

## BIOENGINEERING AREA OF CONCENTRATION, ENGINEERING SCIENCE AS: 411A

Total Credits: 61

Catalog Edition: 2022-2023

### Program Description

This curriculum is designed to provide the first two years of a four-year program leading to the award of a BS in engineering. A student planning to transfer to any baccalaureate degree granting institution should follow the appropriate area of concentration listed below in consultation with an engineering advisor. The student should also visit the Montgomery College Engineering Advising website [www.montgomerycollege.edu/engineeringadvising](http://www.montgomerycollege.edu/engineeringadvising) for up-to-date comprehensive information on transfer requirements for all universities and colleges with which we have an articulated transfer program.

Completion of all requirements for any area of concentration in engineering science will lead to the award of the AS in engineering science.

This area of concentration will prepare students to transfer to a four-year university with a major in bioengineering. Specific requirements in colleges vary, and the student preparing for a particular institution may, with approval, change the sequence listed below; this sequence of courses is articulated with the bioengineering program at the University of Maryland, College Park. A suggested course sequence for full-time students follows; all students should consult an engineering advisor. The student should also visit the Montgomery College Engineering Advising website at [www.montgomerycollege.edu/engineeringadvising](http://www.montgomerycollege.edu/engineeringadvising) for up-to-date comprehensive information.

### Program Outcomes

Upon completion of this program a student will be able to:

- Identify, formulate, and solve basic physics-based, biology problems in biomechanics and biochemistry.
- Demonstrate conceptual understanding of the connections between engineering and life sciences in the context of bioengineering applications.
- Use appropriate computer application software in bioengineering.

### Program Advisors

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For more information, please visit: <https://www.montgomerycollege.edu/engineering-advising>

To view the Advising Worksheet, please visit <https://www.montgomerycollege.edu/documents/counseling-and-advising/advising-worksheets/current-catalog/411a.pdf>

2022-2023

# Program Advising Guide

An Academic Reference Tool for Students

# BIOENGINEERING AREA OF CONCENTRATION, ENGINEERING SCIENCE AS: 411A

## Suggested Course Sequence

A suggested course sequence for full-time students follows. All students should review this advising guide and consult an advisor.

### First Semester

ENGL 102 - Critical Reading, Writing, and Research 3 semester hours (ENGF)  
MATH 181 - Calculus I 4 semester hours (MATF)  
CHEM 132 - Principles of Chemistry II 4 semester hours  
ENES 100 - Introduction to Engineering Design 3 semester hours (NSND/GEEL)

### Third Semester

CHEM 203 - Organic Chemistry I 5 semester hours  
ENES 240 - Scientific and Engineering Computation 3 semester hours  
MATH 280 - Multivariable Calculus 4 semester hours  
PHYS 262 - General Physics II: Electricity and Magnetism 4 semester hours (NSLD)  
Arts Distribution 3 semester hours (ARTD)

### Second Semester

ENES 102 - Statics 3 semester hours  
ENES 120 - Biology for Engineers 3 semester hours  
MATH 182 - Calculus II 4 semester hours  
PHYS 161 - General Physics I: Mechanics and Heat 3 semester hours (NSND)  
Behavioral and Social Sciences Distribution 3 semester hours (BSSD) \*\*

### Fourth Semester

ENES 232 - Thermodynamics 3 semester hours  
MATH 282 - Differential Equations 3 semester hours  
Behavioral and Social Sciences Distribution 3 semester hours (BSSD) \*\*  
Humanities Distribution 3 semester hours (HUMD)

## Total Credit Hours: 61

\*\* Behavioral and social sciences distribution (BSSD) courses must come from different disciplines.

## Advising Notes

Most engineering students will start at MC missing one or more prerequisites for CHEM 131, CHEM 132, CHEM 135, ENGL 102, ENES 100, and MATH 181.

The appropriate initial chemistry courses will be determined by the student's score on the Chemistry Placement Exam, mathematics level, AP/IB credits, or transfer credits. Possible courses include CHEM 099, CHEM 131, CHEM 132, or CHEM 135. Either CHEM 132 or CHEM 135 satisfies the required chemistry credit for UMCP. CHEM 131-CHEM 132 satisfies the required chemistry credit for UMBC, but CHEM 135 does not.

The prerequisite for ENGL 102 is ENGL 101 or ENGL 101A. English course placement is determined by the Accuplacer English/Reading Test.

The corequisite for ENES 100 is MATH 165 or higher.

The prerequisite for MATH 181 is MATH 165 (Precalculus). Mathematics initial course placement will be determined by the ALEKS Math Placement, Accuplacer Math Test, AP/IB credit, or transfer credits.

BIOE 121, 241, and 371, for which MC has no equivalents, must be completed after transfer or through MTAP at UMCP.

## Transfer Opportunities

Montgomery College has partnerships with multiple four-year institutions and the tools to help you transfer. To learn more, please visit <https://www.montgomerycollege.edu/transfer> or <http://artsys.usmd.edu>.

## Get Involved at MC!

Employers and Transfer Institutions are looking for experience outside the classroom.

MC Student Clubs and Organizations: <https://www.montgomerycollege.edu/life-at-mc/student-life/>

Engineering Student Professional Groups: <https://www.montgomerycollege.edu/academics/programs/engineering-science/resources.html>

## Related Careers

Some require a Bachelor's degree.

Biochemical Engineer, Architectural and Engineering Manager, Bioinformatics Scientist, Biologist, Biological Technician, Industrial Engineer, Microbiologist.

## Career Services

Montgomery College offers a range of services to students and alumni to support the career planning process. To learn more, please visit <https://www.montgomerycollege.edu/career>

## Career Coach

A valuable online search tool that will give you the opportunity to explore hundreds of potential careers or job possibilities in Maryland and the Washington D.C. metropolitan area. Get started today on your road to a new future and give it a try. For more information, please visit <https://montgomerycollege.emsicc.com>

## Notes: