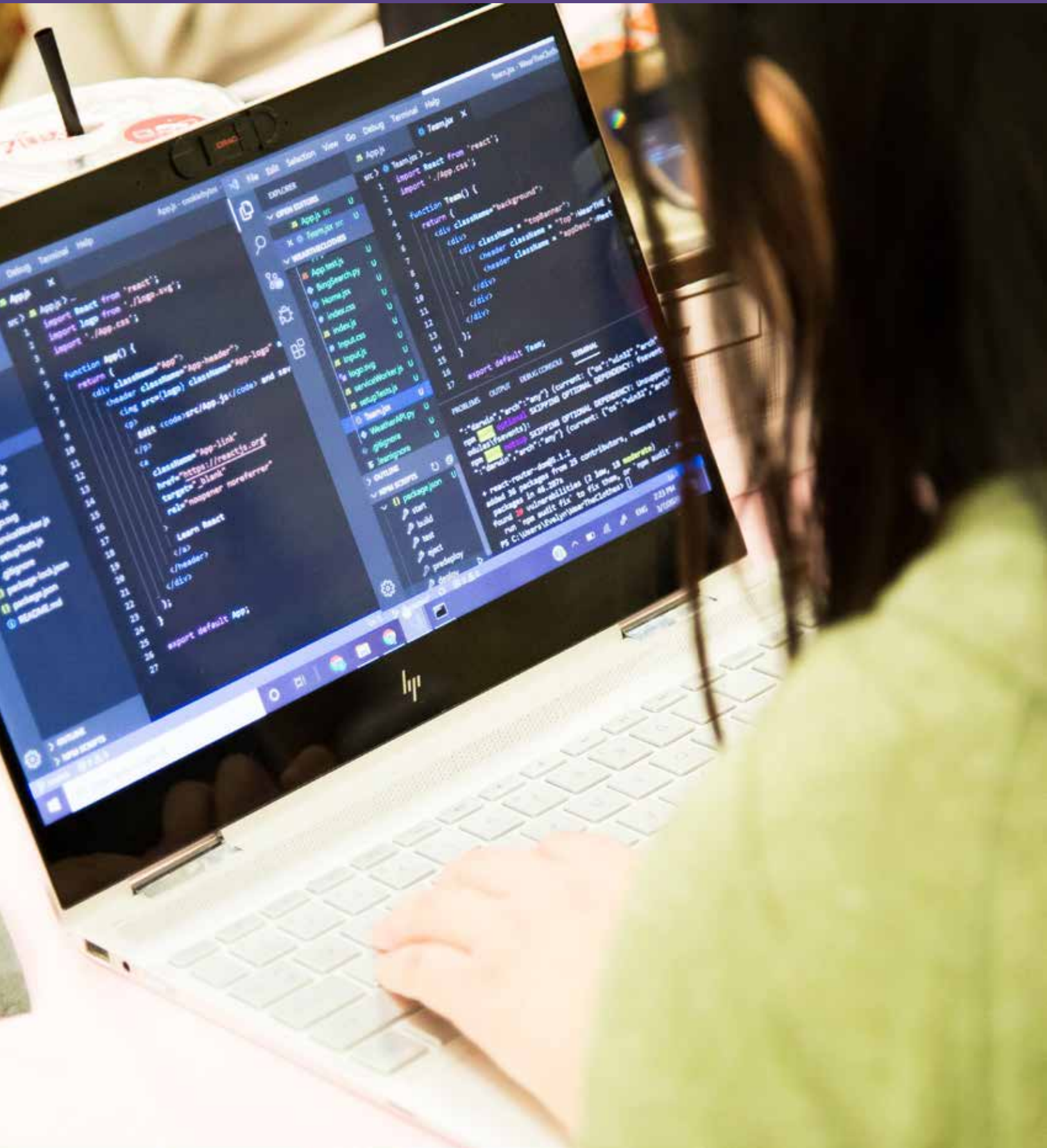


# Computer Science

IT'S MORE THAN JUST CODING



*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.*

## MAJORS & AREAS OF EMPHASIS

- ➔ Computer Science
- ➔ Computer Science (Games)
- ➔ Computer Science / Business Administration
- ➔ Computer Engineering & Computer Science  
(jointly administered by the Electrical & Computer Engineering Department)

## 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 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.

## RESEARCH HIGHLIGHTS

The Department of Computer Science has more than 40 research faculty members from the world-renowned Information Sciences Institute (ISI) – a major player in the creation of the Internet- and from the Institute for Creative Technologies (ICT). Its faculty includes pioneers in modern cryptography, internet technologies, software engineering, databases, computational neuroscience, robotics, natural language processing, computational biology and network sciences, and it has an innovative education program, including the new interdisciplinary Informatics Program as well as one of the nation's first programs in game development.

