Program: Biomedical Engineering
Major: Biomedical Engineering
Degree: Bachelor of Science (B.S.)

Dept: Engineering and Physics
College: Mathematics and Science
Major Code: 6220

University Core (Total Listed 42-44)

For a full list of courses see University Core.
• Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication 9

Quantitative Reasoning/Scientific Method 10-11
• Math 3
• Life Science 4
• Physical Science 3-4

Critical Inquiry and Aesthetic Analysis 6
Aesthetic Analysis 3
• Critical Inquiry 3

American Historical and Political Analysis 6
American National Government 3
American History 3

• Cultural and Language Analysis 3-4
Second Language 4
OR
Cultural Analysis 3

• Social and Behavioral Analysis 3

Life Skills 5
Required Health Course 2
• Elective Life Skills 3

Support Courses

Minimum Required Hours

Support Courses 9-18

	PHIL	1123	Contemporary Moral Problems
	ECON	1103	Introduction to Economics
	FMKT	2323	Global Protocol and Diversity (or Foreign Language)
	*MATH	1533	Precalculus-Algebra **OR**
	MATH	1513	College Algebra **OR** Placement Score **AND**
	*MATH	1593	Plane Trigonometry **OR** Placement Score

*A grade of 'C' or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Students majoring in Biomedical Engineering are encouraged to complete the following course in high school.

One year High School Physics **OR**
PHY 1003 Introduction to Physics

Major Requirements

Biomedical Engineering 96-98

Biology 11
Required courses:

	BIO	1204	Biology for Majors: Principles
	BIO	2203	Cell Biology
	BIO	2604	Human Physiology and Laboratory

Chemistry 5
Required courses:

	CHEM	1103	General Chemistry I
	CHEM	1112	General Chemistry I Recitation/Laboratory

Engineering 48
Required courses:

	ENGR	1112	Introduction to Engineering and Laboratory
	ENGR	1213	Engineering Computing and Laboratory
	BME	1311	Introduction to Biomedical Engineering
	ENGR	2033	Statics
	ENGR	2303	Electrical Science
	ENGR	2311	Electrical Science Laboratory
	#BME	3043	Biomaterials
	BME	3113	Principles of Biomedical Engineering
	ENGR	3223	Digital Logic Design and Laboratory
	ENGR	3303	Engineering Probability and Statistics
	#ENGR	3323	Signals and Systems
	ENGR	3331	Signals and Systems Laboratory
	ENGR	3403	Analog Electronics
	ENGR	3421	Analog Electronics Laboratory
	#BME	4132	Biomedical Engineering Laboratory
	#BME	4223	Biomedical Imaging
	#BME	4233	Biomedical Instrumentation
	#BME	4343	Biomechanics
	#BME	4882	BME Senior Engineering Design I
	#ENGR	4892	Senior Engineering Design II

Mathematics 15
Required courses:

	MATH	2313	Calculus 1
	MATH	2323	Calculus 2
	MATH	2333	Calculus 3
	MATH	2343	Calculus 4
	MATH	3103	Differential Equations

Physics 8
Required courses:

	PHY	2014	Physics for Science and Engineering I and Laboratory
^	PHY	2114	Physics for Science and Engineering II and Laboratory

^ A grade of "C" or better must be earned in PHY 2114.

Biomedical Engineering Elective 3-6
Any 3000/4000 level BME, PHY or ENGR course with the following exceptions: PHY 3014, 3044, 3054 or 3503.

Students in Concentration A are required to have 3 credit hours from Biomedical Engineering electives. Students in Concentration B are required to have 6 credit hours from Biomedical Engineering electives.

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Program: Biomedical Engineering - continued
Major: Biomedical Engineering
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Minimum Required Hours

- CONTINUED FROM PREVIOUS PAGE -

Complete all the courses from one of the following concentrations: 3-8

Concentration A: (courses in preparation for Pre-Med fields)

CHEM	1223	General Chemistry II
CHEM	1232	General Chemistry II Recitation/Laboratory
CHEM	3303	Organic Chemistry I

Concentration B: (courses in preparation for Instrumentation fields)

PHY	3883	Mathematical Physics I

The number of credits needed to meet degree requirements exceeds 124 hours and will vary according to course selection.

