### Bioproducts and Biosystems Engineering - Bioproducts Engineering

#### Freshman Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 1371 Calculus I (placement into course or pre-req)</td>
<td>Math 1372 Calculus II (1371)</td>
</tr>
<tr>
<td>Phys 1301W Intro Physics I &amp;Math 1371</td>
<td>Phys 1302W Intro Physics II (1301, &amp;Math 1372)</td>
</tr>
<tr>
<td>Chem 1061 Chem Princ I (placement into course or 1015, &amp;1065)</td>
<td>Chem 1062 Chem Princ II (1061/1065, &amp;1066)</td>
</tr>
<tr>
<td>BBE 1001 BBE Orientation</td>
<td>BBE 1002 Biorenewable Resources</td>
</tr>
<tr>
<td>CSE 1001 1st Yr Experience</td>
<td>Liberal Education course or Writ 1301</td>
</tr>
<tr>
<td>Liberal Education course or Writ 1301</td>
<td>3/4</td>
</tr>
</tbody>
</table>

#### Sophomore Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 2374 Multivariable Calc (1372)</td>
<td>Chem 2301 Organic Chem I (1062/66)</td>
</tr>
<tr>
<td>Phys 1302W Intro Physics II (1301, &amp;Math 1372)</td>
<td>Biol 1009 General Biology</td>
</tr>
<tr>
<td>Chem 1062 Chem Princ II (1061/1065, &amp;1066)</td>
<td>BBE 2003 Comp App in BBE* (Math 1372, &amp;2373 or &amp;2374)</td>
</tr>
<tr>
<td>BBE 4013 Transport in Biol Sys (UD, 3013, 3043, 3012)</td>
<td>Emphasis Elective</td>
</tr>
<tr>
<td>BBE 4713 Biol Process Engr (UD CSE, 3033, 4013 or &amp;4013)</td>
<td>Technical Elective</td>
</tr>
<tr>
<td>BBE 4303 Intro Bio-bsd Mat Sci (UD, 2001)</td>
<td>Technical Elective</td>
</tr>
<tr>
<td>BBE 4403 BP Engineering Lab II (UD, Chem 2301)</td>
<td>Liberal Education course</td>
</tr>
<tr>
<td>Liberal Education course</td>
<td>3/4</td>
</tr>
</tbody>
</table>

### About This Plan

- This plan is not a contract. Curriculum can change. The APAS is the official method for tracking completion of University degree requirements.
- Shaded courses are only offered in the indicated semester.
- Course pre-requisites and co-requisites (designated by & are listed below the course number and title. Upper Division (UD) requires admission to the major prior to enrollment.
- Students can take either the CSE-only or University-wide versions of the math course (Math 1371/1271, 1372/1272, 2373/2243, 2374/2263).

### Applying to your Major

Students who have completed the required courses for admission to this major (double-boxed and one with dashed outline on plan) and have a 3.2 UM-TC technical GPA at the end of the fall semester will be guaranteed admission. All other students who have completed the required courses will be considered for admission on a space-available basis. Admission following the spring semester is only based on space availability. The major application database is available at z.umn.edu/csemajorapp.

**Total Credits Needed for Degree: 125**

### Department Contact Information

- Website: www.bbe.umn.edu
- Main Phone: 612-625-5200
- Main Office: 203 Kauffert Lab & 213 BioAgEng Bldg (St. Paul)
- Director of Undergraduate Studies: Professor Ulrike Tschirner
- Email: tschi007@umn.edu

### University Degree Requirements

All students must complete the following Writing & Liberal Education requirements, as noted on their APAS report.

**Writing Requirements:**
- **University Writing:** Writ 1301/1401 or equivalent
- **Writing Intensive (WI):** Two: 1xxx or 2xxx level **
  - One: 3/4/5xxx level (in major)*
  - One: 3/4/5xxx level (any dept.)*

Requirements with an (*) will be fulfilled by taking courses at UM-TC required for this major.

**Liberal Education Requirements:**

- **CORES:**
  - Bio*
  - Phy*
  - Hist
  - SocSc
  - Ltr
  - AH
  - Mth*
- **THEMES:**
  - Civ
  - DSJ
  - Env*
  - GP
  - TS*

*Students admitted prior to Fall 2017 may use STAT 3021 to satisfy requirement.
Bioproducts and Biosystems Engineering

POSSIBLE POSITIONS

- **Alternative energy specialist**: Designs and installs systems that use renewable energy sources.
- **Bioprocessing/food engineer**: Integrates biology and engineering to design sustainable systems that produce high quality food, renewable energy, and biomaterials for consumers while protecting the environment.
- **Bioproducts engineer**: Develops sustainable biomass conversion solutions to meet the world’s growing materials and energy demand.
- **Environmental consultant**: Offers expert advice to local, state, and federal government agencies and private sector clients who need to adopt environmentally sound practices or clean up contaminated sites.
- **Environmental engineer**: Addresses the many environmental and natural resource challenges that affect air, soil, and water quality.
- **Process engineer**: Develops the series of actions that efficiently and economically make products (plastics, chemicals, fuel, pharmaceuticals, etc.)
- **Product engineer**: Plans and develops the tools, processes, machines, and equipment necessary to produce or manufacture products.
- **Research engineer**: Conducts basic, systematic investigations leading to new knowledge for a specific application that influences the design and construction of prototypes.

**INDUSTRIES**

- Agriculture
- Alternative energy
- Building products/materials
- Consulting
- Ecological restoration
- Ecology/environmental research
- Environmental consulting
- Food processing
- Food safety and security
- Government agencies
- Institutes
- Laboratories
- Law
- Manufacturing
- Marketing
- Public health
- Pulp and paper products
- Quality control
- Renewable plastics
- Research
- University laboratories
- Wood products

**EMPLOYERS**

- 3M
- Andersen Corporation
- Appvion, Inc.
- Barr Engineering
- Cargill
- CHS Inc.
- Domtar Paper Company
- Donaldson
- Ecolab
- General Mills
- Kellogg’s
- Minnehaha Creek Watershed Dist.
- MN Pollution Control Agency
- Natureworks
- POET
- Renewable Energy Group
- The Schwan Food Company
- Virent
- Verso Paper
- Westwood Professional Services
- WSB/Water Resources Group

**CSE Career Outcomes**

**Average Starting Salary:**
$59,077*

**Post-graduation Outcomes:**

- Grad School: 5.6%
- Employed: 94.4%

**Post-graduation outcomes reflect the percentage of students who were employed full-time in their field or were enrolled in a graduate program.**

**Some of these positions may require an advanced degree.**

More Information:

- [Undergraduate Majors](cse.umn.edu/majors)
- [Salary Information](z.umn.edu/csesalary)
- [Career Center](cse.umn.edu/career)

*Salary and Career Outcomes gathered from the 2016-2017 CSE Graduation Survey.*