

<b>ENGR 442</b>	<b>Interdisciplinary Senior Design II</b>	-	<b>3</b>
<b>ME 311</b>	<b>Introduction to Energy Systems</b>	-	<b>3</b>
	<b>Literature, Fine Arts, or Social Science</b>	-	<b>3</b>
	<b>Total</b>	<b>18</b>	<b>15</b>

### Theology and Religious Studies Requirement

Students in the School of Engineering must take two required TRS courses. TRS 201, Scripture and Jesus Christ is taken as part of the required courses of the FYE program. Note: TRS 201 is a prerequisite for all other TRS courses. Thus, all students must complete TRS 201 during or prior to their penultimate semester, since they will be unable to register for the remaining required TRS course if they postpone TRS 201 until their final semester. The second required course is TRS 202, The Church and the Human Person. This course is offered in two separate formats: TRS 202A and TRS 202B. Either format will satisfy Engineering's TRS 202 requirement.

## Department of Electrical Engineering and Computer Science

<b>Professors</b>	<b>Hang Liu; Nader Namazi, <i>Chair</i>; Charles C. Nguyen</b>
<b>Associate Professors</b>	<b>Lin-Ching Chang; George Nehmetallah</b>
<b>Assistant Professors</b>	<b>Hieu Bui; Matthew Jacobs; Minhee Jun</b>
<b>Visiting Assistant Professors</b>	<b>Chaofan Sun</b>
<b>Lecturers</b>	<b>Charles Campbell Jr.; Vincent Cassella; Aysegul Cuhadar; Robert Kamocsai; Vadim Knyazev; Francis Linehan; Mohsen Marefat; Quang Nguyen; Sridava Rao; Kevin Russo; Hanney Shaban</b>

### Mission of the Department

The mission of the Department of Electrical Engineering and Computer Science is to educate men and women in the disciplines of electrical engineering and computer science in order to prepare them professionally so that they can contribute and service the needs of society with a commitment founded on moral and ethical principles.

### Electrical Engineering Program

The incessant expansion of the Internet, wireless communications, information technology, network and information security, robotics, computer engineering, and alternative energy technologies continues to fuel demand for electrical engineers and computer scientists. Therefore, majoring in electrical engineering offers excellent professional prospects and challenging career opportunities.

Our dedicated and internationally recognized faculty are committed to providing a top-notch education that prepares students to successfully enter the job market or to continue for advanced studies at the graduate level.

We have strong technical programs in electrical engineering and computer science with carefully designed curricula. Students enjoy a friendly and cooperative learning environment that offers advantages such as small class sizes, low student-teacher ratios, personalized interaction with faculty members, and student participation in funded research projects. Our instructional laboratories are equipped with state-of-the-art instrumentation and equipment. Both undergraduate and graduate students can participate in funded research activities performed in our many research laboratories that are actively involved in areas including signal processing and visualization, applied electromagnetics and optics, telecommunications and information networks, robotics and intelligent control, and material properties.

### **Bachelor of Electrical Engineering Standard Program First Year**

See standard first-year engineering program in the general engineering section.

### **Second Year**

Course #	Course Title	1st	2nd
CHEM 107	General Chemistry I	3	-
CHEM 113	General Chemistry Lab I	2	-
ENGR 201	Engineering Mechanics I	3	-
MATH 221	Calculus II	4	-
PHYS 216	University Physics II	4	-
ENGR 207	Robots and Sensors	-	3
ENGR 211	Thermodynamics	-	3
ENGR 212	Electrical Networks	-	3
ENGR 222	Engineering Mathematics I	-	4
TRS 202 A/B	The Church and the Human Person	3	-