The following courses are strongly recommended electives:

BME	4243	Modeling and Analysis of Biomedical Systems
#ENGR	3443	Fluid Mechanics
CHEM	3403	Biochemistry I
CHEM	3323	Organic Chemistry II (for Concentration A)
#ENGR	3183	Electromagnetic Fields I (for Concentration B)

Admission into Engineering and Physics Upper Division is required.

Minimum Grade Requirements

1. **Average in (a) all college course work, and (b) course work at Bio UCO, ... 2.00**
2. **A minimum grade of "C" must be earned in all courses in the major to count toward meeting degree requirements.**

For other regulations pertaining to graduation, see Academic Degree Requirements.

Admission into Engineering and Physics Upper Division

Students seeking the B.S. in Biomedical Engineering, Electrical Engineering, Mechanical Engineering, and Engineering Physics – Physics are required to make formal application to the Chairperson of the Department of Engineering and Physics for admission into the upper division of each of these majors. Applications must be submitted to the Department of Engineering and Physics on or before the last Monday of January for Fall admission and the last Monday of August for Spring admission.

Upper division admission is open to students meeting Engineering and Physics upper division admission requirements. To be admitted into upper division, the student must have:

- A minimum retention grade point average (GPA) of 2.00 in all course work completed by the time the student is formally admitted into upper division.
- Completed 60 semester credit hours by the time the student is formally admitted into upper division.
- Completed the following courses or their equivalent with a minimum grade of "C" by the time the student is formally admitted into upper division:

MATH	2313	Calculus 1
MATH	2323	Calculus 2
MATH	2333	Calculus 3
MATH	2343	Calculus 4
MATH	3103	Differential Equations (Recommended)
PHY	2014	Physics for Science & Engineering I & Lab
PHY	2114	Physics for Science & Engineering II & Lab
ENGR	1112	Introduction to Engineering & Lab
ENGR	1213	Engineering Computing & Lab
ENGR	2033	Statics
ENGR	2303	Electrical Science
ENGR	2311	Electrical Science Lab
ENGR	3303	Engineering Probability and Statistics (Recommended)
CHEM	1112	General Chemistry I Recitation/Lab AND (for Biomedical Engineering)
CHEM	1103	General Chemistry I OR (for Biomedical Engineering)
CHEM	1315	Chemistry for Engineering and Lab (for Electrical Engineering, Mechanical Engineering, and Engineering Physics - Physics)

Formal approval by the department Faculty Advisor and Department Chair is required for admission. Preference is given to University of Central Oklahoma students. The student may enroll in no more than nine (9) hours of 3000 and 4000 level courses in the major prior to admission into upper division unless they secure formal approval from the Department of Engineering and Physics.

Accelerated BS/MS

The Department of Engineering and Physics offers a M.S. Engineering Physics - Biomedical Engineering major. Students in the B.S. Biomedical Engineering program are eligible to pursue, with approval, the M.S. Engineering Physics - Biomedical Engineering degree beginning in their senior year. Approved B.S. Biomedical Engineering students may take up to nine credit hours of 5000-level BME courses during their senior year of the B.S. program. These courses will count toward both the B.S. and M.S. degrees. A formal application to the M.S. Engineering Physics program and an approval from the Department of Engineering and Physics are required. Requirements are located in the UCO Graduate Catalog under Engineering Physics - Biomedical Engineering.

Up to nine credit hours of the following courses can be used to satisfy both the B.S. Biomedical Engineering and the M.S. Engineering Physics - Biomedical Engineering programs:

BME	5223	Biomedical Imaging
BME	5233	Biomedical Instrumentation
BME	5343	Biomechanics

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Accelerated BS/PSM
UCO's P.S.M. (Professional Science Master's) in Computational Science has partnered with the B.S. in Biomedical Engineering so that approved students may take up to 10 credit hours of 5000-level ENGR courses during their senior year of the B.S. program. These courses will count toward both the B.S. and P.S.M. degrees. A formal application to the P.S.M. Computational Science program and an approval from the Department of Engineering and Physics are required. Requirements for the P.S.M. program are located in the UCO Graduate Catalog under Computational Science - Computational Engineering, P.S.M.

Up to 10 credit hours of the following courses can be used to satisfy both the B.S. Biomedical Engineering and the P.S.M. Computational Science - Computational Engineering:

ENGR	5023	Heat Transfer
ENGR	5103	Finite Element Analysis
BME	5223	Biomedical Imaging
ENGR	5333	Digital Signal Processing
ENGR	5311	Digital Signal Processing Laboratory
ENGR	5803	Mechatronics & Laboratory