The history of computer science at the University of Connecticut begins over half a century ago with the introduction of our first computing courses in the 1960’s. The first defense of a Ph.D. in Computer Science was held in 1967. The Computer Science curriculum was established in 1970, and the program was accredited in 1972 among the very first undergraduate programs in the field of Computer Science. As we enter our next epoch, Computer Science & Engineering encompasses broad areas of intellectual discourse in informatics spanning a plethora of educational and research activities including algorithms and complexity, bio and biomedical informatics, big data, computational science, cybersecurity, cyber-physical systems and machine learning that underlie the endeavors of the modern society.

The department is ever-growing; our undergraduate enrollment has doubled in the last four years and the number of doctoral students exceeds one hundred. Our faculty includes more than thirty full-time members. Since the start of the millennium, the department has experienced significant qualitative evolution, complementing our rigorous educational curricula with comprehensive research programs in several crucial areas of societal importance.

Our department has excellent and diverse faculty with research and education expertise in the traditional and emerging fields of computer science and engineering. We continue to attract talented young faculty, with thirteen of our faculty winning the prestigious National Science Foundation Career Awards since the turn of the century.

Given that computers are playing a major role in every area of science and engineering as well as the society at large, our presence remains strong in the society as we fulfill our mission of research, education, industrial and public outreach, and service to the profession. I invite you to browse our website at www.cse.uconn.edu where you will find detailed information on our academic programs at the undergraduate and graduate levels, research and teaching profiles of our faculty, and student societies. I am confident that you will find a topic that sparks your interest. As you get to know us better do not hesitate to contact us. We will be happy to answer your questions.

Sincerely,

Sanguthevar Rajasekaran
Department Head
DEREK AGUIAR
Assistant Professor
Ph.D., Brown University, 2014
derek.aguiar@uconn.edu
• Probabilistic Modelling
• Computational Biology
• Machine Learning
• Algorithms

HANNA AKNOUCHE-MARTINSSON
Associate Professor in-Residence
Ph.D., Universite de Clermont-Ferrant II France, 2008
hanna.aknouche-martinsson@uconn.edu
• Computer Vision
• Robot Vision
• Probabilistic Robotics

REDA A. AMMAR
Professor and Director of Engineering Global Programs
Ph.D., University of Connecticut, 1983
reda.ammar@uconn.edu
• Performance Engineering
• Underwater Computer Systems
• Big Data Analytics
• Real-time Distributed Systems

MUKUL S. BANSAL
Associate Professor
Ph.D., Iowa State University, 2009
mukul.bansal@uconn.edu
• Computational Biology and Bioinformatics
• Computational Molecular Evolution
• Combinatorial Optimization
• Algorithms

KEITH BARKER
Professor
University Teaching Fellow
Ph.D., Sheffield University, 1966
keith.barker@uconn.edu
• Computer Science Education
• Curriculum and Technology Development
• Instructional Design

JINBO BI
Professor and Associate Department Head for Research and Strategic Initiatives
Ph.D., Rensselaer Polytechnic Institute, 2003
jinbo.bi@uconn.edu
• Machine Learning
• Statistical Data Mining
• Large Scale Optimization
• Biomedical Informatics

PHILLIP BRADFORD
Associate Professor in-Residence, Director of Computer Science, Stamford Regional Campus
Ph.D., Indiana University, 1995
philip.brADFORD@uconn.edu
• Applied Algorithms, Optimization and Machine Learning
• Security, Programming Languages, Data Analytics
• Computational Finance, Auctions, Bitcoin/Blockchain

C. AUGUSTO CASAS
Associate Professor in-Residence
Ph.D., Nova Southeastern University, 2002
augusto.casas@uconn.edu
• Computational Finance
• Financial Planning Informatics
• Legal Informatics

STEVEN A. DEMURJIAN
Professor
Ph.D., The Ohio State University, 1987
steven.demurjian@uconn.edu
• Role-based, Discretionary, and Mandatory Access Control
• Mobile and Cloud Computing with Access Control
• Secure Software Engineering
• Software Architectures for Biomedical Informatics