## 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

## FACULTY HIGHLIGHTS

**Bistra Dilkina** is an associate of computer science and co-director of USC's Center for Artificial Intelligence in Society. Dilkina is a leader in the emerging field of computational sustainability. Her research focuses on solving real-world large-scale problems, particularly in areas of sustainability such as biodiversity, conservation planning and urban planning. Her work spans discrete optimization, network design, stochastic optimization and machine learning. She recently received the Okawa Foundation Research Grant Award. Prior to joining USC, she was an assistant professor at the Georgia Institute of Technology's College of Computing and received her PhD from Cornell University in 2012.



**Xiang Ren** is an assistant professor of computer science with an affiliated appointment at the USC Information Sciences Institute (ISI). His interests span machine learning, natural language processing and data mining, with a focus on weak-supervision methods for modeling natural-language text data and graph-structured data. He earned his PhD in computer science from University of Illinois Urbana-Champaign and was a research scholar at Stanford University before joining USC. He has recently received numerous faculty awards from industry partners, including a Google Faculty Research Award, Amazon Research Award, JP Morgan AI Research Award and Adobe Research Award. He was also named a 2019 Forbes' Asia 30 Under 30 honoree.



**Stefanos Nikolaidis** is an assistant professor of computer science. His research focuses on the mathematical foundations of human-robot interaction, drawing from machine learning, algorithmic game theory and decision making under uncertainty. His work enables robotic systems to interact optimally with people in practical, real-world applications. He holds a PhD from Carnegie Mellon's Robotics Institute, a master's from MIT, an MEng from the University of Tokyo and a BS from the National Technical University of Athens.



**Heather Culbertson** is an assistant Professor of computer science. Her research investigates how humans interact with the world, robots and technology through touch. Culbertson focuses on the design and control of haptic devices and rendering systems, human-robot interaction and virtual reality. She is particularly interested in creating natural haptic interactions that realistically mimic touch sensations in the physical world. She received her PhD in the Department of Mechanical Engineering and Applied Mechanics (MEAM) at the University of Pennsylvania.



**Joseph Lim** is an assistant professor in computer science. His research interests are in computer vision and machine learning, with a particular interest in deep learning, structure learning and multi-domain data. His goal is to develop intelligent systems that can perceive, reason and interact with the world. He received a PhD in electrical engineering and computer science at Massachusetts Institute of Technology and, prior to joining USC, served as a postdoctoral scholar at the Stanford Artificial Intelligence Laboratory.



## ALUMNI HIGHLIGHTS

### **Avri Parker | BS Computer Science, Business Administration '19**

Avri served as president of the National Society of Black Engineers USC Chapter, which won the organization's coveted National Chapter of the Year award in 2018. During her tenure, the organization partnered with Google to put on the second Black Excellence Gala, a night to celebrate Black excellence. At USC, Avri interned at MITRE, Hulu and Microsoft. She is now a program manager at Microsoft in Redmond, WA.



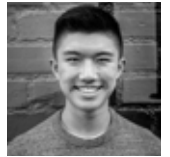
### **Sabrina Kiamilev | BS Computer Science '18**

An adventure-seeking computer science student with a love of dance, Sabrina combined her passions at USC. As part of an international exchange, she studied computer science at the University of Botswana by day and learned traditional Setswana dance by night. Back on campus, she worked as an undergraduate teaching assistant and a tutor teaching computing concepts to local second graders. She now works at Flatiron Health in New York, a cancer-focused healthcare tech company where she completed an internship in 2017.



### **Lucas Hu | B.S. Computer Science, MS Electrical Engineering (data science) '20**

While at USC, Lucas Hu founded the student branch of the USC Center for Artificial Intelligence, CAIS++, dedicated to furthering AI for social good. He also served as an undergraduate researcher at CAIS, training models to detect poachers and endangered animals. He currently works full-time as a data scientist at Palo Alto Networks, and leads the engineering efforts at Duet, a non-profit he co-founded while at USC, which helps connect refugees, donors and local businesses.



