Michigan Technological University
Interdisciplinary Minor in Bioprocess Engineering
Program Code IMBE, Academic Year 2024-25
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 Course: 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) and (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

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IMBE Elective Courses, continued

- 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))