School of Engineering and Computational Sciences

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RESIDENTIAL FACULTY
Professor
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Assistant Professor
Bae, Rich

PURPOSE
The School of Engineering and Computational Sciences functions with the purpose of teaching Christ-centered men and women with the values, knowledge, and skills critical for impacting computing and technology-related disciplines in tomorrow’s world. Enhanced in the fall of 2007, the School has the long-term vision of creating and maintaining nationally recognized technology-related degrees, centers, institutes, and initiatives in education, research, training, and missions so that our Christ-centered graduates can have the greatest impact on tomorrow’s world.

The School offers five degrees and one minor that provide students with the skills, knowledge, and understanding of information technology necessary for impacting tomorrow’s socio-technological culture.

PROGRAM ACCREDITATION
The Bachelor of Science degree programs in Electrical Engineering and Industrial and Systems Engineering have been accredited by the Engineering Accreditation Commission of ABET (Accrediting Board for Engineering and Technology). ABET is the recognized accrediting agency for college and university programs in applied science, computing, engineering, and engineering technology. ABET accreditation
demonstrates a program's commitment to providing its students with a quality education.

TEACHER LICENSURE
Liberty University offers teacher licensure programs which are approved by the State of Virginia Department of Education. Teacher preparation and endorsement in Computer Science is available through the School of Engineering and Computational Sciences in cooperation with the Teacher Education Department.

Those who enter the teacher licensure program must complete the academic major, be subject to the same general education requirements as all other students, and complete academic and practicum experiences related to professional teacher training.

Those wishing to pursue teacher-related programs should seek information from the Teacher Licensure Office in the School of Education. Licensure information is also available at www.liberty.edu/uguide.

DEGREE COMPLETION PLANS
Degree Completion Plans for programs offered by the School of Engineering and Computational Sciences can be accessed online at: http://www.liberty.edu/dcps.

Engineering Programs

PROGRAM LEARNING OUTCOMES
The student will be able to:

1. An ability to apply knowledge of mathematics, science, and engineering;
2. An ability to design and conduct experiments, as well as to analyze and interpret data;
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
4. An ability to function on multidisciplinary teams;
5. An ability to identify, formulate, and solve engineering problems;
6. An understanding of professional and ethical responsibility;
7. An ability to communicate effectively;
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
9. A recognition of the need for, and an ability to engage in life-long learning;
10. A knowledge of contemporary issues; and
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Computer Engineering Major (B.S.)

PURPOSE
Liberty University's 138-hour Bachelor of Science program in Computer Engineering requires students to take 53 to 58 hours of coursework in
engineering, and another 35 to 39 hours in math and science in addition to the general education requirements. A Senior Capstone Project as well as a Directed Research project is also required.

The computer engineering degree is designed to develop Christ-centered men and women with the values, knowledge, and skills essential to positively influence computer and electrical engineering-related industries in the current and evolving economy. The program prepares graduates for the thoughtful integration of work and life and to view the computer engineering profession as a lifelong commitment to serving others.

**PROGRAM EDUCATIONAL OBJECTIVES**
Our goal is, within a few years of graduating, our Computer Engineering graduates will be able to:

1. Advance in an engineering career or graduate studies.
2. Be recognized as a creative thinkers; exhibiting an aptitude for continuous learning.
3. Display professional ethics and behavior consistent with foundational Christian principles.

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**Program of Study**

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**Electrical Engineering Major (B.S.)**

**PURPOSE**
Liberty University’s 138- to 147-hour Bachelor of Science program in Electrical Engineering requires students to take 53 to 58 hours of coursework in engineering, and another 35 to 39 hours in math and science in addition to the general education requirements. A Senior Capstone Project as well as a Directed Research project is also required.

The Electrical Engineering degree is designed to develop Christ-centered men and women with the values, knowledge, and skills essential to positively influence electrical engineering-related industries in the current and evolving economy. The program prepares graduates for the thoughtful integration of work and life and to view the computer engineering profession as a lifelong commitment to serving others.

**PROGRAM EDUCATIONAL OBJECTIVES**
Our goal is, within a few years of graduating, our Electrical Engineering graduates will be able to:

1. Advance in an engineering career or graduate studies.
2. Be recognized as a creative thinkers; exhibiting an aptitude for continuous learning.
3. Display professional ethics and behavior consistent with foundational Christian principles.
Program of Study

Industrial and Systems Engineering Major (B.S.)

PURPOSE
Liberty University's 138-hour Bachelor of Science program in Industrial and Systems Engineering requires students to take 52 to 57 hours of coursework in engineering, and another 35 to 42 hours in math and science in addition to the general education requirements. A Senior Capstone Project as well as a Directed Research project is also required.

The industrial and systems engineering degree is designed to develop Christ-centered men and women with the values, knowledge, and skills essential to positively influence an industrial setting of complex, integrated systems. The program prepares graduates for the thoughtful integration of work and life and to view the industrial engineering profession as a lifelong commitment to serving others.

