

Master of Biomedical Engineering, Minor in Catholic Bioethics and Medical Engineering

HBI University

Course Duration: 3 years

Credit Hours: 68 (including 15 credit hours for minor)



Program Description

The Master of Biomedical Engineering at HBIU University prepares students for careers in the development of medical devices, biomechanics, biomaterials, and regenerative medicine. This program integrates engineering principles with biological sciences to advance healthcare technologies, improve patient outcomes, and innovate medical solutions.

The Minor in Catholic Bioethics and Medical Engineering explores the ethical considerations of biomedical advancements through the lens of Catholic teachings. Students will study moral decision-making in healthcare, ethical dilemmas in biotechnology, and faith-based perspectives on medical innovations and patient care.

Admissions Requirements

- Bachelor's degree in Biomedical Engineering or a related field
- Minimum GPA of 3.0
- GRE scores (if applicable)
- Statement of Purpose (1,000-1,500 words) outlining research interests and career goals
- Three letters of recommendation
- Academic writing sample
- Curriculum Vitae (CV) or resume
- Interview with faculty (if required)

Foundational Courses (30 Credit Hours)

Course Code	Course Name	Credit Hours
BME 201	Introduction to Biomedical Engineering	3
BME 202	Medical Device Design and Development	3
BME 203	Biomechanics and Rehabilitation Engineering	3
BME 204	Biomaterials and Tissue Engineering	3
BME 205	Biomedical Signal Processing	3
BME 206	Human Physiology for Engineers	3
BME 207	Medical Imaging and Instrumentation	3
BME 208	Computational Methods in Biomedical Engineering	3
BME 209	Regenerative Medicine and Nanotechnology	3
BME 210	Clinical Trials and Regulatory Affairs	3

Core Courses (24 Credit Hours)

Course Code	Course Name	Credit Hours
BME 601	Advanced Biomedical Engineering Principles	3
BME 602	Biomedical Robotics and Prosthetics	3
BME 603	Neural Engineering and Brain-Computer Interfaces	3
BME 604	Wearable Health Technologies	3
BME 605	Artificial Organs and Implantable Devices	3
BME 606	Biotechnology and Genetic Engineering	3
BME 607	3D Printing in Biomedical Applications	3

BME 608	Capstone in Biomedical Engineering	3
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Minor in Catholic Bioethics and Medical Engineering (15 Credit Hours)

Course Code	Course Name	Credit Hours
CBE 701	Catholic Bioethics and Medical Decision-Making	3
CBE 702	Ethical Considerations in Biomedical Engineering	3
CBE 703	Faith and Science in Medical Innovations	3
CBE 704	Moral Issues in Biotechnology and Genetic Research	3
CBE 705	Healthcare Justice and Catholic Social Teaching	3

Program Outcomes

- Develop expertise in biomedical engineering principles, medical device innovation, and healthcare technology.
- Apply engineering solutions to biological and medical challenges.
- Integrate Catholic bioethical principles into biomedical research and development.
- Advance healthcare through the development of medical technologies and patient-centered engineering solutions.

Career Outcomes and Potential Pay Scale

Career Path	Average Salary (Annual)
Biomedical Engineer	\$80,000 - \$140,000
Medical Device Engineer	\$85,000 - \$150,000
Clinical Research Engineer	\$90,000 - \$160,000
Regulatory Affairs Specialist	\$80,000 - \$135,000
Neural Engineer	\$95,000 - \$170,000

Practicum Requirement

The practicum for this program provides students with hands-on experience in medical technology design, biomechanics research, and regulatory compliance. Students will work with hospitals, biomedical firms, and research institutions to apply engineering solutions to healthcare challenges.

Practicum Requirements:

- A minimum of 200 hours of supervised field experience.
- Submission of a comprehensive practicum report detailing experiences and learning

outcomes.

- Participation in professional development workshops and seminars.
- Completion of a presentation summarizing fieldwork and key takeaways.

Master's Thesis Requirements

The Master's thesis is a critical component of the program, requiring students to conduct original research in biomedical engineering.

The thesis must demonstrate a thorough understanding of foundational principles, research methodologies, and ethical considerations.

Students must complete the following steps:

- Develop a research proposal approved by faculty advisors.
- Conduct an in-depth literature review relevant to their topic.
- Collect and analyze data using appropriate methodologies.
- Write a comprehensive thesis (minimum 50 pages) following academic guidelines.
- Successfully defend their thesis before a faculty committee.

Advocacy in Biomedical Engineering

Biomedical engineers play a crucial role in advocating for ethical medical innovations, equitable access to healthcare technology, and responsible research practices. Graduates of this program will be prepared to address ethical dilemmas in medical engineering, promote patient-centered innovation, and integrate faith-based perspectives in healthcare advancements.

Advocacy Goals:

- Promote ethical development of biomedical devices and prosthetics.
- Advocate for accessibility and affordability in medical technology.
- Support policies that uphold Catholic bioethical principles in medical research.
- Champion innovation in healthcare engineering while ensuring ethical responsibility.

Additional Elective Courses

Course Code	Course Name	Credit Hours
ELE 901	Advancements in Biomechanics	3
ELE 902	Healthcare Robotics and AI	3
ELE 903	Biosensors and Wearable Devices	3
ELE 904	Sustainable and Eco-Friendly Medical Technologies	3
ELE 905	Ethical AI and Machine Learning in Medicine	3