**Total    16    16**

### Third Year

Course #	Course Title	1st	2nd
EE 311	Signals and Systems	3	-
EE 342	Electromagnetic Fields and Waves I	3	-
EE 357	Electromagnetic Laboratory	1	-
ENGR 321	Electronic Circuits	3	-
ENGR 355	Electrical Laboratory I	1	-
MATH 309	Probability and Statistics for Engineers	3	-
PHIL 362	Professional Ethics in Engineering	3	-
EE 312	Microprocessors	-	3
EE 326	Switching Circuits and Logic Design	-	3
EE 327	Switching Circuits and Logic Design Lab	-	1
EE 362	Analog and digital signal processing	-	3
	Literature, Fine Arts, or Social Science	-	3
	<b>Total</b>	<b>17</b>	<b>13</b>

**Fourth Year**

Course #	Course Title	1st	2nd
EE 413	Communication Systems	3	-
EE 457	Communications Laboratory	1	-
ENGR 401	Senior Seminar I	1	-
ENGR 403	Control Systems	3	-
ENGR 441	Interdisciplinary Senior Design	3	-
	Program Electives	3	6
	Liberal Studies Electives	3	3
ENGR 442	Interdisciplinary Senior Design II	-	3
	<b>Total</b>	<b>17</b>	<b>12</b>

**Concentrations**

Students in the Computer Engineering Concentration select program electives tailored to this area of specialization.

**Recommended Program Electives**

New courses are frequently added. For this reason students should consult their advisor regarding the department's recommendations and approval of each semester's program electives.

EE 502	Optical Systems and Devices
EE 504	Introduction to Fourier Optics
EE 514	Introduction to Hardware Accelerated Computing
EE 515	Advanced Digital Signal Processing
EE 516	Power Systems
EE 519	Digital Systems Design
EE 521	Programmable Logic Devices and HDL Design
EE 522	Linear System Analysis
EE 524	Secure Programming

EE 526	Computer and Network Security
EE 530	Parallel and Heterogeneous Computing
EE 531	Data Communications Networks
EE 534	Communication and Computer Network Simulation
EE 540	Introduction to Antenna Systems
EE 541	Electromagnetic Theory
EE 542	Antennas and Propagation for Wireless Communications
EE 543	Remote Sensing
EE 544	RF and Microwave Circuits
EE 545	High Resolution Radar Signal Processing
EE 546	Electrical Properties of Materials
EE 548	Optical Signal and Image Processing
EE 550	Semiconductor Optoelectronics - Materials and Devices
EE 561	Random Signal Theory
EE 563	Fundamentals of Acoustics
EE 565	Information Security
EE 569	Computer Security and Privacy
EE 572	Basics of Information Coding and Transmission
EE 576	Introduction to Robotics
EE 581	Cryptography and Steganography
ENGR 520	Mathematical Analysis for Graduate Students
ENGR 543	Wireless Sensor Networks
ENGR 570	Basics of High Performance Computing for Engineers
ENGR 652	Advanced Optical and Image Processing
PHYS 406	Introduction to Modern Physics
PHYS 428	Optics
PHYS 431	Introduction to Quantum Theory

### **Educational Objectives of the Electrical Engineering Program**

**Graduates of the electrical engineering program within a few years of graduation will:**

1. Use their broad knowledge of electrical engineering as a foundation for ongoing learning, and will have realized some success early in their professional careers and/or in the pursuit of graduate studies.
2. Use their creative and critical reasoning skills to solve technical problems, ethically and responsibly, in service to society.
3. Use their mathematical and scientific knowledge to solve emerging real-world problems related to power, electronics, control systems, image analysis, signal processing, and communication systems, and will use their communication, organization, and teamwork skills for the execution of complex technological solutions.
4. Use their communication skills in bridging the divide between advanced technology and end users in the practice of electrical engineering.

### **Standard Program**

For the alternative energy track in electrical engineering, courses vary from the standard program. Please refer to the departmental course tracking sheets for details.

## Computer Science Program

The Computer Science Program, offering a Bachelor of Science in Computer Science, is designed to prepare graduates for leading roles in the computer science profession. The core areas of this program include operating systems, information processing, programming languages, computer graphics, hardware accelerated architectures, and information security. Many computer science electives are available to broaden the student's perspective in this field. Completion of this program also prepares the graduate for further graduate studies. Areas of special interest include data and communication networks, multimedia processing, bioinformatics, information assurance, and intelligent information systems. The department also offers a computer science minor, catering to students from other majors seeking to expand their command of information technologies.

