

THE DEPARTMENT OF BIOMEDICAL ENGINEERING  
THE UNIVERSITY OF MEMPHIS

BME UNDERGRADUATE ADVISING GUIDE

**WELCOME!** And we are delighted you have selected Biomedical Engineering as your undergraduate major! The Biomedical Engineering degree is a wonderful program that provides graduates with unique training, skills and knowledge for a wide range of career options in medical research, development, education and regulatory oversight, and in medical and legal professions.

This advising guide provides general information about the Biomedical Engineering discipline, and the biomedical engineering program at The University of Memphis. It also provides information about how to plan, with your advisor, a curriculum to help you achieve your career goals. This document is only a guide; official policies, as updated and or augmented may be found in The University of Memphis undergraduate bulletin (<http://www.memphis.edu/ugcatalog/archive/index.php>).

### PROGRAM EDUCATIONAL OBJECTIVES\*

The Biomedical Engineering Program at the University of Memphis aims to produce graduates who demonstrate the following within the first few years after graduation. Graduates will:

- secure employment in biomedical or related health industries or institutions,
- pursue professional studies,
- pursue opportunities for professional growth, development, and service.

*\*( revised 23 Feb 2015)*

### STUDENT OUTCOMES

The following outcomes describe what students are expected to know and be able to do by the time of graduation from the Biomedical Engineering undergraduate program:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) 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
- (d) an ability to function on multidisciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

In addition students will gain experience in:

- applying principles of engineering, biology, human physiology, chemistry, calculus-based physics, mathematics (through differential equations), and statistics;
- solving bio/biomedical engineering problems, including those associated with the interaction between living and non-living systems;
- analyzing, modeling, designing and realizing bio/biomedical engineering devices, systems, components, or processes; and
- making measurements on and interpreting data from living systems

## BIOMEDICAL ENGINEERING OVERVIEW:

- Biomedical engineering combines biology and medicine with engineering to advance healthcare through the creation of innovative devices and procedures.
- The field encompasses many diverse areas for improving human health such as
  - implant devices and biomechanics
  - tissue engineering/regeneration
  - biosensors
  - imaging
  - electrophysiological technologieswhich are used for the prevention, detection, diagnosis, and treatment of diseases such as osteoporosis, cancer and heart arrhythmia.
- All these areas are multi-disciplinary in nature and present challenges to engineers, scientists and medical professionals.
- Students who complete an undergraduate program may immediately fill positions such as R&D design engineer, research and test engineer, regulatory specialist, quality control engineer, technical support engineer or sales engineer.
- Most students continue their education, earning masters, doctoral, medical, dental, or other professional degrees including law degrees (especially in intellectual property).
- See the [American Institute of Medical & Biological Engineering](#) webpages for additional information

## BIOMEDICAL ENGINEERING – THE FUTURE IS BRIGHT!

- According to the U.S. Bureau of Labor Statistics, "employment of biomedical engineers is projected to grow 27 percent from 2012 to 2022, much faster than the average for all occupations."
  - The aging of the population and a growing focus on health issues will drive demand for better medical devices and equipment designed by biomedical engineers. Along with the demand for more sophisticated medical equipment and procedures, an increased concern for cost-effectiveness will boost demand for biomedical engineers, particularly in pharmaceutical, medical device manufacturing and related industries.
- A 2014 survey by the National Association of Colleges and Employers found the average starting salary for a person with a Bachelor's degree in Biomedical Engineering to be \$43,200/year, with substantial increase in starting salary to \$71,600/year with MS degree in Biomedical Engineering (Jan 2015)
- In 2014 the U.S. Bureau of Labor Statistics reported the median salary of all Biomedical Engineers employed in the U.S. to be \$86,960 /year.

