

Bachelor of Science in Biomedical Engineering

Required 125 Credits (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES Listing)

II. Biomedical Engineering Required Courses

Code	Title	Credits
BME 180	Biomedical Engineering Innovation-Based Learning I ‡	2
BME 181	Biomedical Engineering Innovation-Based Learning II ‡	2
BME 280	Biomedical Engineering Innovation-Based Learning III ‡	2
BME 281	Biomedical Engineering Innovation-Based Learning IV ‡	2
BME 380	Junior Innovation-Based Learning I ‡	2
BME 381	Junior Innovation-Based Learning II ‡	2
BME 450	Biomedical Instrumentation (Medical IoT Innovation I)	3
BME 480	Senior Innovation Based Learning I ‡	3
BME 481	Senior Innovation Based Learning II ‡	3
Total Credits		21

III. College of Engineering and Mines Core Program Requirements

One course from each block must be completed with the exception of Engineering Core Courses, where both must be completed. College of Engineering and Mines Core Program course recommendations for those students pursuing a double major or concentration are provided within the concentration requirements.

1. Programming Course (one of the following):

Code	Title	Credits
ENGR 200	Computer Applications in Engineering	2
CSCI 130	Introduction to Scientific Programming	4
EE 304	Computer Aided Measurement and Controls	3

2. Electrical Engineering Foundations (one of the following):

Code	Title	Credits
ENGR 206	Fundamentals of Electrical Engineering	3
EE 206 & 206L	Circuit Analysis and Circuits Laboratory I	4

3. Statistics Elective (one of the following):

Code	Title	Credits
CHE 315	Engineering Statistics and Design of Experiments	3
EE 318	Engineering Data Analysis	3
MATH 321	Applied Statistical Methods	3

4. Engineering Core Courses (must take both):

Code	Title	Credits
ENGR 340	Professional Integrity in Engineering	3
ENGR 460	Engineering Economy	3

IV. Requirements Outside of the College of Engineering and Mines

Code	Title	Credits
CHEM 121 & 121L	General Chemistry I and General Chemistry I Laboratory ‡	4
MATH 165	Calculus I ‡	4
MATH 166	Calculus II ‡	4

MATH 265	Calculus III ‡	4
MATH 266	Elementary Differential Equations ‡	3
PHYS 251	University Physics I ‡	4
PHYS 252	University Physics II ‡	4
PSYC 111	Introduction to Psychology	3
Total Credits		30

V. Program Required Electives

1. Biomedical Electives (9 credits from the following)**:

Code	Title	Credits
BME 397	Cooperative Education *	1-2
BME 430	Fundamentals of Biomedical Imaging	3
BME 432	Fundamentals of Biomedical Optics	3
BME 460	Computational Biology	3
BME 490	Special Topics	3
CHE 505	Biochemical and Biomaterial Engineering	3
ME 515	Advanced Processing of Materials and Biomaterials	3

2. Technical Electives (36 credits)**:

A list of approved technical electives is available upon request from the program director. A minimum of 24 credits of technical electives must be taken from the College of Engineering and Mines. Students may take up to 12 credit hours outside the college with approval from the program director.

Code	Title	Credits
Technical Electives		36

Chemical Concentration (Required 125 Credits)

Students who pursue this concentration can fulfill a portion of the technical elective requirements with the following concentration specific requirements. The remaining technical electives must be chosen from the program approved list. Students who pursue this option are strongly encouraged to consider a double major.

Required courses:

Code	Title	Credits
CHEM 122 & 122L	General Chemistry II and General Chemistry II Laboratory	4
CHEM 340 & 340L	Survey of Organic Chemistry and Survey of Organic Chemistry Laboratory	5
CHE 201	Chemical Engineering Fundamentals	3
CHE 206	Unit Operations in Chemical Engineering	3
CHE 232	Chemical Engineering Laboratory I	2
CHE 301	Introduction to Transport Phenomena	4
CHE 303	Chemical Engineering Thermodynamics	4
CHE 331	Chemical Engineering Laboratory II	2
CHE 332	Chemical Engineering Laboratory III	2
Total Credits		29

Students fulfill technical electives with the above listed requirements. For students pursuing a Chemical Concentration, the following courses are recommended to fulfill the College of Engineering and Mines Core Program Requirements with the following courses: ENGR 200 Computer Applications in Engineering, ENGR 206 Fundamentals of Electrical Engineering, and CHE 315 Engineering Statistics and Design of Experiments

Electrical Concentration (Required 127 Credits)

Students who pursue this concentration can fulfill a portion of the technical elective requirements with the following concentration specific requirements. The remaining technical electives must be chosen from the program approved list. Students who pursue this option are strongly encouraged to consider a double major.

