

Michigan Technological University

Interdisciplinary Minor in Bioprocess Engineering

Program Code IMBE, Academic Year 2023-24

Department of Chemical Engineering and Biological Sciences

Total Credits Required: 18

Description: Work to develop lifesaving medicines and improve the food supply for a hungry world. Graduates in this field provide expertise on biological processes to major chemical, pharmaceutical, and food manufacturers.

Required Engineering Course: select one for 3 credits

- CM 2110 Material and Energy Balances (3) *Prereqs: (CH 1112 or (CH 1150 and CH 1151) and (MA1160 or MA1161 or MA1135 or MA1121))*
- CEE 3501 Env Engineering Fundamentals (3) *Prereqs: MA 2160 and CH 1112 or (CH 1150 and CH 1151)*
- CEE 3503 Environmental Engineering (3) *Prereqs: MA 2160 and CH 1112 or (CH 1150 and CH 1151)*
- BE 3300 Biomechanics I: Stats & Dynamics (3) *Prereqs: BE 2400 and (MA2321 or MA 2320 or MA 2330) and (MA3521 or MA3520 or MA 3530) and BL2010(C)*

Required Biochemistry Course: select one for 3 credits

- BL 3020 Biochemistry I (3) *Prereqs: (BL1020 or BL1040 or BE2400) or (BL1200 and BL1210) or (BL1400 and BL1410) and (CH2410 or CH2420)*
- BL 3025 Biochem for Health Professions (3) *Prereqs: (BL1200 or BL1400) and (CH2410 or CH2430)*
- CH 3540 Biophysical Chemistry (3) *Prereqs: BL1020 or BL1040 or (BL1200 and BL1210) or (BL1400 and BL1410) and CH 1122 or (CH1160 and CH1161) and MA2160 and PH2200*
- CH 4710 Biomolecular Chemistry I (3) *Prereqs: CH 2420 or CH2440*

Required Bioengineering Courses: select one for 3 credits

- CM 4710 Biochemical Processes (3) *Prereqs: CH2410*
- CM 4780 Biomanufacturing and Biosafety (3) *Prereqs: BL3020 or BL3025 or CH4710 or CM4040 or CM4080 or CM4710 or (CM3110(C) and BL1400) or (CM3110(C) and BL1200)*

Elective Courses: select remaining credits from course list below for 3 to 9 credits

- BE 4000 Independent Study (1-6) *Restrictions: Permission of instructor and department required; Topic must be approved by minor academic advisor*
- BE 4200 Cellular & Molecular Bio II (3) *Prereqs: BE2400*
- BL 3210 General Microbiology (4) *Prereqs: BL 1020 or BL1040 or (BL1200 and BL1210) or (BL1400 and BL1410) OR*
 - BL 3310 Environmental Microbiology (3) *Prereqs: BL 1020 or BL1040 or BL3080 or (BL1200 and BL1210) or (BL1400 and BL1410)*
- BL 3300 Introduction to Genomics (3) *Prereqs: BL2200 or FW3320*
- BL 4000 Research in Biology (1-6) *Instructor Permission Required; Topic must be approved by minor academic advisor*
- BL 4020 Biochemistry II (3) *Prereqs: BL 3020*
- BL 4030 Molecular Biology (3) *Prereqs: BL1020 or BL1040 or (BL1200 and BL1210) or (BL1400 and BL1410) and (BL3020 or CH4710)*
- BL 4300 Applied Bacterial Genomics (3) *Prereqs: BL2200*
- BL 4805 Molecular Diagnostics (5) *Prereqs: BL2200*
- BL 4995 Research in Biochemistry (1-6) *Prereqs: none*
- CH 4110 Medicinal Chemistry: Mechanism of Drug Action (3) *Prereqs: CH2410 or CH2430*
- CH 4120 Medicinal Chemistry: Drug Design (3) *Prereqs: CH 2420 or CH2440*

- CH 4140 Introduction to Pharmaceutical Analysis (3) *Prereqs: CH 2410 or CH2430*
- CH 4720 Biomolecular Chemistry II (3) *Prereqs: BL 3020 or CH 4710*
- CM 3025 Bioprocessing Laboratory (1) *Prereqs: CH1112 or (CH1150 and CH1151)*
- CM 4040 UG Research in Biological Engineering (1-6) *Prereqs: none*
- CM 4080 UG Research in Biofuels Engineering (1-6) *Prereqs: none*
- ENT XXXX Enterprise Project Work (1-3) *Topic must be approved by minor academic advisor*
- If not used for the bioengineering requirement:
 - CM 4710 Biochemical Processes (3) *Prereqs: CH2410*
 - CM 4780 Biomanufacturing and Biosafety (3) *Prereqs: CH 4710 or CM 4040 or CM 4080 or CM 4710 or (CM 3110(C) and BL 1040 or (BL1400 and BL1410) or (CM3110(C) and BL1020 or (BL1200 and BL1210))*