### **James Collins | BS Computer Science (Games) '19**

At USC, James organized events and hackathons for the Association of Computing Machinery and joined the virtual reality Southern California club. He was a research assistant at the Robotics Embedded Systems Lab, working on autonomous surface vehicle sensing arrays, and interned at companies like Gadget Bot Productions and Deck Head Games. After graduation, he secured a role at Hidden Variable Studios, an LA-based games company.



### **Rupali Bahl | BS Computer Science and Business Administration '19**

At USC, Rupali interned at companies including Airbnb and StitchFix. She founded VIS (Women in Entrepreneurship), aimed at promoting women in entrepreneurship and increasing the number of female and non-binary founders. She also mentored middle school students and helped them ideate and implement web games and e-commerce websites. She is now a software engineer at Microsoft in Redmond, Washington.



### **Justine Foote | BS Computer Science and Business Administration '17**

At USC, Justine interned at companies like Symantec, Disney and Apple. She was the president of the USC Women in Computing student group, a community for women interested in computer science. She also worked as the head undergraduate course producer for a class called Introduction to Computer Science. She is now a software engineer at Amazon, working in Orange County, CA.





# Computer Science

FIRST YEAR		SECOND YEAR		THIRD YEAR		FOURTH YEAR	
FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING
CSCI 102L	CSCI 103L	CSCI 104L	CSCI 201L	CSCI 310	CSCI 353	CSCI 360	CSCI 350
ENGR 102	CSCI 170	EE 109L	CSCI 270	TECHNICAL ELECTIVE	CSCI 356	TECHNICAL ELECTIVE	CSCI 401 or 404
MATH 125	MATH 126	MATH 226	MATH 225	BASIC SCIENCE	EE 364 or MATH 407	WRIT 340	TECHNICAL ELECTIVE
WRIT 150	GEN ED	GEN ED	BASIC SCIENCE	GEN ED	GEN ED	REQUIRED ELECTIVE	GEN ED
GEN ED	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE

## ENGINEERING

**CSCI 102L:** Fundamentals of Computation  
**CSCI 103L:** Introduction to Programming  
**CSCI 104L:** Data Structures & Object-Oriented Design  
**CSCI 170:** Discrete Methods in Computer Science  
**CSCI 201L:** Principles of Software Development  
**CSCI 270:** Introduction to Algorithms & Theory of Computing  
**CSCI 310:** Software Engineering  
**CSCI 350:** Introduction to Operating Systems  
**CSCI 353:** Introduction to Internetworking  
**CSCI 356:** Introduction to Computer Systems  
**CSCI 360:** Introduction to Artificial Intelligence  
**CSCI 401:** Capstone: Design & Construction of Large Software Systems  
**CSCI 404:** Capstone: Creating Your High-Tech Startup  
**EE 109L:** Introduction to Embedded Systems  
**EE 364:** Introductions to Probability & Statistics or **MATH 407:** Probability Theory  
**ENGR 102:** Engineering Freshman Academy  
**TECHNICAL ELECTIVES:** Specialized upper division courses you choose for your major/ specialization.

## MATHEMATICS

**MATH 125:** Calculus I  
**MATH 126:** Calculus II  
**MATH 226:** Calculus III  
**MATH 225:** Linear Algebra & Differential Equations

## BASIC SCIENCE

Choose from Biology, Chemistry, or Physics. Both courses must be taken in sequence in the same subject.

## GENERAL EDUCATION

As a USC Viterbi student your General Education (Gen Ed) curriculum will include courses in the Arts, Humanistic Inquiry and Social Analysis.

