supply Chain Design
- ISE 370:** Human Factors in Work Design
- ISE 375L:** Facilities Design
- ISE 382:** Database Systems: Concept, Design and Implementation
- ISE 410:** Prod. Planning and Scheduling
- ISE 426:** Statistical Quality Control
- ISE 435:** Discrete Systems Simulation
- ISE 440:** Work, Technology and Organization
- ISE 460:** Engineering Economy
- ISE 495A:** Senior Design Project
- ISE 495B:** Senior Design Project
- OPERATIONS ELECTIVES**

### SPECIAL NOTES

Courses with the AP/IB symbol may be satisfied with AP, IB or A-Level exams. See page 17 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.

**APPROVED ENGINEERING ELECTIVES:** 9 units of coursework. See Advisor for current, approved list.

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

Please note some courses can fulfill both the Approved Engineering Electives and Info Systems Electives requirements. Discuss options with your advisor.

**BIOLOGY ELECTIVE:** Select one among BISC 103, BISC 104, BISC 230, or HBIO 205

# Get the Student Perspective

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