DEPARTMENT OF BIOSYSTEMS ENGINEERING

FOR STUDENTS STARTING SECOND YEAR FALL 2016

STUDENTS ARE EXPECTED TO FOLLOW EITHER THE 4 YEAR OR THE 5 YEAR MODEL PROGRAM. THIS WILL ENSURE PREREQUISITE AND TIMETABLE REQUIREMENTS ARE MET.

PRELIMINARY ENGINEERING PROGRAM: The following 12 courses must be completed by all engineering students.

<table>
<thead>
<tr>
<th>2015</th>
<th>cr hr</th>
<th>Pre- (p) or Co- (c) Requisites</th>
<th>2015</th>
<th>cr hr</th>
<th>Pre- (p) or Co- (c) Requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complementary Studies Elective</td>
<td>3</td>
<td></td>
<td>ENG 1430</td>
<td>Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 1300</td>
<td>Chemistry</td>
<td>3</td>
<td>ENG 1440</td>
<td>Engineering Statics</td>
<td>3</td>
</tr>
<tr>
<td>COMP 1012</td>
<td>Comp Prog Eng</td>
<td>3</td>
<td>ENG 1450</td>
<td>Intro Elec &amp; Comp Eng</td>
<td>3</td>
</tr>
<tr>
<td>ENG 1460</td>
<td>Thermal Sciences</td>
<td>3</td>
<td>ENGL 1400</td>
<td>Lit Topics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1510</td>
<td>Applied Calculus 1</td>
<td>3</td>
<td>MATH 1210</td>
<td>C/L Algebra</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 1050</td>
<td>Physics</td>
<td>3</td>
<td>MATH 1500/1510 (p or c)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

ADMISSION TO BIOSYSTEMS ENGINEERING PROGRAM: Any Preliminary Engineering courses not yet completed should be taken in Second Year if possible.

FALL TERM (September)

<table>
<thead>
<tr>
<th>SECOND YEAR 2016</th>
<th>Pre- (p) or Co- (c) Requisites</th>
<th>WINTER TERM (January)</th>
<th>Pre- (p) or Co- (c) Requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 2110</td>
<td>Transport Phenomenon</td>
<td>3 ENG 1460 (p)</td>
<td>BIOE 2480</td>
</tr>
<tr>
<td>BIOE 2590</td>
<td>Biology for Engineers</td>
<td>3 ENG 1460 (p)</td>
<td>CIVL 2800</td>
</tr>
<tr>
<td>BIOE 2900</td>
<td>Design 1</td>
<td>4 ENG 1430 (p)</td>
<td>ENG 1440 (p), MATH 1710/1700 (p)</td>
</tr>
<tr>
<td>CIVL 2790</td>
<td>Fluid Mechanics (or BIOE 2790)</td>
<td>4 ENG 1440 (p), MATH 1710/1700 (p)</td>
<td>CIVL 3590</td>
</tr>
<tr>
<td>CHEM 1310</td>
<td>Chem 2 (or CHEM 1110 &amp; 1126)</td>
<td>3 ENG 1460 (p)</td>
<td>MATH 2130</td>
</tr>
<tr>
<td>MATH 2132</td>
<td>Math Analysis 2</td>
<td>3 MATH 1210 (p), MATH 1710/1700 (p)</td>
<td>Elective slot (see note 1 below)</td>
</tr>
</tbody>
</table>

THIRD YEAR 2017

| BIOE 3400 | Des of Struc Comp Mach | 4 CIVL 2800 or MECH 2222 (p) or BIOE 2800 | BIOE 3270 | Instrumentation for Biosys | 4 |
| BIOE 3590 | Mechanics of Biomater | 4 CIVL 2800 (p) or BIOE 2800 | BIOE 3320 | Eng Prop of Biol Mater | 4 |
| BIOE 3900 | Design 2 | 4 BIOE 2900 (p) | MECH 3482 | Kinematics & Dynamics | 4 |
| MBIO 1220 | Essentials of Microbiology | 3 | STAT 2220 | Statistics for Engineers | 3 |
| BIOE Design Elective slot (see Note 2) | 4 | BIOE Design Elective slot (see Note 2) | 4 |
| Elective slot (see Note 1 below) | 3/4 | Elective slot (see Note 1 below) | 3/4 |