## WRITING

**WRIT 150:** Writing & Critical Reasoning  
**WRIT 340:** Advanced Writing

## ELECTIVES

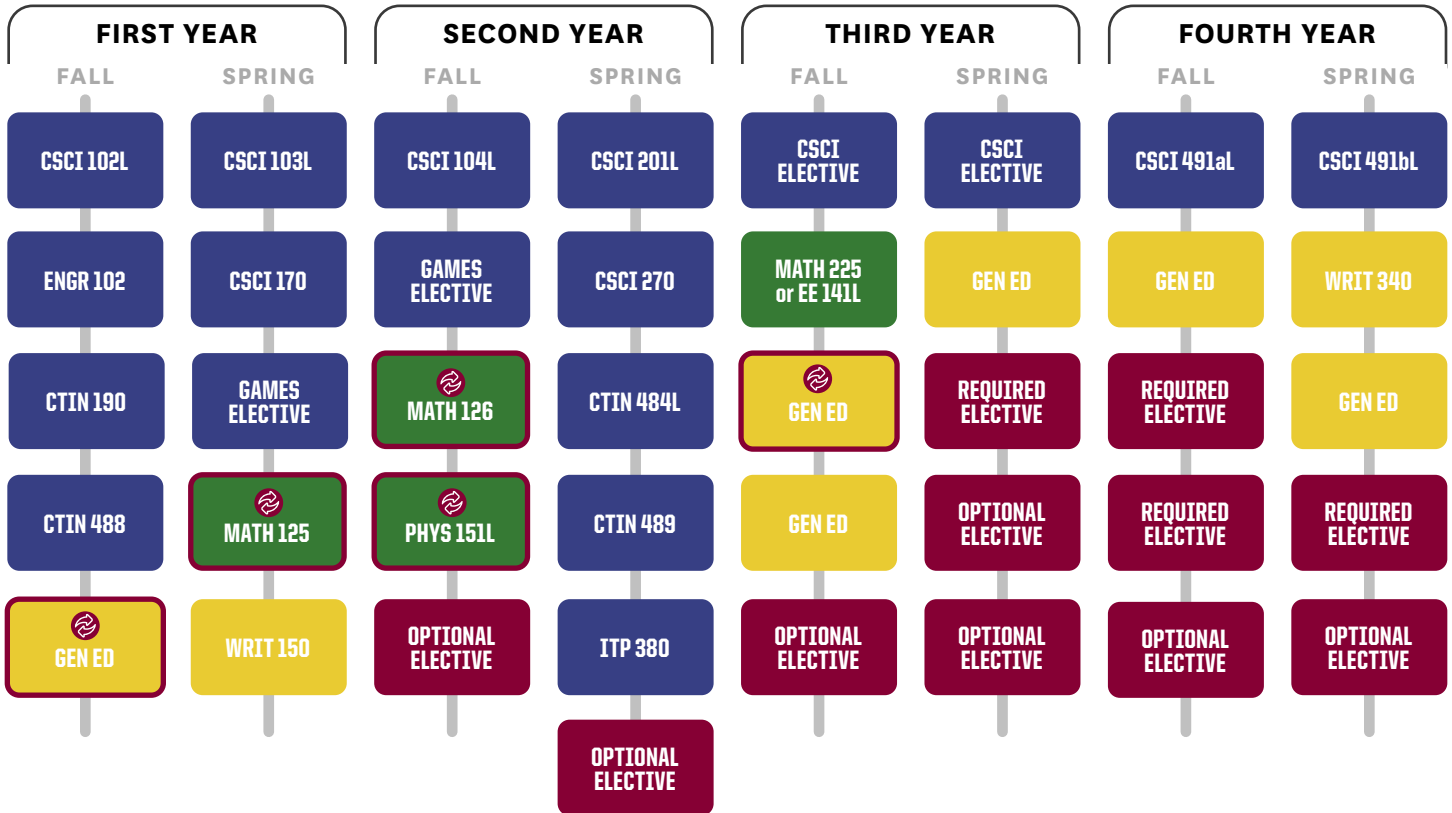
Your optional electives are one way to build engineering+ into your curriculum by choosing classes of interest to you.



Courses with this symbol may be satisfied with certain AP, IB or A-Level exams. With each requirement you replace with prior credit, you increase your optional electives, creating more flexibility for you to pursue additional electives and increase your engineering+ education.

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# Computer Science (Games)



## ENGINEERING

**CSCI 102L:** Fundamentals of Computation  
**CSCI 103L:** Introduction to Programming  
**CSCI 104L:** Data Structures & Object-Oriented Design  
**CSCI 170:** Discrete Methods in Computer Science  
**CSCI 201L:** Principles of Software Development  
**CSCI 270:** Introduction to Algorithms & Theory of Computing  
**CSCI 491aL:** Final Game Project  
**CSCI 491bL:** Final Game Project  
**CTIN 190:** Introduction to Interactive Entertainment  
**CTIN 484L:** Intermediate Game Development  
**CTIN 488:** Game Design Workshop  
**CTIN 489:** Intermediate Game Design Workshop  
**ENGR 102:** Engineering Freshman Academy  
**ITP 380:** Video Game Programming  
**CSCI & GAMES ELECTIVES:** Specialized upper division courses you choose for your major/ specialization.