## BIOMEDICAL ENGINEERING CURRICULUM AT THE UNIVERSITY OF MEMPHIS:

- Integrates physical, chemical, mathematical, and computational sciences and engineering with biology and medicine.
- Curriculum prepares graduates for professional practice and provides a foundation for lifelong learning and professional growth.
- Curriculum includes biomedical and engineering foundation courses as well as upper level biomedical, engineering and technical electives (as noted in the typical sequence below) to allow students, with advisor's assistance, to focus<sup>1</sup> their curriculum to areas of interest in the larger BME discipline and its supporting fields.
- Curriculum culminates in a senior design experience in which a medical device is designed, constructed and evaluated.

- Curriculum flow charts and degree sheets are on the departmental website under the [“Current Student”](#) link to help you in planning and tracking your progress in the program.

<sup>1</sup>Undergraduate students may focus\* their degree program in:

- 1] Biomaterials/Tissue Engineering;
- 2] Bioelectrical Devices and Systems;
- 3] Biomechanics;
- 4] BioSensor Devices and Systems;
- 5] Pre-medical professional studies.

\*(Note focus areas are not official and students may develop curriculum to overlap/integrate one or more focus areas for their particular career goals.)

## FOCUS AREAS

Biomaterials/Tissue Engineering: This area provides the student with basic knowledge and background in understanding structure, organization, and properties necessary for materials to be used in medical devices and/or for engineering tissues, to replace, augment and/or restore function of damaged or diseased tissues. This area involves the development, selection, modification and evaluation of material structure and properties and interactions with host cells/tissues.

Bioelectric & BioSensors Devices and Systems: This area trains students in the basic concepts and principles for detecting, measuring and monitoring chemical and bio-electrical phenomena in cardiovascular, neurological and musculoskeletal tissues, diagnostic interpretation via signal processing and the application of electrical simulation for tissue function.

Biomechanics: The Biomechanics focus introduces and develops students’ skills for examining forces acting upon and within biological/physiological structures and the effects produced by such forces. This includes mechanical analyses of implant devices, hard (e.g. bones) and soft (e.g. ligaments, blood vessels, lung) tissues, and blood and air flow analyses.

Pre-medical studies: This area provides students with highly recommended courses, including organic chemistry, to prepare them for pursuing medical, dental and/or related health science programs. This program will require additional hours to meet pre-medical, biology, and chemistry course requirements above and beyond the 128 hours required for the BS BME degree. Additional information and resources are available at the [Pre-Health Advising Center](#).

Second major: Second majors provide students the opportunity to expand and build their undergraduate degree program to meet career goals. Students may obtain a second major in physics. This program requires additional hours above and beyond the 128 required semester hours. Second majors may also be obtained in other engineering departments and options should be discussed with advisor.

Pre-law studies: Biomedical engineers are in unique position to help review and litigate many legal issues in the biotechnology sector, particularly with respect to Copyright and Intellectual Property statutes and laws. Students interested in using the BS degree in biomedical engineering to pursue a legal career are encouraged to talk with their advisor and to review information and resources at the [Pre-law Advising Center](#). This program may require additional hours above and beyond the 128 required semester hours for degree.

Honors in Biomedical Engineering: Biomedical Engineering Honors Program is for highly motivated and high achieving students and provides special opportunities to advance their career and professional development. The program aims to develop student talents, interests, and abilities within the curriculum and to encourage independence and creativity. Students are eligible to [apply for the honors program](#) in biomedical engineering if they have and maintain a cumulative GPA of 3.4, with at least junior standing and have received approval for department honors committee. The honors program requires a minimum of 10 hours of honors course credit in upper division biomedical engineering courses, including both BIOM 4800 BME Honors Seminar (1hr) and BIOM 4999 BME Honors Thesis (3hrs). Students that complete the honors requirements and regular B.S.B.M.E. curriculum will be recognized at the commencement ceremony by having their degree awarded “With Honors in Biomedical Engineering.” Honors designation will also appear on student’s diploma and academic transcript.