FOURTH YEAR 2018

| BIOE 4900** | Design 3 | 4 BIOE 3900 (p) | BIOE 4950** | Design 4 | 4 BIOE 4900 (p) |
| BIOE 4240* | Graduation Project | 3 BIOE 3270 (p) | CIVL 4050 | Eng Economics (or ENG 3000) | 3 |
| BIOE Design Elective slot (see Note 2) | 4 | ANTH 2430, ENG 3020 or CIVL 4460 | BIOE 4240* | Graduation Project | 3 |
| Elective slot (see Note 1 below) | 3/4 | BIOE Design Elective slot (see Note 2) | 4 |
| Elective slot (see Note 1 below) | 3/4 | Elective slot (see Note 1 below) | 3/4 |

*Students may register for BIOE 4240 Graduation Project in either term.
**BIOE 4900 & 4950 must be taken in the same academic year

Note 1: Must choose two science electives, two complementary studies electives, and two free electives.

Note 2: Three BIOE design electives are required (out of the four slots shown). Choose from specified lists if a Specialization is desired.

Biomedical Specialization:

Students in the Biomedical Specialization should take BIOI 1410 (Fall) and BIOI 1412 (Winter) in the elective slots of third year.

Bioresource Specialization:

Students in the Bioresource Specialization should take BIOE 2600 (alternatively ANSC 3530 in the Winter of second year or PLNT 2510 in the Fall of third year) and SOIL 4060 in the Winter of third year.

Environmental Specialization:

Students in the Environmental Specialization should take BIOE 2600 (alternatively BIOI 2300 in the Winter of second year or AGEC 2370 in the Fall of third year) and SOIL 4060 in the Winter of third year.

1. PLNT 2510 is only offered in the fall every two years.
BIOSYSTEMS ENGINEERING: EXAMPLE OF AN 8-TERM PROGRAM

*Pre- and co-requisites for Biosystems Engineering Science and Design Electives are dependent on course selection

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**Term 1**
- **Fall**
  - Written English Requirement
  - Applied Calculus I
    - MATH 1510(3)
  - Introduction to Statics
    - ENGR 1440(3)
  - Mechanics
    - PHYS 1050(3)

**Term 2**
- **Winter**
  - Design in Engineering
    - ENGR 1430(3)
  - Applied Calculus II
    - MATH 1710(3)

**Term 3**
- **Fall**
  - Fluid Mechanics
    - BIE 2790(4) or CIVL 2790(4)
  - BIE 2900(4)
  - BIE 3270(4)
  - BIE 3400(4)
  - BIE 4240(3)

**Term 4**
- **Winter**
  - BIE 2790(4) or CIVL 2790(4)
  - BIE 2900(4)
  - BIE 3270(4)

**Term 5**
- **Fall**
  - BIE 2480(3)

**Term 6**
- **Winter**
  - BIE 4390(3) or BIE 4412(3)

**Term 7**
- **Fall**
  - BIE 4440(3) or BIE 4460(3)
  - BIE 4620(3)
  - BIE 4640(3)

**Term 8**
- **Winter**
  - BIE 4440(3) or BIE 4460(3)
  - BIE 4590(3)

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**NOTE 1:** Choose 2 courses
(specific courses are to be taken if completing a specialization)

**NOTE 2:** Course is to be selected from a specified list if completing a specialization

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**Fall Term – Odd Years**
- BIE 4390 Unit Operations 1
- BIE 4610 Design of Assistive Technology Devices
- BIE 4600 Design of Water Management System

**Winter Term – Even Years**
- BIE 4440 Bioprocessing for Biorefining
- BIE 4620 Remediation Engineering
- BIE 4640 Bioengineering Applications in Medicine

**Fall Term – Even Years**
- BIE 4440 Bioprocessing for Biorefining
- BIE 4620 Remediation Engineering
- BIE 4640 Bioengineering Applications in Medicine

**Winter Term – Odd Years**
- BIE 4412 Design of Light-Frame Building
- BIE 4460 Air Pollution Assessment & Management
- BIE 4414 Imaging & Spectroscopy for Biosystems

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**September 2016 Admits**

**Revised:** April 28, 2021