Required courses:

Code	Title	Credits
EE 201 & 201L	Introduction to Digital Electronics and Digital Electronics Laboratory	4
EE 313 & 313L	Linear Electric Circuits and Circuits Laboratory II	4
EE 314 & 314L	Signals and Systems and Signal and Systems Laboratory	4
EE 321 & 321L	Electronics I and Electronics Laboratory I	4
EE 421 & 421L	Electronics II and Electronics Lab II	4
EE 452	Embedded Systems	3
MATH 207	Introduction to Linear Algebra	2
Total Credits		25

Students fulfill technical electives with the above listed requirements. For students pursuing an Electrical Concentration, the following courses are recommended to fulfill the College of Engineering and Mines Core Program Requirements: EE 304 Computer Aided Measurement and Controls, EE 206 Circuit Analysis/EE 206L Circuits Laboratory I, and EE 318 Engineering Data Analysis

Mechanical Concentration (Required 125 Credits)

Students who follow pursue this concentration can fulfill a portion of the technical elective requirements with the following concentration specific requirements. The remaining technical electives must be chosen from the program approved list. Students who pursue this option are strongly encouraged to consider a double major.

Required courses:

Code	Title	Credits
ENGR 201	Statics	3
ENGR 202	Dynamics	3
ENGR 203	Mechanics of Materials	3
ME 101	Introduction to Mechanical Engineering	3
ME 201	Student Design	2
ME 301	Materials Science	3
ME 306	Fluid Mechanics	3
ME 322	Design of Machinery	3
ME 323 & 323L	Machine Component Design and Machine Component Design Laboratory	4
ME 341	Thermodynamics	3
Total Credits		30

Students fulfill technical electives with the above listed requirements. For students pursuing a Mechanical Concentration, the following courses are recommended to fulfill the College of Engineering and Mines Core Program Requirements: ENGR 200 Computer Applications in Engineering, ENGR 206 Fundamentals of Electrical Engineering, and MATH 321 Applied Statistical Methods

Pre-Medicine

Students who are planning on applying to medical school may pursue this route as it contains critical information for students who plan on taking the MCAT. *This is not a concentration and will not be added to the transcript as such.*

II. Biomedical Engineering Required Courses (as listed above)

III. College of Engineering and Mines Core Program Requirements (as listed above)

IV. Requirements Outside of the College of Engineering and Mines (as listed above)

V. Technical Electives:

Students need to complete 45 credits of approved program technical electives. A list of approved technical electives is available from the program director. Students may take up to 12 credit hours outside the college with approval from the program director. For students planning on taking the MCAT exam, the following 12 credits are recommended and approved to count towards technical electives in the program:

Code	Title	Credits
BIOL 341 & 341L	Cell Biology and Cell Biol Lab	4
CHEM 341 & 341L	Organic Chemistry I and Organic Chemistry I Laboratory	4
CHEM 342 & 342L	Organic Chemistry II and Organic Chemistry II Laboratory	4
or BMD 301	Biochemistry	
Total Credits		12

‡ Grade of "C" or better in these courses is required for graduation.

* Students must ensure all appropriate pre-requisites are met prior to registering for all courses in the curriculum. BME 397 credits are unique.

Registering for and successfully completing two (2) credits of BME 397 Cooperative Education (40 hours/week) will count as 3 credits towards the Program Required Electives (2 transcript credits + 1 waived credit) requirement. Students are allowed to register for/complete up to 4 total credit hours of BME 397 Cooperative Education (completing 4 credit hours of BME 397 would count as 6 credits of Program Required Electives).

** Students may petition program director for alternative courses to fulfill requirements.

Credit totals per concentration may vary 1-2 credit hours based on student course selection.