What can I do with a major in...
Biomedical Engineering

By combining biology and medicine with engineering principles and practices, biomedical engineers develop devices and procedures that solve medical and health-related problems. Many biomedical engineers do research, along with life scientists, chemists, and medical scientists, to develop and evaluate systems and products such as artificial organs, prostheses (artificial devices that replace missing body parts), instrumentation, medical information systems, and health management and care delivery systems. Biomedical engineers also design devices used in various medical procedures, such as the cardiac pacemaker, computers used to analyze blood, laser systems used in corrective eye surgery, and imaging systems such as magnetic resonance imaging (MRI). They develop artificial organs, imaging systems such as ultrasound, and devices for automating insulin injections or controlling body functions. Some specialty areas include:

- **Bioinstrumentation**: Application of electronics and measurement techniques to develop medical devices.
- **Biomaterials**: Understanding of materials for placement in the human body.
- **Biomechanics**: Study of motion and flow within the body and devices.
- **Cellular, tissue, and genetic engineering**: Development of devices to attack biomedical problems on the microscopic level.
- **Clinical engineering**: Intersection of technology and healthcare.
- **Medical imaging**: Electronic data processing and analysis to display medical images in non-invasive ways.

### CSE Career Outcomes

**Average Starting Salary:**
$60,769*

**Post-graduation Outcomes:***

### INDUSTRIES

- Bio-Instrumentation
- Biomaterials
- Biomechanics
- Biotechnology
- Diagnostics
- Healthcare
- Institutes
- Invasive Devices
- Laboratories
- Medical Imaging
- Medical software companies
- Orthopedics
- Pharmaceuticals
- Tissue and cellular Engineering
- Universities

### EMPLOYERS

- Abbott
- Accenture
- American Medical Systems
- AUM Cardiovascular
- Baxter Healthcare
- Boston Scientific
- Edwards Lifesciences
- Epic Systems
- InSitu Technologies
- Medtronic
- Minneapolis VA Healthcare System
- Minnetronix
- Miromatrix Medical
- Smiths Medical
- Vascular Solutions
- Ximedica
- Zimmer Spine
- Zurich Medical

### TECHNICAL SKILLS

- Arduino
- AutoCAD
- Excel
- Labview
- Mathematica
- MATLAB
- Microsoft Office
- MTS Electromechanical Testing System
- Solidworks
POSSIBLE POSITIONS

- **Biomechanical engineer**: Develops mechanical devices such as the artificial hip, heart, and kidney.
- **Manufacturing engineer**: Ensures that medical devices are manufactured in a cost-effective and efficient manner.
- **Medical device designer**: Uses technology and research to design new medical devices.
- **Prosthesis designer**: Designs, creates, and fits prosthetic devices such as artificial limbs for patients who have lost limbs or hands.
- **Quality engineer**: Ensures that medical devices meet FDA standards for safety and efficacy.
- **Rehabilitation engineer**: Designs, develops, adapts, tests, evaluates, applies, and distributes technological solutions to problems confronted by individuals with disabilities.
- **Research and development engineer**: Develops new products and improves existing products for groundbreaking medical device equipment.
- **Field clinical representative**: Uses technical expertise to sell products, write technical support documents, and interface between sales staff and design engineers (works directly with scientists, doctors, and engineers).
- **Regulatory affairs specialist**: Coordinate and document internal regulatory processes, such as internal audits, inspections, license renewals, or registrations. Prepare submissions and obtain approval for products and therapies to markets worldwide.
- **Product development engineer**: Design, develop, and test processes for producing prototype and long-term production of products.

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

GET INVOLVED

- Biomedical Engineering Society
- CSE K-12 Outreach
- CSE Ambassadors
- CSE International Ambassador
- Engineering World Health
- National Society of Black Engineers
- Society of Asian Scientists and Engineers
- Society of Hispanic Professional Engineers
- Society of Women Engineers
- Solar Vehicle Project
- Synthetic Biology Society

RESOURCES

- ACEC MN chapter: [acecmn.org](http://acecmn.org)
- American Council of Eng. Companies: [acec.org](http://acec.org)
- Department of Biomedical Engineering: [bme.umn.edu](http://bme.umn.edu)
- MN biomed. Business Network: [mbbnet.umn.edu](http://mbbnet.umn.edu)
- MN Society of Professional Engineers: [mnspe.org](http://mnspe.org)
- National Science Foundation: [nsf.gov](http://nsf.gov)

See the Major Binders available in the CSE Career Center’s Resource Center for more information about this major and career.

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

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

For detailed starting salary information see the CSE Career Center website.*