## REQUIREMENTS

Admission: Admission requirements to The University of Memphis are located on the [University on-line catalogue](#). Once admitted to the University, students will declare their major as Engineering-Pre-Biomedical. To be admitted to the Biomedical Engineering major, the *following courses must be completed with a minimum grade of “C” in each:*

MATH 1910 – Calculus I

BIOM 1710 – Introduction to Biomedical Engineering/Biotechnology

(or EECE1202 – Electrical and Computer Engineering Concepts or MECH 1307 – Mechanical Engineering Computing)

BIOM 1720 – Introduction to Biomedical Engineering Tools

PHYS 2110 – Physics I for Science and Engineering/Calculus-based

ENGL 1010 – English Composition

Students’ progress/completion of above listed requirements is monitored by the [Herff College of Engineering \(HCoE\) Academic Advisor](#).

Graduation Requirements: Students must satisfy all university, college and departmental degree requirement for the degree desired. University requirements may be found on [University on-line catalogue](#).

All students are required to complete an approved curriculum of a minimum 128 semester hours. All students must obtain a minimum 2.0 grade point average on all work completed, and obtain a minimum grade of "C-" in all engineering, mathematics, physics, biology, and chemistry courses used to satisfy degree requirements. **Engineering requires that a minimum of 30 hours of the hours required by the University for residency be taken as upper division hours in courses in the Herff College of Engineering.** Specific departmental requirements are subject to change and students should consult their advisor regularly to learn of changes that occur. Other [University](#) and [HCoE](#) requirements are located on the University on-line catalogue

**Graduation:** Graduation is NOT automatic and **you must file your intent to graduate by the appropriate deadlines.** Information on the dates and deadlines for filing your intent to graduate form for your intended semester of graduation are published by the [University Registrar](#). You *also* need to see your advisor to file your [HCoE Degree Application](#).

Transfer Students: A student will satisfy residence requirements for graduation by earning at least twenty-five (25) percent of credit hours required for the degree at the University of Memphis. At least thirty (30) of the final sixty (60) hours required for the degree must be completed at the University of Memphis. A student transferring credits from a two-year college or institution must complete, as a requirement for the baccalaureate degree, a minimum of sixty semester hours in an accredited senior institution.

Transfer Credit: Any University of Memphis student considering taking courses at another institution, to satisfy degree requirements, should meet with his/her academic advisor, refer to the **Transfer Equivalency Table** to see how those courses will transfer back to the University of Memphis, and complete a **Transfer Credit Request (TCR) form**. For program degree credits, please contact your advisor or Ms. Lori Stewart (ljstwart@memphis.edu), the HCoE student advisor.

## OTHER ACADEMIC INFORMATION

Cooperative Education: The Cooperative (co-op) Education Program offers students a real-world engineering dimension to their education often referred to as 'total education.' The Herff College of Engineering Co-op program may best be summarized as being a unique educational opportunity by which students obtain an academic education and at the same time obtain a minimum of one year of vitally needed practical experience in their chosen field of study. Co-op opportunities exist with many of the biomedical companies in the Memphis area including, Medtronic, Smith-Nephew, Wright Medical Technologies Inc., Odessey Medical Inc., Onyx, Gyrus ENT Inc., GE Medical Systems. Students interested in co-op opportunities should contact Ms. Shelia Moses, Program Services Specialist in the HCoE Dean's office (phone 678-4933; [srmoses@memphis.edu](mailto:srmoses@memphis.edu)). *Note, co-op course credits do not satisfy degree requirements. Grades assigned for co-op courses are used in calculating student's GPA.*

International/Study Abroad Programs: Engineering is a global industry and profession in which engineers, scientists, and managers from diverse backgrounds and cultures must function in a dynamic international environment. Engineers may be involved with several design teams on several continents linked electronically. Engineers are often called upon daily to deal with foreign suppliers and customers. Opportunities for students to experience work and education in different countries and experience different cultures will allow them to be more competitive and successful in the international engineering and business markets and in the changing global environment. Contact The University of Memphis Study Abroad Office (<http://www.memphis.edu/abroad/>) to find out about different study abroad programs, requirements, and scholarships.