CAIWEEN DING
Assistant Professor
Ph.D., Northeastern University, 2019
caiwen.ding@uconn.edu
• Machine Learning & Deep Neural Network Systems
• Heterogeneous Computing (CPUs/FPGAs/GPUs)
• Non-von Neumann Computing and Neuromorphic Computing

BENJAMIN FULLER
Assistant Professor
Ph.D., Boston University, 2015
benjamin.fuller@uconn.edu
• Cryptography
• Security
• Information-Theory
• Complexity

SWAPNA S. GOKHALE
Associate Professor
Ph.D., Duke University, 1998
swapna.gokhale@uconn.edu
• Social Media
• Software Engineering
• Performance and Dependability Analysis

SONG HAN
Assistant Professor
Ph.D., University of Texas, Austin, 2012
song.han@uconn.edu
• Cyber-Physical Systems
• Real-Time and Embedded Systems
• Large-Scale Real-Time Data Management
• Wireless Networks and Mobile Computing

SUINING HE
Assistant Professor
Ph.D., The Hong Kong University of Science and Technology, 2016
suining.he@uconn.edu
• Ubiquitous and Mobile Computing
• Urban Computing and Smart Transportation
• Big Data Analytics
• Crowdsourcing and Crowdsensing

SEUNG-HYUN SEAN HONG
Assistant Professor in-Residence
Ph.D., University of Connecticut, 2005
seung-hyun.hong@uconn.edu
• Medical Image Analysis
• Digital Image Processing
• Bioinformatics

AMIR HERZBERG
Professor, Comcast Chair for Security Innovation, Director of Graduate Programs
D.Sc., Technion-Israel Institute of Technology, 1991
amir.herzberg@uconn.edu
• Security and Privacy for Internet and beyond
• Applied Cryptography
• Secure Usability and Human-Computer Interaction
OUR PROGRAMS

UNDERGRADUATE DEGREE

Our undergraduate program provides a breadth of instruction in computer science and engineering, while allowing the students to gain a depth of knowledge in particular technical areas of interest. The curriculum provides sufficient work in mathematics, science, and engineering allowing students to design solutions to a wide variety of problems. Coursework in the humanities and social sciences are an integral part of the engineering program to make students aware of their social responsibility and to consider non-technical factors in the practice of engineering.

AT THE UNDERGRADUATE LEVEL WE OFFER:

- B.S. in Engineering with a major in Computer Science and Engineering *
- B.S. with a major in Computer Science +
- B.S. in Engineering with a major in Computer Engineering*, offered jointly with the Electrical and Computer Engineering Department

+ Accredited by the Computing Accreditation Commission of ABET, http://www.abet.org

As part of the Bachelor’s Degrees in Computer Science and Engineering and Computer Science, students complete a concentration in one of the following areas: Theory and Algorithms, Systems and Networks, Cybersecurity, Bioinformatics, Software Design and Development, Computational Data Analytics, Unspecialized or Individually Designed.

GRADUATE DEGREES

Our graduate program is a flourishing international community of scholars, consisting of faculty and students from around the world. Graduate degrees prepare students for advanced work or research careers in academia or industry.

AT THE GRADUATE LEVEL WE OFFER:

- Master of Science in Computer Science and Engineering, with both course and thesis options. The course-based program is intended as either a terminal degree which prepares students for advanced work in industry, or as preparation for Ph.D. studies. The thesis-based program is specifically intended to prepare students for research and Ph.D. studies.
- Doctor of Philosophy in Computer Science and Engineering. The Ph.D. degree prepares students for a career in research, either in industry or academia.

Our graduate students are routinely supported by fellowships, research assistantships, or teaching assistantships. Our graduates are in constant demand, both by academia and industry.

The Information Technologies Engineering (ITE) Building

is home to the Computer Science & Engineering and Electrical & Computer Engineering departments. This 110,000 square foot high-tech gem houses a 350-seat auditorium, classrooms, an extensive learning center, specialty training facilities and some of the most innovative research labs in the country for advancing cutting-edge engineering technology. CSE research labs located in the ITE building cover a broad spectrum of research activities. This includes Artificial Intelligence, Bioinformatics, Big Data, Computer Systems, Cyber-Security, Distributed Computing, Machine Learning, Software Engineering, Theoretical Foundations, and Voting Technology.