PROGRAM EDUCATIONAL OBJECTIVES
Our goal is, within a few years of graduating, our Industrial and Systems Engineering graduates will be able to:

1. Advance in an engineering career or graduate studies.
2. Be recognized as a creative thinkers; exhibiting an aptitude for continuous learning.
3. Display professional ethics and behavior consistent with foundational Christian principles.

Program of Study

Computational Science Programs

In general, the computational science programs [i.e., Computer Science (CS) and Web Technology and Design] are designed to prepare our students to enter the professional workforce with the knowledge and skills to impact computing and technology-related disciplines in tomorrow’s world.

PROGRAM LEARNING OUTCOMES
The student will be able to:

1. Apply knowledge of computing and mathematics appropriate to the discipline.
2. Analyze a problem, and identify and define the computing requirements appropriate to its solution.
3. Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
4. Function effectively on teams to accomplish a common goal.
5. Demonstrate an understanding of professional, ethical, legal, security and
social issues and responsibilities.
6. Communicate effectively with a range of audiences.
7. Analyze the local and global impact of computing on individuals, organizations, and society.
8. Recognize the need for and an ability to engage in continuing professional development.
9. Use current techniques, skills, and tools necessary for computing practice.
10. Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
11. Apply design and development principles in the construction of software systems of varying complexity.

Computer Science Major (B.S.)

PURPOSE
The Computer Science (CSCI) major is offered by the School of Engineering and Computational Sciences with the purpose of developing Christ-centered men and women with the values, knowledge, and skills essential to impact computing-related disciplines in tomorrow’s world.

Students are exposed to the computer science core body of knowledge from a Christian worldview. Equipped with a firm foundation in algorithms and problem solving, they learn to analyze problems and design, implement, and test software solutions. Students also develop a strong background in mathematics to cultivate their reasoning abilities. Faculty help students prepare for a lifetime of service while encouraging undergraduate research and effective application of technology from a Christian worldview.

PROGRAM EDUCATIONAL OBJECTIVES
Our goal is, within a few years of graduating, our Computer Science graduates will be able to:

1. Demonstrate a sound understanding of the fundamentals principles and practices of computer science necessary for employment and graduate studies.
2. Apply computer science principles and practices to identify and document requirements, develop designs, as well as implement and validate solutions for computing systems of varying levels of complexity.
3. Establish a sense of continuous life-long learning and adopting new technologies where appropriate.
4. Develop skills for working in teams; communicating technical information effectively in both oral and written forms; engaging in creative and critical thinking; gaining and applying business knowledge; building leadership skills.
5. Display the Christian principles that are the basis for their professional ethics and behavior.

TEACHER LICENSURE
An endorsement in Computer Science is available. Those wishing to pursue
teacher-related programs should seek information from the Teacher Licensure Office in the School of Education.

**Career Opportunities**

- Computer Scientists
- Operations Research
- Computer Engineers
- Systems Analysts
- Computer Programmers
- Computer Support Specialists
- Database Administrators
- Teaching in Private Schools & Public Schools

**Programs of Study**

**Web Technology and Design Major (B.S.)**

**PURPOSE**

The Web Technology and Design major is offered by the School of Engineering and Computational Sciences with the purpose of developing Christ-centered men and women with the values, knowledge, and skills essential to impact the Internet and web-related disciplines in tomorrow’s world.

In many schools, artistically-talented technology students and technologically-talented graphic design students are forced to choose a major between two strong interests. The Web Technology and Design major uniquely blends these disciplines, thus allowing students who are interested in both art and computing technology to use their talents in one of the fastest growing areas of technology. With the explosion of Internet technologies is an accompanying demand for web technology professionals with skill sets that are relevant to their occupations. All analyses indicate that this demand will continue on an upward trend for many years to come.

**PROGRAM EDUCATIONAL OBJECTIVES**

Our goal is, within a few years of graduating, our Web Technology and Design graduates will be able to:

1. Demonstrate a sound understanding of the fundamentals principles and practices of web technologies necessary for employment and graduate studies.
2. Apply web technologies principles and practices to identify and document requirements, develop designs, as well as implement and validate solutions for computing systems of varying levels of complexity.
3. Establish a sense of continuous life-long learning and adopting new technologies where appropriate.
4. Develop skills for working in teams; communicating technical information effectively in both oral and written forms; engaging in creative and critical thinking; gaining and applying business knowledge; building leadership skills.
5. Display the Christian principles that are the basis for their professional ethics.
Career Opportunities

Web Programmers  Database Administrators
Web Engineers    Network Administrators
Graphic Designers Systems Administrators
Design Support Specialists Data Processing Managers
Software Developers Software Trainers and Support Specialists
Software Project Managers

Program of Study

Computer Science Minor