DEPARTMENT OF BIOSYSTEMS ENGINEERING
4 YEAR MODEL PROGRAM

For students starting second year Fall 2017

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>2016</th>
<th>cr hr</th>
<th>Pre- (p) or Co- (c) Requisites</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>
</tr>
<tr>
<td>CHEM 1300</td>
<td>Chemistry</td>
<td>3</td>
<td>ENG 1440</td>
<td>Engineering Statics</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>
</tr>
<tr>
<td>ENG 1480</td>
<td>Thermal Sciences</td>
<td>3</td>
<td>ENGL 1400</td>
<td>Lit Topics</td>
</tr>
<tr>
<td>MATH 1510</td>
<td>Applied Calculus 1</td>
<td>3</td>
<td>MATH 1210</td>
<td>C/L Algebra</td>
</tr>
<tr>
<td>PHYS 1050</td>
<td>Physics</td>
<td>3</td>
<td>MATH 1500/1510</td>
<td>(p or c)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>SECOND YEAR</th>
<th>2017</th>
<th>FALL TERM (September)</th>
<th>WINTER TERM (January)</th>
<th>Pre- (p) or Co- (c) Requisites</th>
<th>Pre- (p) or Co- (c) Requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 2110</td>
<td>Transport Phenomenon</td>
<td>3</td>
<td>BIOE 2800 (p)</td>
<td>BIOE 2480</td>
<td>Impact of Eng on Environ</td>
</tr>
<tr>
<td>BIOE 2590</td>
<td>Biology for Engineers</td>
<td>3</td>
<td>CHEM 1300 (p)</td>
<td>BIOE 2800</td>
<td>Solid Mechanics</td>
</tr>
<tr>
<td>BIOE 2900</td>
<td>Design 1</td>
<td>4</td>
<td>ENG 1430 (p)</td>
<td>ENG 2022</td>
<td>Eng CAD Technology</td>
</tr>
<tr>
<td>BIOE 2790</td>
<td>Fluid Mechanics</td>
<td>4</td>
<td>ENG 1440 (p), MATH 1710/1700 (p)</td>
<td>MECH 2150</td>
<td>Numerical Methods</td>
</tr>
<tr>
<td>CHEM 1310</td>
<td>Chm 2 (CHEM 1110 &amp; 1120)</td>
<td>3</td>
<td>CHEM 1300 (p)</td>
<td>MATH 2130</td>
<td>Math Analysis 1</td>
</tr>
<tr>
<td>MATH 2132</td>
<td>Math Analysis 2</td>
<td>3</td>
<td>MATH 1210 (p), MATH 1710/1700 (p)</td>
<td>Elective slot (see note 1 below)</td>
<td>3/4</td>
</tr>
</tbody>
</table>

THIRD YEAR | 2018 | Pre- (p) or Co- (c) Requisites |
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>BIOE 3400</td>
<td>Des of Struc Comp Mac</td>
<td>4</td>
</tr>
<tr>
<td>BIOE 3590</td>
<td>Mechanics of Biomater</td>
<td>4</td>
</tr>
<tr>
<td>BIOE 3900</td>
<td>Design 2</td>
<td>4</td>
</tr>
<tr>
<td>MBIO 1220</td>
<td>Essentials of Microbiolo</td>
<td>3</td>
</tr>
<tr>
<td>BIOE Design Elective slot (see Note 2)</td>
<td>4</td>
<td>BIOE Design Elective slot (see Note 2)</td>
</tr>
</tbody>
</table>

FOURTH YEAR | 2019 | Pre- (p) or Co- (c) Requisites |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>BIOE 4900**</td>
<td>Design 3</td>
<td>4</td>
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<tr>
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</tr>
<tr>
<td>BIOE 4240*</td>
<td>Graduation Project</td>
<td>3</td>
</tr>
<tr>
<td>BIOE Design Elective slot (see Note 2)</td>
<td>4</td>
<td>BIOE Design Elective slot (see Note 2)</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

*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. (Science electives should be completed by end of Third Year.) Choose from specified lists if a Specialization is desired.

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 BIOL 1410 (Fall) and BIOL 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 25101 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 BIOL 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.

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

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

AGEC 2370 Principles of Ecology or BIOL 2300 Principles of Ecology
ANSC 3530 The Animal and its Environment
BIOE 4390 Design of Unit Operations
BIOE 4412 Design of Light-Frame Building
BIOE 4414 Imaging & Spectroscopy for Biosystems
BIOE 4420 Crop Preservation
BIOE 4450 Textiles in Healthcare and Medical Applications
BIOE 4590 Management of By-Products from Animal Production

**BIOE Design Electives are typically offered in a Two-Year Rotation.**

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### Term 1
- **Fall**
  - Written English Requirement
  - Computer Program for Sci & Eng
  - Critical Thinking recommended
  - Pre-requisites for Biosystems Engineering Science and Design Electives are dependent on course selection.

### Term 2
- **Winter**
  - Intro to Statics
  - Design in Engineering
  - Applied Calculus 1
  - Computer Program for Sci & Eng

### Term 3
- **Fall**
  - Solid Mechanics I
  - Bio Eng Design 1
  - Eng CAD Technology
  - Intro to Elec & Comp Eng Techniques

### Term 4
- **Winter**
  - Fluid Mechanics
  - Bio Eng Design 2
  - Eng Math Analysis 2
  - Bio Eng Design Elective**

### Term 5
- **Fall**
  - Mechanics of Bio Materials
  - Design of Struct Comp in Machines
  - Bio Eng Design Elective**

### Term 6
- **Winter**
  - Kinematics & Dynamics
  - Eng Prop Biological Materials
  - Istr & Measure for Biosystems
  - Graduation Project (offered in both terms)

### Term 7
- **Fall**
  - Free Elective
  - Bio Eng Design 3*

### Term 8
- **Winter**
  - Tech & Society
  - Complementary Studies (See Note 2 below)

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**Fall Term – Odd Years**
- BIOE 4390 Unit Operations
- BIOE 4610 Design of Assistive Technology Devices
- BIOE 4600 Design of Water Management System
- BIOE 4440 Bioprocessing for Biorefining
- BIOE 4620 Remediation Engineering
- BIOE 4640 Bioengineering Applications in Medicine

**Winter Term – Even Years**
- BIOE 4412 Design of Light-Frame Building
- BIOE 4460 Air Pollution Assessment & Management
- BIOE 4414 Imaging & Spectroscopy for Biosystems
- BIOE 4420 Crop Preservation
- BIOE 4650 Textiles in Healthcare and Medical Applications
- BIOE 4590 Management of By-Products from Animal Production

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

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