What can I do with a major in...

Bioproducts and biosystems engineering

**ACTIVITIES BIOPRODUCTS AND BIOSYSTEMS ENGINEERING MAJORS DO:**
Bioproducts and biosystems engineers apply knowledge of engineering, technology, chemistry, and biology to select the appropriate renewable resources – such as wood, agricultural residues, fiber crops, and other biomass – for producing a wide range of “green” materials, including wood products, paper, chemicals, industrial feedstocks, plastics, building materials, and energy. Bioproducts and biosystems engineers also develop energy-efficient, economical, and environmentally friendly processes, machinery, and equipment for manufacturing these products. They consider the ethical and safety issues surrounding bioproducts as well as their economic impact, and they design sustainable systems that protect the environment, humans, plants, and animals.

In addition to basic science and engineering, bioproducts and biosystems engineers focus on bioresources, biological/biochemical processes, bio-based products, and biological systems.

- Environmental and ecological engineers focus on engineering applications to land and water resources, air and soil quality, land-use management, ecosystem services, ecological restoration, and waste management.
- Bioproducts engineers design and develop engineering solutions for sustainable manufacturing and end-use applications of “green” products, including biofuels, bioenergy, biodegradable plastics, building materials, paper, and chemicals.
- Food engineers design and develop systems for production, processing, distributing, and storing food and agricultural materials.

**INDUSTRIES BIOPRODUCTS AND BIOSYSTEMS ENGINEERING MAJORS WORK IN (SAMPLE LISTING):**

<table>
<thead>
<tr>
<th>Alternative energy</th>
<th>Law</th>
<th>Pulp and paper products</th>
<th>Quality control</th>
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<tbody>
<tr>
<td>Research</td>
<td>Building products/materials</td>
<td>Food safety and security</td>
<td>Marketing</td>
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<tr>
<td>Public health</td>
<td>Wood products</td>
<td>University laboratories</td>
<td>Consultants</td>
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<tr>
<td>Manufacturing</td>
<td>Renewable plastics</td>
<td>Ecological restoration</td>
<td>Laboratories</td>
</tr>
<tr>
<td>Institutes</td>
<td>Food processing</td>
<td>Renewable plastics</td>
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<tr>
<td>Environmental consulting</td>
<td>Alternative energy</td>
<td>Ecology/environmental research</td>
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<td>Government agencies</td>
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</tbody>
</table>

**EMPLOYERS WHO HIRE BIOPRODUCTS AND BIOSYSTEMS ENGINEERING MAJORS (SAMPLE LISTING):**

- Andersen Windows
- MN Pollution Control Agency Appvion
- General Mills
- Avant Energy
- Metropolitan Council
- Institute for Environmental Health
- Cargill
- Hormel
- Barr Engineering
- MEDTOX Laboratories
- Genetech, Inc.
- Medtronic
- Land O’Lakes
- Monsanto Company
- SSOE Group
- Tetra Pak
- MOM Brands
- Syngenta
- POET
- U.S. Department of Agriculture
- Soil and Water Conservation District

**TYPES OF POSITIONS FOR BIOPRODUCTS AND BIOSYSTEMS ENGINEERING MAJORS (SAMPLE LISTING):**

- **Environmental engineer**: Addresses the many environmental and natural resource challenges that affect air, soil, and water quality.
- **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.
- **Alternative energy specialist**: Designs and installs systems that use renewable energy sources.
TYPES OF POSITIONS FOR BIOPRODUCTS AND BIOSYSTEMS ENGINEERING MAJORS (Continued):

- **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.
- **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.
- **Project engineer**: Leads a group of technical engineers and serves as the contact person to the client.

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

USEFUL WEBSITES FOR BIOPRODUCTS AND BIOSYSTEMS ENGINEERING MAJORS:

- Department of Bioproducts and Biosystems Engineering: [bbe.umn.edu](http://bbe.umn.edu)
- Minnesota Technology Assistance Program: [mntap.umn.edu](http://mntap.umn.edu)
- Pulp and Paper: [pulpandpaper.net](http://pulpandpaper.net)
- U.S. Department of Energy: [energy.gov](http://energy.gov)
- U.S. Department of Agriculture Agricultural Research Service: [ars.usda.gov/careers](http://ars.usda.gov/careers)
- BioBusiness Alliance of MN: [biobusinessalliance.org](http://biobusinessalliance.org)

USEFUL WEBSITES FOR ENGINEERING MAJORS:

- Engineer.net: [engineer.net](http://engineer.net)
- Engineer Jobs: [engineerjobs.com](http://engineerjobs.com)
- Engineering Central: [engcen.com](http://engcen.com)
- Graduating Engineer: [graduatingengineer.com](http://graduatingengineer.com)
- ThinkJobs.com: [thinkjobs.com](http://thinkjobs.com)
- Engineering.com: [engineering.com](http://engineering.com)

PROFESSIONAL ORGANIZATIONS:

- Midwest Renewable Energy Association: [the-mrea.org](http://the-mrea.org)
- Association of Energy Engineers: [aeecenter.org](http://aeecenter.org)
- American Bioenergy Association: [biomass.org](http://biomass.org)
- American Society of Agricultural and Biological Engineers: [asabe.org](http://asabe.org)
- American Council of Engineering Companies: [acec.org](http://acec.org)
- American Council of Engineering Companies-MN chapter: [acecmn.org](http://acecmn.org)
- Technical Association of the Pulp and Paper Industry: [tappi.org](http://tappi.org)
- National Society of Professional Engineers: [nspe.org](http://nspe.org)
- Minnesota Society of Professional Engineers: [mnspe.org](http://mnspe.org)
- Society of Women Engineers: [swe.org](http://swe.org)

*Additional job/internship search websites and resources can be found at cse.umn.edu/career.*

Information on this page was compiled from the Occupational Outlook Handbook, the Encyclopedia of Careers and Vocational Guidance, *The Eco Guide to Careers that Make a Difference, Great Jobs for Engineering Majors*, University of Minnesota departmental websites, and student-reported data.