ADJUNCT FACULTY

DINA GOLDIN
Associate Professor in-Residence
Ph.D., Brown University, 1996
dina.goldin@uconn.edu
- Efficient Querying of Non-Traditional Data
- Models of Interactive Computation
- Software Architecture for Online and Sensor-based Systems

MARMAR MOUSSA
Adjunct Faculty
Ph.D., University of Connecticut, 2019
marmar.moussa@uconn.edu
- Computational Genomics
- Machine Learning & Algorithms
- Bioinformatics
- Differential Privacy

RYAN O’CONNOR
Adjunct Faculty
M.S., University of Connecticut, 2014
ryan@uconn.edu
- Industrial IoT
- Sustainability
- iOS AppDev

DAVID A. TONN
Adjunct Faculty
Ph.D., University of Connecticut, 2007
david.tonn@uconn.edu
- Antennas and Electromagnetics/Radiowave Propagation
- RF Materials Engineering
- Computational Methods in Engineering
- Antenna Measurement Physics/Range Design

Sanguthevar Rajasekaran
Department Head
Jinbo Bi
Associate Department Head

Computer Science & Engineering
University of Connecticut
371 Fairfield Way, Unit 4155
Storrs, CT 06269-4155
Phone: (860) 486-3719
Email: engr-csoffice@uconn.edu
High School Students

Freshman Applicant Profile Sought by the School of Engineering

A freshman applicant to UConn must meet the following requirements:

- Be a graduate of an approved secondary school
- Have completed at least 16 units of work, of which 15 must be college preparatory in nature
- Be in the upper range of their high school class
- Have achieved an appropriate score on the ACT

Applications for freshman admission must include:

- Official high school transcript or official GED
- Official SAT or ACT scores
- Personal essay
- Application fee (non-refundable)

Minimum high school course requirements for the School of Engineering are as follows:

- 4 years of English
- 3 1/2 years of math (Algebra I, Algebra II, and Geometry; Pre-calculus preferred) **4 years is recommended**
- 2 1/2 years of social studies (including 1 year of U.S. History)
- 2 years of a **single** foreign language (3 years **strongly** recommended)
- 2 years of laboratory science
- 2 1/2 years of electives
- High School Chemistry
- High School Physics

Please refer to the current application for admission for more detailed information regarding requirements and application deadlines.

For more specific information regarding admission, please direct your inquiries to:

**The Office of Undergraduate Admissions**

University of Connecticut, 2131 Hillside Road, Unit 3088, Storrs, CT 06269-3088
Phone: (860) 486-3137
Website: [admissions.uconn.edu](http://admissions.uconn.edu)
E-mail: beahusky@uconn.edu
Bachelor Degree Programs

The Computer Science and Engineering Department offers two bachelor degree programs: a BSE in Computer Science and Engineering and a BS in Computer Science. In collaboration with the Electrical and Computer Engineering Department, we also offer a BSE in Computer Engineering. The first year of these programs is virtually identical, allowing students the opportunity to decide which program is right for them. The two BSE degrees continue this similarly throughout the sophomore year as well.

Which Degree to Choose?

The **Computer Science** program produces graduates with a broad understanding of both computing principles and computing practice. The program emphasizes the fundamental computing models through the design and analysis of algorithms and software. The structure of the program includes core courses in fundamental computing areas: functional and object-oriented programming, algorithms and data structures, computer architecture, and systems programming. In addition to taking the core courses, each student also completes a concentration in one of the following areas: theory and algorithms, systems and networks, cybersecurity, bioinformatics, software design and development, computational data analytics, unspecialized or individually designed. This degree program was first offered in the fall of 1999 and has received accreditation from CAC/ABET since 2000.