## MATHEMATICS

**MATH 125:** Calculus I  
**MATH 126:** Calculus II  
**MATH 225:** Linear Algebra & Differential Equations or **EE 141L:** Applied Linear Algebra for Engineering

## SCIENCE

**PHYS 151L:** Mechanics & Thermodynamics

## GENERAL EDUCATION

As a USC Viterbi student your General Education (Gen Ed) curriculum will include courses in the Arts, Humanistic Inquiry and Social Analysis.

## WRITING

**WRIT 150:** Writing & Critical Reasoning  
**WRIT 340:** Advanced Writing

## ELECTIVES

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# Computer Science / Business Administration

FIRST YEAR		SECOND YEAR		THIRD YEAR		FOURTH YEAR	
FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING
ENGR 102	CSCI 102L	CSCI 103L	CSCI 104L	CSCI 201L	CSCI 310L	CSCI 401 or 404	CSCI / BUAD ELECTIVE
BUAD 302	ECON 351x	CSCI 170	BUAD 307	CSCI 270	CSCI ELECTIVE	BUAD 311	BUAD 497
MATH 125	MATH 126	BUAD 201	ACCT 410x	STATISTICS COURSE	BUAD 306	BUAD ELECTIVE	GEN ED
WRIT 150	BASIC SCIENCE	ECON 352x	MATH 225 or EE 141	GEN ED	GEN ED	WRIT 340	GEN ED
GEN ED	GEN ED	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE

## ENGINEERING

**CSCI 102L:** Fundamentals of Computation  
**CSCI 103L:** Introduction to Programming  
**CSCI 104L:** Data Structures & Object-Oriented Design  
**CSCI 170:** Discrete Methods in Computer Science  
**CSCI 201L:** Principles of Software Development  
**CSCI 270:** Intro to Algorithms & Theory of Comp.  
**CSCI 310:** Software Engineering  
**CSCI 401:** Capstone: Design & Construction of Large Software Systems  
 or **CSCI 404:** Capstone: Creating Your High-Tech Startup  
**ENGR 102:** Engineering Freshman Academy  
**CSCI & BUAD ELECTIVES:** Specialized upper division courses you choose for your major/ specialization.

## BUSINESS & ECONOMICS

**ACCT 410X:** Accounting for Non-Business Majors  
**BUAD 302:** Communication Strategy in Business  
**BUAD 304:** Organizational Behavior & Leadership  
**BUAD 306:** Business Finance  
**BUAD 307:** Marketing Fundamentals  
**BUAD 311:** Operations Management  
**BUAD 497:** Strategic Management  
**ECON 351x:** Microeconomics for Business  
**ECON 352x:** Macroeconomics for Business

## MATHEMATICS

**MATH 125:** Calculus I  
**MATH 126:** Calculus II  
**MATH 225:** Linear Algebra & Differential Equations or **EE 141:** Applied Linear Algebra for Engineering

## STATISTICS & PROBABILITY

**BUAD 310:** Applied Business Statistics or **BUAD 312:** Statics and Data Science or **EE 364:** Intro to Probability & Statistics or **MATH 407:** Probability Theory

## BASIC SCIENCE

**BISC 120L, CHEM 105aL, or PHYS 151L**

## GENERAL EDUCATION


As a USC Viterbi student your General Education (Gen Ed) curriculum will include courses in the Arts, Humanistic Inquiry and Social Analysis.

## WRITING

**WRIT 150:** Writing & Critical Reasoning  
**WRIT 340:** Advanced Writing

## ELECTIVES

Your optional electives are one way to build engineering+ into your curriculum by choosing classes of interest to you.