Overload: Students are allowed to register for a maximum of 20.5 hours each semester without prior approval. To register for more than 20.5 hours in any one term, the student must fill the Course Overload Form with a signature from the authorized personnel for the department or college (<http://www.memphis.edu/registrar/forms.htm>)

To Change Major: If you have decided to change your major, contact the **faculty/departmental advisor for your NEW major**.

Withdrawing from the Current or Upcoming Term: We hope it is not necessary, but if you need to withdraw completely from the University, your first step should be to drop all of your courses online on or before the "Last Day to Drop a Class" for the term/part(s)-of-term. See the appropriate [Dates & Deadlines calendar](#) to find this date. ***Do not make the mistake of thinking that you are withdrawing by simply not attending your classes.*** You must drop the classes you have enrolled in; otherwise, you may receive F grades and, possibly, owe the University money.

You *must have permission* to drop all of your courses if you are a **scholarship athlete**, are under contract due to **academic suspension, high school deficiencies, or remediation** or are receiving a **Lottery Scholarship**. You will need to contact the athletic academic services, academic status and retention office and/or financial aid office to obtain permission.

It is possible to withdraw from a term after the drop deadline has passed; this is a **Late Withdrawal**. It is even possible to withdraw from a term after it has ended and grades have been issued; this is a **Retroactive Withdrawal**. In either instance, however, you must apply for permission to withdraw, and your withdrawal will be permitted only if you have the proper approval. Approval is granted only in those instances in which "serious and unforeseen circumstances" prevented you from completing that term's classes. To apply for either late or retroactive withdrawal, please contact your advisor or the HCoE advisor, Ms. Lori Stewart (ljstewart@memphis.edu).

## ELECTIVES

Electives may be used to tailor program of study to match individual student's career goals. The B.S. BME degree program has two (2) biomedical engineering (BIOM) electives, four (4) engineering electives, two (2) technical electives, and one (1) biology or engineering elective. These nine (9) electives provide much flexibility and choices in developing program of study to meet career goals.

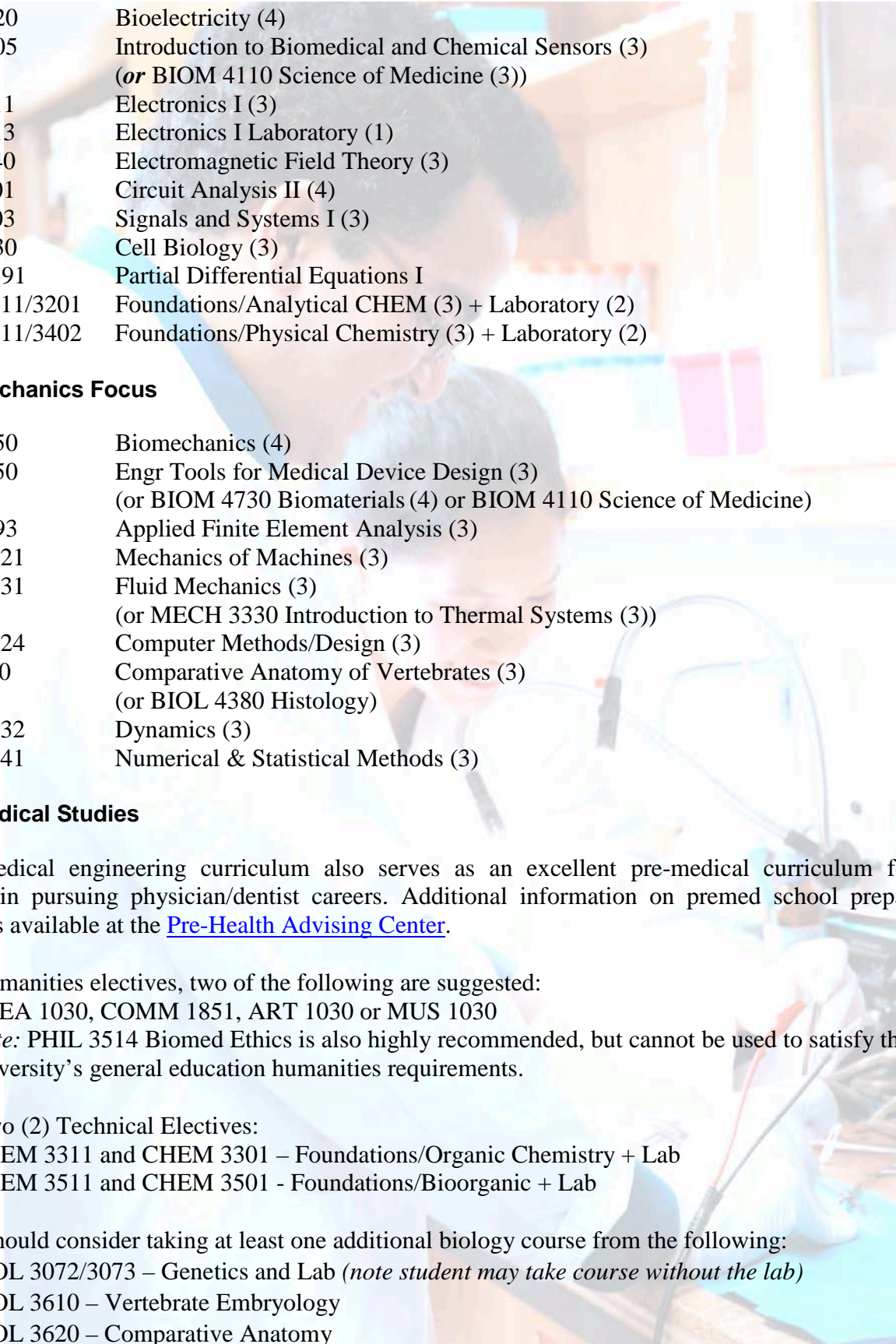
The BIOM electives must be selected from the upper division BIOM courses. The engineering electives may be selected from upper division engineering courses in the HCoE. The technical electives may be selected from upper division courses in BIOL, CHEM, Engineering (including biomedical), MATH, PHYS and Engineering Technology (TECH). The biology-engineering elective must be from upper division courses in BIOL or Engineering. These elective courses should be chosen with permission of the advisor, the Chair or the Chair designee. Students may need to take other courses to satisfy pre-requisite requirements for upper division courses outside of the department.

The focus areas below are examples pertaining to specific areas and career paths. It is not necessary for students to select a focus area since students can be well served by choosing topics from each focus area. Not all electives have been specified for each focus area. Selection of additional electives should be done in consultation with student advisor.

### **a. Biomaterials/Tissue Engineering Focus**

BIOM 4730	Biomaterials (4)
BIOM 4702	Biotechnology Tools of Biomedical Engineering Research (3)
BIOM 4150	Engr Tools for Medical Device Design (3)
BIOM 4750	Biomechanics (4) (or BIOM 4205 Introduction to Biomedical or Chemical Sensors (3) or BIOM 4110 Science of Medicine (3))
MECH 3331	Fluid Mechanics (3) (or MECH 3322 Mechanics of Materials (3))
MECH 4324	Computer Aided Design (3) (or METH 4472 Computer Aided Drafting and Design (3))
BIOL 3130	Cell Biology (3) (or BIOL 4094 - Biology of Stem Cells (3) or BIOL 4380 Histology (3) or BIOL 4445 Immunology (3))
CHEM 3310/3301	Foundations/Organic Chemistry (3) + Laboratory (1)
CHEM 3511/3501	Foundations/BioOrganic Chemistry (3) + Laboratory (1)