The **Computer Science and Engineering** program produces graduates with a broad perspective in both software and hardware topics pertinent to computing systems. The core of this program includes additional courses in analog and digital circuits and performance analysis, consistent with its increased emphasis on hardware systems. Computer Science and Engineering students also complete a concentration in the same areas as the Computer Science students. This degree program was first accredited by EAC/ABET in 1972. Since 1993, the program has earned accreditation from both the Engineering and Computing commissions of ABET.

The **Computer Engineering** program produces graduates with skills in designing computer hardware and peripherals, and emphasizes the electrical characteristics of the computer itself. It is focused on the design of computer hardware, associated core software structures and their interfaces. It is well suited to students interested in designing computers or computer interfaces, real time applications, or networking solutions. This degree program has received accreditation from EAC/ABET since 2006.

All three of these programs require students in their senior year to complete a two semester team-oriented capstone design and development project. Students work in teams of four to six and many projects are sponsored by industry. Students demonstrate projects at the School of Engineering Senior Design Day held each May.
# Computer Science & Engineering

## Bachelor of Science in Engineering Program

### Catalog Year 2019-2020

## Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 1127Q or 1147Q-Gen. Chem. I or Honors Chem I</td>
<td>4</td>
<td>PHYS 1501Q-Engineering Phys. I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1131Q- Calculus I</td>
<td>4</td>
<td>MATH 1132Q-Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 1010 or ENGL 1011-Acad. Writing</td>
<td>4</td>
<td>CSE 1729 - Intro to Principles of Programming</td>
<td>3</td>
</tr>
<tr>
<td>CSE 1010 - Intro Computing for Engineers</td>
<td>3</td>
<td>Area 2 (Social Science)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 1000-Orientation to Engineering</td>
<td>1</td>
<td>Area 1 (Arts and Humanities)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>17</td>
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</table>

## Sophomore Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 1502Q-Engineering Phys II</td>
<td>4</td>
<td>MATH 2410Q-Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2110Q-Multivariable Calculus</td>
<td>4</td>
<td>CSE 2500 -Intro to Discrete Systems</td>
<td>3</td>
</tr>
<tr>
<td>CSE 2050 – Data Structures and Object-oriented Design</td>
<td>3</td>
<td>ECE 2001 – Electric Circuits</td>
<td>4</td>
</tr>
<tr>
<td>CSE 2300 – Digital Logic Design</td>
<td>4</td>
<td>PHIL 1104 (Area 1) - Phil. and Social Ethics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Area 2 (Social Science)</td>
<td>3</td>
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<td></td>
<td>16</td>
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</tbody>
</table>

## Junior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 3100 - Systems Programming.</td>
<td>3</td>
<td>CSE xxxx - Concentration course 1</td>
<td>3</td>
</tr>
<tr>
<td>CSE 2304 or 3666 - Intro. to Comp. Arch.</td>
<td>3</td>
<td>CSE 3504- Prob. Perf. Analy. of Computer Sys.</td>
<td>3</td>
</tr>
<tr>
<td>CSE 3500- Algorithms and Complexity</td>
<td>3</td>
<td>CSE 3000-Contemporary Issues in CSE</td>
<td>1</td>
</tr>
<tr>
<td>Prob. and Stat.Course¹</td>
<td>3</td>
<td>CSE 3140</td>
<td>2</td>
</tr>
<tr>
<td>Area 4 (Diversity and Multiculturalism)</td>
<td>3</td>
<td>Math 2210Q-Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16</td>
</tr>
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</table>

## Senior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 4939W-CS &amp; E Design Project I</td>
<td>3</td>
<td>CSE 4940-CS &amp; E Design Project II</td>
<td>3</td>
</tr>
<tr>
<td>CSE xxxx - Concentration course 2</td>
<td>3</td>
<td>CSE xxxx - Concentration course 4</td>
<td>3</td>
</tr>
<tr>
<td>CSE xxxx - Concentration course 3</td>
<td>3</td>
<td>CSE Elective²</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>4</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Area 4 (Diversity and Multiculturalism)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Additionally the program must include one W course other than CSE 4939W, which may be used to satisfy other requirements or Free Electives.