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# Computer Engineering & Computer Science

## COMPUTING SYSTEMS

FIRST YEAR		SECOND YEAR		THIRD YEAR		FOURTH YEAR	
FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING
CSCI 102L	CSCI 103L	CSCI 104L	CSCI 270	CSCI 201L	CSCI 350	CSCI 353	CSCI 401, 404, or EE 459
ENGR 102	CSCI 170	EE 250L	EE 354L	EE 457	TECHNICAL ELECTIVE	EE 451, 454L, or 477L	EE 451L, 454L, or 477L
MATH 125	EE 109L	MATH 226	MATH 225	EE 364 or MATH 407	GEN ED	TECHNICAL ELECTIVE	WRIT 340
WRIT 150	MATH 126	GEN ED	PHYS 151L	PHYS 152L	GEN ED	GEN ED	GEN ED
GEN ED	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE

### ENGINEERING

**CSCI 102L:** Fundamentals of Computation  
**CSCI 103L:** Introduction to Programming  
**CSCI 104L:** Data Struct. & Object-Oriented Design  
**CSCI 170:** Discrete Methods in Computer Science  
**CSCI 201L:** Principles of Software Development  
**CSCI 270:** Intro to Algorithms & Theory of Comp.  
**CSCI 350:** Introduction to Operating Systems  
**CSCI 353:** Introduction to Internetworking  
**CSCI 401:** Capstone: Design & Construction of Large Software Systems  
 or **CSCI 404:** Creating Your High-Tech Startup  
 or **EE 459L:** Embedded Systems Design Laboratory  
**EE 109L:** Introduction to Embedded Systems  
**EE 250L:** Distributed Systems for the Internet of Things  
**EE 354L:** Introduction to Digital Circuits  
**EE 451:** Parallel & Distributed Computation  
 or **EE 454L:** Intro to Systems Using Microprocessors  
 or **EE 477L:** MOS VLSI Circuit Design  
**EE 457:** Computer Systems Organization  
**ENGR 102:** Engineering Freshman Academy  
**TECHNICAL ELECTIVES:** Specialized upper division courses you choose for your major/ specialization.

### MATHEMATICS

**MATH 125:** Calculus I  
**MATH 126:** Calculus II  
**MATH 226:** Calculus III  
**MATH 225:** Linear Algebra & Differential Equations

### STATISTICS & PROBABILITY

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

### SCIENCE

**PHYS 151L:** Mechanics & Thermodynamics  
**PHYS 152L:** Electricity & Magnetism

### GENERAL EDUCATION

As a USC Viterbi student your General Education (Gen Ed) curriculum will include courses in the Arts, Humanistic Inquiry and Social Analysis.

### WRITING

**WRIT 150:** Writing & Critical Reasoning  
**WRIT 340:** Advanced Writing

### ELECTIVES

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# Computer Engineering & Computer Science

## EMBEDDED SYSTEMS

FIRST YEAR		SECOND YEAR		THIRD YEAR		FOURTH YEAR	
FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING
CSCI 102L	CSCI 103L	CSCI 104L	CSCI 270	EE 202	EE 301	EE 453	CSCI 430
ENGR 102	CSCI 170	EE 250L	EE 354L	EE 457	TECHNICAL ELECTIVE	TECHNICAL ELECTIVE	EE 459Lx
MATH 125	EE 109L	MATH 226	MATH 225	EE 364 or MATH 407	GEN ED	WRIT 340	GEN ED
WRIT 150	MATH 126	GEN ED	PHYS 151L	PHYS 152L	GEN ED	GEN ED	FREE ELECTIVE
GEN ED	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE	OPTIONAL ELECTIVE

### ENGINEERING

**CSCI 102L:** Fundamentals of Computation  
**CSCI 103L:** Introduction to Programming  
**CSCI 104L:** Data Structures & Object-Oriented Design  
**CSCI 170:** Discrete Methods in Computer Science  
**CSCI 270:** Introduction to Algorithms & Theory of Computing  
**CSCI 430:** Introduction to Computer & Network Security  
**EE 109L:** Introduction to Embedded Systems  
**EE 202:** Linear Circuits  
**EE 250L:** 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 459Lx:** Embedded Systems Design Laboratory  
**ENGR 102:** Engineering Freshman Academy  
**TECHNICAL ELECTIVES:** Specialized upper division courses you choose for your major/ specialization.

### MATHEMATICS

**MATH 125:** Calculus I  
**MATH 126:** Calculus II  
**MATH 226:** Calculus III  
**MATH 225:** Linear Algebra & Differential Equations

### STATISTICS & PROBABILITY

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

### SCIENCE

**PHYS 151L:** Mechanics & Thermodynamics  
**PHYS 152L:** Electricity & Magnetism

### GENERAL EDUCATION

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