

# BIOMEDICAL ENGINEERING MINOR

Minor in Biomedical Engineering (15 hours)



## NATURE OF THE WORK

Biomedical engineers develop devices and procedures that solve medical and health-related problems by combining their knowledge of biology and medicine with engineering principles and practices. Many do research, along with medical scientists, to develop and evaluate systems and products such as artificial organs, prostheses (artificial devices that replace missing body parts), instrumentation, medical information systems, and health management and care delivery systems. Biomedical engineers also may design devices used in various medical procedures, imaging systems such as magnetic resonance imaging (MRI), and devices for automating insulin injections or controlling body functions. Most engineers in this specialty need a sound background in another engineering specialty, such as mechanical or electronics engineering, in addition to specialized biomedical training. Some specialties within biomedical engineering are biomaterials, biomechanics, medical imaging, rehabilitation engineering, and orthopedic engineering.

*(compiled from U.S. Dept. of Labor Occupational Outlook Handbook 2010-2011)*

## USF DEPARTMENT OF CHEMICAL & BIOMEDICAL ENGINEERING EXPERTISE

Biomedicine & Biotechnology

Energy

Environment & Sustainability

Functional Materials & Nanotechnology

Neuroengineering

The University of South Florida Bachelor of Science degree programs in Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering and Mechanical Engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The Bachelor of Science in Computer Science program at the University of South Florida is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology. ABET 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 telephone: (410) 347-7700.

## > EDUCATION REQUIREMENTS > JOB OUTLOOK > SALARY

- A bachelor's degree in engineering is required for most entry-level jobs, but some research positions may require a graduate degree.
- Continuing education is critical for engineers in order to keep up with improvements in technology.
- Overall job opportunities for engineers are expected to be good.
- Average starting salary - \$55,197 *(NACE spring 2011)*

## REAL WORLD OPPORTUNITIES

**Co-ops and Internships** – These programs offer students numerous opportunities to engage with the broader-based engineering, technology and science community.

**Engineering EXPO** – This student-run event exposes school children to science and engineering principles in a two-day, on campus event.

**Research Experiences for Undergraduates** – The program gives undergraduate students an opportunity to participate. Students work as Research Assistants with professors and graduate students on a variety of exciting and interdisciplinary research projects.

**Scholarships** – More than 100 scholarships are awarded to USF engineering students totaling more than \$150,000 to provide financial support and recognizing their exceptional efforts.

## STUDENT ORGANIZATIONS

[American Institute of Chemical Engineers](#)  
[Biomedical Engineering Society](#)  
[Omega Chi Epsilon](#)

[Engineers Without Borders](#)  
[Engineers for Sustainable World](#)  
[Student Chapter of the Florida Engineering Society](#)  
[National Society of Black Engineers](#)  
[Society of Hispanic Engineers](#)  
[Society of Women Engineers](#)  
[Tau Beta Pi The Engineering Honor Society](#)  
[Theta Tau](#)



For more information  
<http://outreachrequest.eng.usf.edu>  
[www.eng.usf.edu](http://www.eng.usf.edu)

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# UNIVERSITY OF SOUTH FLORIDA COLLEGE OF ENGINEERING

## 2011-12 CURRICULUM

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### **MINOR IN BIOMEDICAL ENGINEERING ..... 15 hours**

#### Biomedical Engineering Minor

This biomedical engineering minor is a 15 credit hour program that is open to all engineering majors and other students that meet the prerequisites listed below. For engineering majors, at least 9 hours beyond the B.S. in any Engineering discipline must be completed for the biomedical engineering minor. Student must register with the Department of Chemical & Biomedical Engineering undergraduate advisor prior to starting this minor program. Departments within the College of Engineering are currently developing additional courses that will be added to the list of courses that can be applied to this minor, so consultation with the advisor will ensure that students are informed of all offered courses.

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#### PREREQUISITE COURSES

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1. Biology I: BSC 2010
2. Calculus II: MAC 2282, MAC 2242, MAC 2233 or MAC 2312
3. Physics II: PHY 2049 or PHY 2054
4. General Chemistry II: CHM 2046

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#### REQUIRED COURSES (6 HOURS)

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ECH 4931 Special Topics in Chemical Engineering*	3
BME 4406 Engineering of Biological Systems	3

#### **The remaining 9 credit hours can be taken from the following list:**

ECH 6417 Bioseparations	3
ECH 4931 Special Topics in Chemical Engineering**	3
PHZ 4702 Applications of Physics to Biology & Medicine I	4
PHZ 4703 Applications of Physics to Biology & Medicine II	4
BCH 3023 Introductory Biochemistry	3
EIN 4313C Human Factors	3
BME 5006 Theory and Design of Bioprocesses	3
EIN 5245 Work Physiology/Biomechanics	3
BME 5040 Pharmaceutical Engineering	2
ECH 5748 Selected Topics in Biomedical Engineering**	1-10
BME 5748 Selected Topics in Biomedical Engineering **	3

\*Please see academic advisor for required special topics courses.

\*\*Please see academic advisor for selected special topics courses.