The setting for this education is in a modern computer environment. The concentration of in-course studies, combined with laboratory studies, enhances the abilities of the students. Other school programs including electrical, civil, biomedical, and mechanical engineering offer a broad range of courses to computer science students as additional program electives for students with special interests.

## Bachelor of Science in Computer Science Standard Program

### First Year

Course #	Course Title	1st	2nd
CSC 120	Intro to Computational Thinking	3	-
CSC 123	C/C++ Programming	3	-
ENG 101	Rhetoric/Composition	3	-
MATH 121	Calculus I	4	-
PHIL 201	Classical Mind	3	
CSC 223	Object Oriented Programming	-	3
	Science Elective	-	3
MATH 121	Calculus II	-	4
PHIL 202	Modern Mind	-	3

TRS 201	Faith Seeking Understanding	-	3
	<b>Total</b>	<b>16</b>	<b>16</b>

**Second Year**

Course #	Course Title	1st	2nd
CSC 210	Discrete Mathematics	3	-
CSC 280	Data Structures	3	-
	Liberal Studies Elective	3	-
	Science Elective	3	-
TRS 202A/B	The Church and the Human Person	3	-
CSC 212	Theory of Computing	-	3
CSC 326	Switching Circuits and Logic Design	-	3
CSC 327	Switching Circuits and Logic Design Lab	-	1
CSC 370	Concepts of Programming Languages	-	3
	Literature, Fine Arts, or Social Science	-	3
	Science/Math Elective	-	3
	<b>Total</b>	<b>15</b>	<b>16</b>

**Third Year**

Course #	Course Title	1st	2nd
CSC 322	Introduction to Computer Graphics	3	-
CSC 323	Introduction to Computer Networks	3	-
CSC 390	Computer Organization & Architecture	3	-
MATH 309	Probability and Statistics for Engineers	3	-
PHIL 362	Engineering Ethics	3	-
CSC 363	Software Engineering	-	3
CSC 306	Introduction to Operating Systems	-	3
	Liberal Studies Elective	-	3
	Math Elective	-	3
	Computer Science Program Elective	-	3
	<b>Total</b>	<b>15</b>	<b>15</b>

**Fourth Year**

Course #	Course Title	1st	2nd
CSC 409	Web Programming	3	-
CSC 442	Introduction to Database Systems	3	-



ENGR 441	Interdisciplinary Senior Design I	3	-
	Computer Science Program Electives	3	6
	Math Electives	3	3
CSC 411	Analysis of Algorithm	-	3
ENGR 442	Interdisciplinary Senior Design II	-	3
	<b>Total</b>	<b>15</b>	<b>15</b>

## Educational Objectives of the Computer Science Program

The educational objectives of the computer science program are to develop alumni who possess:

1. The broad knowledge of computer science to serve as a foundation for ongoing lifelong learning, and who will have demonstrated some success early in their professional careers and/or in the pursuit of graduate studies.
2. The creative and critical reasoning skills to solve technical problems, ethically and responsibly, in service to society.
3. Mathematical and scientific knowledge to solve emerging real world problems related to programming, networking, information security, image analysis, and advanced computing systems, and the necessary communication, organization, and teamwork skills for the execution of complex technological solutions.
4. The necessary communication skills to bridge the divide between advanced technology and end users in the practice of computer science.

## Department of Mechanical Engineering

Professors	J. Steven Brown; Sen Nieh
Professors Emeriti	Mario Casarella; Yun Chow Whang
Associate Professors	Jandro Abot; John A. Judge; Xiaolong Luo; Diego Turo; Joseph Vignola, <i>Chair</i> ; Zhaoyang Wang
Assistant Professors	Christian Bomela; Chuan-Fu Lin; Sergio Picozzi