---

¹ This course must be chosen from the list of MATH 3160Q- Probability, STAT 3025Q Statistical Methods I, STAT 3345Q- Probability Models for Engineers or STAT 3375Q Introduction to Mathematical Statistics.

² If needed to get 50 CSE credits. 126 total credits required, including 50 CSE credits.

Revised 2/4/19
Computer Science & Engineering Concentration Requirements

Every CSE major must satisfy the requirements for a concentration. A concentration consists of four courses within a defined set of alternatives (one or more of the courses may be required for the concentration). A student must declare a single concentration to count toward graduation; that is the one that will be listed on his or her transcript. There are currently 8 concentrations available, these are listed below. For information about the concentration requirements, see the Guide to Course Selection, linked from the CSE department web page under Undergraduate Studies.

Concentration 1: Theory and Algorithms
Concentration 2: Systems and Networks
Concentration 3: Cybersecurity
Concentration 4: Bioinformatics
Concentration 5: Software Design and Development
Concentration 6: Computational Data Analytics
Concentration 7: Unspecialized
For the Unspecialized concentration, students must take required courses from 3 different concentrations, plus any other 2000+ level CSE course not used to fulfill another requirement.

Concentration 8: Individually Designed
Students may propose an individually-designed concentration to fit their academic or career interests. This will be a minimum of 12 credits at the 2000+ level, proposed by the student and approved by the student's advisor and the CSE Department Undergraduate Committee. The expectation is that such a concentration will have a strong unifying theme. This may include non-CSE courses, but the student will still be subject to the overall requirement of 50 CSE credits.
### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Science(^1)</td>
<td>4</td>
<td>Lab Science(^1)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1131Q – Calculus I</td>
<td>4</td>
<td>MATH 1132Q – Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>CSE 1010 – Intro Computing for Engineers</td>
<td>3</td>
<td>CSE 1729 – Intro to Principles of Programming</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 1000 – Orientation to Engineering</td>
<td>1</td>
<td>ENGL 1010 or 1011 – Seminar in Writing</td>
<td>4</td>
</tr>
<tr>
<td>Area 2 (Social Sciences)</td>
<td>3</td>
<td></td>
<td>15</td>
</tr>
<tr>
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</tbody>
</table>

### SOPHOMORE YEAR

<table>
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<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Science(^1)</td>
<td>4</td>
<td>CSE 2304 or 3666 – Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>CSE 2500 – Intro to Discrete Systems</td>
<td>3</td>
<td>CSE 3500 – Algorithms and Complexity</td>
<td>3</td>
</tr>
<tr>
<td>CSE 2050 – Data Structures &amp; Object-Oriented Design</td>
<td>3</td>
<td>CSE 3100 – Systems Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2110Q – Multivariable Calculus or</td>
<td>4 or 3</td>
<td>Area 2 (Social Science)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2410Q – Elem. Differential Equations</td>
<td></td>
<td>PHIL 1104 (Area 1) – Phil. and Soc Ethics</td>
<td>3</td>
</tr>
<tr>
<td>Area 1 (Arts and Humanities)</td>
<td>3</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>17 or 16</td>
<td></td>
<td></td>
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### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE xxxx - Concentration course 1</td>
<td>3</td>
<td>CSE xxxx - Concentration course 2</td>
<td>3</td>
</tr>
<tr>
<td>CSE 3140 – Cybersecurity Lab</td>
<td>2</td>
<td>Area 4 Course (Diversity and Multiculturalism)</td>
<td>3</td>
</tr>
<tr>
<td>STAT 3025Q-Stat. Methods</td>
<td>3</td>
<td>CSE 3000 -Contemporary Issues in CSE</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2210Q-Linear Algebra</td>
<td>3</td>
<td>CSE Elective(^2)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Elective</td>
<td>16</td>
</tr>
</tbody>
</table>

### SENIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 4939W – CSE Design Project I</td>
<td>3</td>
<td>CSE 4940 – CSE Design Project II</td>
<td>3</td>
</tr>
<tr>
<td>CSE xxxx - Concentration course 3</td>
<td>3</td>
<td>CSE xxxx - Concentration course 4</td>
<td>3</td>
</tr>
<tr>
<td>Area 4 (Diversity and Multiculturalism)</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective(^3)</td>
<td>4 to 5</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective(^3)</td>
<td>13 to 14</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additionally the program must include one W course other than CSE 4939W, which may be used to satisfy other requirements or Free Electives.