## b. Bioelectrical Devices, Sensors and Systems Focus



BIOM 4720	Bioelectricity (4)
BIOM 4205	Introduction to Biomedical and Chemical Sensors (3) ( <i>or</i> BIOM 4110 Science of Medicine (3))
EECE 3211	Electronics I (3)
EECE 3213	Electronics I Laboratory (1)
EECE 3240	Electromagnetic Field Theory (3)
EECE 3201	Circuit Analysis II (4)
EECE 3203	Signals and Systems I (3)
BIOL 3130	Cell Biology (3)
MATH 4391	Partial Differential Equations I
CHEM 3211/3201	Foundations/Analytical CHEM (3) + Laboratory (2)
CHEM 3411/3402	Foundations/Physical Chemistry (3) + Laboratory (2)

## c. Biomechanics Focus

BIOM 4750	Biomechanics (4)
BIOM 4150	Engr Tools for Medical Device Design (3) ( <i>or</i> BIOM 4730 Biomaterials (4) <i>or</i> BIOM 4110 Science of Medicine)
BIOM 4393	Applied Finite Element Analysis (3)
MECH 3321	Mechanics of Machines (3)
MECH 3331	Fluid Mechanics (3) ( <i>or</i> MECH 3330 Introduction to Thermal Systems (3))
MECH 4324	Computer Methods/Design (3)
BIOL 3620	Comparative Anatomy of Vertebrates (3) ( <i>or</i> BIOL 4380 Histology)
MECH 2332	Dynamics (3)
MECH 3341	Numerical & Statistical Methods (3)

## e. Premedical Studies

The biomedical engineering curriculum also serves as an excellent pre-medical curriculum for students interested in pursuing physician/dentist careers. Additional information on premed school preparation and activities is available at the [Pre-Health Advising Center](#).

For Humanities electives, two of the following are suggested:

THEA 1030, COMM 1851, ART 1030 or MUS 1030

*Note:* PHIL 3514 Biomed Ethics is also highly recommended, but cannot be used to satisfy the university's general education humanities requirements.

For Two (2) Technical Electives:

CHEM 3311 and CHEM 3301 – Foundations/Organic Chemistry + Lab

CHEM 3511 and CHEM 3501 - Foundations/Bioorganic + Lab

Students should consider taking at least one additional biology course from the following:

BIOL 3072/3073 – Genetics and Lab (*note student may take course without the lab*)

BIOL 3610 – Vertebrate Embryology

BIOL 3620 – Comparative Anatomy

BIOL 3130 – Cell Biology



BIOL 4380 – Histology  
BIOL 3500 – Micro I/Fundmntl Aspect  
BIOL 4445 – Immunology  
CHEM 4511/4512 – Biochemistry I & II

f. **General list of possible technical electives** (*there are other electives and they should be discussed with advisor*)

BIOL 3130 - Cell Biology (3)  
BIOL 4094 - Biology of Stem Cells (3)  
BIOL 4480 - Cellular/Molec Pharm (3)  
BIOL 4402 – Toxicology (3)  
BIOL 3072/3073 – Genetics and Laboratory (3/4)  
BIOL 3620 - Comparative Anatomy of Vertebrates (3)  
BIOL 4445 – Immunology (3)  
BIOL 4150 - Developmental Biology (3)  
BIOL 4200 - Cell and Developmental Biology Lab (3)  
BIOL 4380 - Histology (3)  
BIOL 3500/3505 – Microbiology I/Fundamental Aspects and Lab (3/4)

MATH 3242 – Introduction to Linear Algebra (3)  
MATH 4391 – Partial Differential Equations I (3)  
MATH 4721 – Numerical Analysis (3)

PHYS 2115 - Classical Physics (3)  
PHYS 3010 - Modern Physics (3)  
PHYS 3011 - Theoretical Physics(3)  
PHYS 3211 - Electricity and Magnetism (3)  
PHYS 4410 - Quantum Physics (3)

TECH 4462 - Quality Improvement (3)  
TECH 4463 - Quality Systems (3)  
TECH 4472 – Computer Aided Design (3)

Other CIVL, MECH, EECE upper division engineering courses

CHEM 3310/3301 – Foundations Organic Chemistry (3) + Laboratory (1)  
CHEM 3511/3501 – Foundations of BioOrganic chemistry (3) = Laboratory (1)  
CHEM 3211/ 3201 - Foundations/Analytical CHEM (3) + Lab (2)  
CHEM 3411/3402 - Foundations/Physical Chemistry + Lab (2)  
CHEM 5411 - Biochemistry I (3)

**ADDITIONAL DEGREE PROGRAMS FOR BIOMEDICAL ENGINEERING STUDENTS**

**a. Second Major In Physics for Biomedical Engineering Students.**

Physics remains a key foundation to many biomedical engineering activities including materials development, electromagnetic radiation and imaging, biomechanics and nanotechnology. Students have the opportunity to enhance and expand their biomedical engineering degree by obtaining a second major in Physics. The second major requires a total of twenty-nine (29) semester hours beyond PHYS 2110/2111 and PHYS 2120/2121, many of which count toward the engineering degree and/or are already required by the

biomedical engineering degree program as outlined below. Note the second major in physics program only requires and additional 8 hours (three courses) beyond the 128 hour requirement for the B.S. degree in biomedical engineering. For details, please visit the Department of Physics web site at: [http://www.memphis.edu/physics/academics\\_undergrad\\_2ndmajor.htm](http://www.memphis.edu/physics/academics_undergrad_2ndmajor.htm). Please register for the program with your advisor and HCoE Academic Advisor, Ms. Lori Stewart ([ljstwart@memphis.edu](mailto:ljstwart@memphis.edu)),

<u>Physics Requirements:</u>	<u>Credits</u>	<u>Offered Every</u>	<u>To Satisfy Requirement:</u>
2115 Classical Physics	3	Spring	<a href="#">Take this class</a>
3010 Modern Physics	3	Fall	<a href="#">Take as Upper Divis techn elective</a>
3011 Theoretical Physics	3	Spring	<a href="#">Take as Upper Divis techn elective</a>
3111 Mechanics	3		Take BIOM 2810 & MECH 2332 (Intro Biomech & Dynamics)
3211 Elec & Magnetism	3	Fall	<a href="#">Take this class</a>
3610 Exp. Techniques I	1		Take BIOM 4780 Sr. Proj.
3611 Exp. Techniques II	1		Take BIOM 4780 Sr. Proj.
4410 Quantum Physics	3	Fall	<a href="#">Take this class</a>
4510 Thermodynamics	3		<i>Note: check prerequisites</i> Take MECH 3311 Thermodynamics
Upper Divis. Elective I	3		Take BIOM 4760 Biom. Eng. Design Principles
Upper Divis. Elective II Biomechanics	3		Take BIOM 4720 Bioelec. or BIOM 4730 Biomaterials or BIOM 4750

#### **b. Accelerated BS/MS Program in Biomedical Engineering**

Highly qualified students are allowed to earn a [Bachelor's degree in an approved undergraduate discipline and a Master's degree in Biomedical Engineering \(BME\) in five years](#). Students with high school advanced placement credits may require less time. Students will join research teams organized through the Joint Graduate Program in Biomedical Engineering, which is shared by the University of Memphis and The University of Tennessee Health Science Center. [Students apply](#) once they have reached sophomore standing and have completed one semester of course work. In addition to an application form, students must submit one letter of reference and a copy of their transcript to the BME department. Each applicant will be required to complete an interview with a pre-graduate advisor in the BME department. **This is a highly competitive program and admission is limited.** **In order to remain in the program past the junior year, students must maintain a minimum GPA of 3.25.** Students in their senior year will become eligible to apply for combination senior status, allowing them to take graduate courses in BME. Up to 9 hours of graduate course work may be applied towards B.S degree requirements; the courses that may be applied will be determined in consultation with your academic advisor. To continue in this program past the B.S., students must submit a "Change of Status" application with Graduate Admissions. Contact your advisor to find out if this option is right for you.