---

\(^1\) A two-course sequence must be selected from one of the following sequences. CHEM 1127Q, 1128Q; CHEM 1147Q,1148Q; CHEM 1137Q, 1138Q; PHYS 1401Q, 1402Q; PHYS 1601Q, 1602Q; PHYS 1501Q, 1502Q. An additional course must be selected from the department not selected for the sequence or from BIOL 1107, BIOL 1108, BIOL 1110, or GEOL 1050.

\(^2\) If needed to get at least 43 credits in CSE courses.

\(^3\) Sufficient to make 120 credits.

Revised 2/4/19
Computer Science Concentration Requirements

Every Computer Science major must satisfy the requirements for a concentration. A concentration consists of four courses within a defined set of alternatives (one or more of the courses may be required for the concentration). A student must declare a single concentration to count toward graduation; that is the one that will be listed on his or her transcript. There are currently 8 concentrations available, these are listed below. For information about the concentration requirements, see the Guide to Course Selection, linked from the CSE department web page under Undergraduate Studies.

Concentration 1: Theory and Algorithms
Concentration 2: Systems and Networks
Concentration 3: Cybersecurity
Concentration 4: Bioinformatics
Concentration 5: Software Design and Development
Concentration 6: Computational Data Analytics
Concentration 7: Unspecialized
For the Unspecialized concentration, students must take required courses from 3 different concentrations, plus any other 2000+ level CSE course not used to fulfill another requirement.

Concentration 8: Individually Designed
Students may propose an individually-designed concentration to fit their academic or career interests. This will be a minimum of 12 credits at the 2000+ level, proposed by the student and approved by the student's advisor and the CSE Department Undergraduate Committee. The expectation is that such a concentration will have a strong unifying theme. This may include non-CSE courses, but the student will still be subject to the overall requirement of 43 CSE credits.
# COMPUTER ENGINEERING 2019-20

## FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1131Q – Calculus I</td>
<td>4</td>
<td>MATH 1132Q – Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 1127Q – Gen. Chem. I</td>
<td>3</td>
<td>PHYS 1501Q(^1) – Engineering Physics I</td>
<td>4</td>
</tr>
<tr>
<td>CSE 1010 – Intro. to Computing for Engr.</td>
<td>4</td>
<td>CSE 1729 – Intro. Principles of Programming</td>
<td>3</td>
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<tr>
<td>ENGL 1010 or 1011 – Academic Writing</td>
<td>4</td>
<td>Arts and Humanities course(^2)</td>
<td>3</td>
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<tr>
<td>ENGR 1000 – Orientation to Engineering</td>
<td>1</td>
<td>Social Sciences course(^2)</td>
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## SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 2110Q – Multivariable Calculus</td>
<td>4</td>
<td>MATH 2410Q – Differential Equations</td>
<td>3</td>
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<tr>
<td>PHYS 1502Q(^1) – Engineering Physics II</td>
<td>4</td>
<td>ECE 2001 – Electric Circuits</td>
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<tr>
<td>CSE 2050 – Data Structures &amp; OO Design</td>
<td>3</td>
<td>CSE 2500 – Intro to Discrete Systems</td>
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<tr>
<td>CSE 2300 – Logic Design</td>
<td>4</td>
<td>PHIL 1104 – Philosophy and Social Ethics</td>
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<td></td>
<td>15</td>
<td>Social Sciences course(^2)</td>
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## JUNIOR YEAR