## ADDITIONAL INFORMATION FOR BME AND UNIVERSITY CURRICULUM

The **only** Courses that satisfy the University's [Humanities and Social/Behavioral Science](#) elective requirements are listed below. Other courses may be taken but cannot be used to satisfy graduation requirements in the HCoE.

### **HUMANITIES (6 hrs.) (Select any two)**

ART 1030 (1101)	Introduction to Art - Fundamental principles of visual artistic expression as the basis for understanding Western and non-Western traditions.
ARTH 2010 (2101)	World Art I - Development of visual arts from prehistoric times through medieval period.
ARTH 2020 (2102)	World Art II - Continues World Art I; development of visual arts from medieval period through Renaissance to present.
CLAS 2481	Mythology - Thematic study of ancient myths.
COMM 1851	Introduction to Film - Film as a cultural, artistic, and social phenomenon.
DANC 1151	Introduction to Dance - Dance as an expressive art form, a symbolic language, and an integral aspect of world cultures.
JDST 2850	Religions of Abraham: Judaism, Christianity, Islam - Religious traditions arising from ancient Near East.
MUS 1030 (MUHL 1101)	Music Appreciation - Music of various Western and non-Western cultures.
MUS 1040	Music in America - Music history, sources and current styles of American music.
PHIL 1101	Fundamental Issues in Philosophy - Critical exploration of such issues as knowledge, reality, and the good life.
PHIL 1102	Values and the Modern World - Introduction to social and ethical issues: good and evil, science, religion, sex, race.
POLS 1101	Introduction to Ancient Political Thought - Fundamental questions of ancient political thought.
POLS 1102	Introduction to Modern Political Thought - Fundamental questions of modern political thought.
RLGN 1100	Introduction to Religion - The world's major spiritual traditions from ancient times to the present
THEA 1030 (1551)	Introduction to Theatre - Experiential, conceptual, historical, and cultural study of theatre.
UNIV 3580	Hebrew and Greek Legacy - Interdisciplinary examination of major traditions of ancient Hebraic and Greek cultures.
UNIV 3581	Faith, Reason and Imagination - Interdisciplinary examination of the religious, rationalist, and aesthetic viewpoints as distinctive ways of understanding.

### **SOCIAL/BEHAVIORAL SCIENCES (select one; ECON 2110 is already required in BME curriculum)**

ANTH 1100	Biological Anthropology and Prehistory- Origins of humans and human society, behavior, and culture.
ANTH 1200	Cultural Anthropology - Origins and development of human culture throughout the world.
CSED 2101	The Family in Global Perspective - Interdisciplinary overview of the family as a primary, global, social institution.

ECON 2010 (2110)	Macroeconomics - Nature and functions of the national economy in a global context.
ECON 2020 (2120)	Microeconomics - Operations of the market economy at the individual and firm level.
ESCI 1301 (GEOG 1301)	Survey of World Regions - Survey of economic, cultural, and physical traits characteristic of developing and industrialized nations.
ESCI 1401 (GEOG 1401)	Introduction to Cultural Geography - Geographical aspects of human behavior.
JOUR 1700	Survey of Mass Communication - History and cultural roles of major forms of mass communication.
POLS 1030 (1100)	American Government - Development, structures, and processes of the American system of government.
POLS 1301	Intro to Comparative Politics - Comparisons of political issues and systems in a variety of European, Asian, and African countries.
POLS 1501	International Relations - Conflict, competition, and cooperation among global factors in the world arena.
PSYC 1030 (1200)	General Psychology - Introduction to social aspects of psychology as a science of behavior.
PSYC 3510	Deviance: Its Role in History and Culture - Defamation and glorification of concepts of deviance across cultures.
SOCI 1010 (1111)	Introduction to Sociology - Concepts and methods of sociology, social structure, and social institutions.
SOCI 2100	Sociology of International Development - Social change in an increasingly interdependent world.
UNIV 2304	Gender and Society - Interdisciplinary study of gender as a social experience among different racial, ethnic, class, and cross-cultural groups.