<table>
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<tbody>
<tr>
<td>ECE 3101 – Signals and Systems</td>
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<td>ECE 3401 – Digital Systems Design</td>
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<tr>
<td>ECE 3201 – Electronic Circuit Design and Analysis</td>
<td>4</td>
<td>ECE 3411 – Microprocessor App. Lab or CSE 4903 – Microprocessor Lab</td>
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<tr>
<td>CSE 3100 – Systems Programming</td>
<td>3</td>
<td>CSE 4302 – Advanced Computer Architecture</td>
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<tr>
<td>CSE 3666 – Intro. to Computer Architecture</td>
<td>3</td>
<td>STAT 3345Q – Probability Models Engineers</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2210Q – Linear Algebra</td>
<td>3</td>
<td>Diversity and Multiculturalism course(^2)</td>
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## SENIOR YEAR

<table>
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<tbody>
<tr>
<td>ECE 4901 – E&amp;ECE Design I</td>
<td>2</td>
<td>ECE 4902 – E&amp;ECE Design II</td>
<td>3</td>
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<tr>
<td>ECE 4099W – Independent Study w/writing(^5)</td>
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<td>ECE 3421 – VLSI Design &amp; Simulation</td>
<td>4</td>
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<tr>
<td>CSE 4300 – Operating Systems</td>
<td>3</td>
<td>Professional Requirement(^3)</td>
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<tr>
<td>Professional Requirement(^3)</td>
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<td>Professional Requirement(^3)</td>
<td>3</td>
</tr>
<tr>
<td>Design Laboratory(^4)</td>
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<td>Diversity and Multiculturalism course(^2)</td>
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<td>Elective</td>
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<tr>
<td></td>
<td>15</td>
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</tbody>
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\(^1\) Either the two-semester sequence of PHYS 1401Q-1402Q or the three-semester sequence of PHYS 1201Q-1202Q followed by PHYS 1230 or 1530 may be taken instead to satisfy this requirement. However, only eight credits of PHYS 1201-1202-1230/1530 can be used toward the required 126 credits for the Engineering degree.

\(^2\) The courses from content areas one (Arts and Humanities) and two (Social Sciences) must be from four different departments. One course from either content area one (Arts and Humanities) or content area two (Social Sciences) may also be used to fulfill one of the requirements from content area four (Diversity and Multiculturalism). One course from content area four must be an international course.

\(^3\) Choose three (3) from: ECE 3111, ECE 3431/CSE 3802, ECE 3221, ECE 4112, ECE 4121, ECE 4131, ECE4451, CSE 2102, CSE 3300, CSE 3500, CSE 3504, CSE4707, and CSE4709. At least one of the three must be ECE 4112 or CSE 3504.

\(^4\) Choose one (1) from: CSE 3350/ECE 4401, CSE 4901/ECE 4402, ECE 4114, and ECE 4132

\(^5\) One additional W course must be taken, typically as one of the content area courses.
The Faculty

Our faculty members graduated from top schools, are on the technological cutting edge and conduct externally-funded research (13 Faculty members are NSF CAREER-award recipients!) in exciting fields such as parallel and distributed computing, cryptography, cybersecurity, combinatorial optimization, networking, and bioinformatics.

Modern Curriculum
State-of-the-art Facilities
World-Class Faculty
Endless Possibilities

A world of applications
- Bioinformatics
- Cryptography
- Cybersecurity
- High Performance Computing
- Networking and the Internet
- Optimization
- Parallel and Distributed Computing
- Voting Technology

Opportunities
- Three majors
- Several minors
- Eight concentrations
- Co-op/Internships
- Honors program and University Scholars
- Sponsored design projects
- Undergraduate research experience
- Graduate study

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Current Faculty
- 25 Tenured/tenure Track Faculty
- 8 Teaching Faculty

AY 18-19 Graduates
- 164 B.S./B.S.E., 31 M.S. 15 Ph.D. 76 Minors

Programs
- CS and CSE undergraduate programs
- CompE joint with ECE Department
- Several minors, 8 concentrations and a graduate program with M.S. and Ph.D.
- Many non-major students

Current Enrollment - Fall 2019
- 855 undergraduate 43 M.S. 102 Ph.D. 396 Minors

Research for 2018-2019
- 13 NSF Career Awardees to date
- 1 Patent Award
- 32 journal articles
- 93 conference papers
- $18,823,955 active research projects
- $4,016,745 in research expenditures
- $3,651,386 in new research awards

Research Expenditures