BIOLOGICAL AND BIOMEDICAL ENGINEERING - BIOMANUFACTURING (NON-THESIS) (M.ENG.) (45 CREDITS)

Offered by: Biological & Biomedical Engr (Faculty of Medicine and Health Sciences)
Degree: Master of Engineering
Program credit weight: 45

Program Description

The M.Eng. in Biological and Biomedical Engineering; Non-Thesis - Biomanufacturing focuses on the life sciences, the physical sciences, and engineering, industrial practices and processes, and data science for application in the filed of biomanufacturing. Hands-on experience available through projects carried out during internships in academic, industrial, and governmental laboratories.

Note: For information about Fall 2025 and Winter 2026 course offerings, please check back on May 8, 2025. Until then, the "Terms offered" field will appear blank for most courses while the class schedule is being finalized.

Required Courses (21 credits)

Expand allContract all

Course	Title	Credits
BBME 681	Internship 1.[1]	9
BBME 682	Internship 2.[1]	9
BIEN 601	cGMP and Regulation in Biomanufacturing.	3

[1] must take place in the Biomanufacturing sector

Complementary Courses (24 credits)

Minimum of 18 credits from the following three lists of core courses. At least 12 credits must be chosen from biomanufacturing core courses. At least 12 credits must be chosen from BBME core courses, of which at least 6 credits must be chosen from quantitative courses.

Biomanufacturing Core

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Course	Title	Credits
BIEN 580	Synthetic Biology.	3
BIEN 585	Metabolic Engineering.	3
BIEN 590	Cell Culture Engineering.	3
BIEN 670	Downstream Processing.	3
BIEN 675	Process Analytical Technologies and Data Sciences.	3
BIEN 680	Bioprocessing of Vaccines.	4
BIEN 685	Gene and Cell Therapy Viral Vectors Biomanufacturing.	3
BMDE 505	Cell and Tissue Engineering.	3
CHEE 512	Stem Cell Bioprocess Engineering.	3
CHEE 651	Advanced Biochemical Engineering.	4

BBME Courses (Quantitative)

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Course	Title	Credits
BIEN 510	Engineered Nanomaterials for Biomedical Applications.	3
BIEN 530	Imaging and Bioanalytical Instrumentation.	3
BIEN 550	Biomolecular Devices.	3
BIEN 560	Design of Biosensors.	3
BIEN 570	Active Mechanics in Biology.	3
BIEN 590	Cell Culture Engineering.	3
BMDE 502	BME Modelling and Identification.	3
BMDE 503	Biomedical Instrumentation.	3
BMDE 512	Finite-Element Modelling in Biomedical Engineering.	3
BMDE 519	Biomedical Signals and Systems.	3
BMDE 520	Machine Learning for Biomedical Data.	3
BMDE 610	Functional Neuroimaging Fusion.	3

BBME Core (Non-Quantitative)

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Course	Title	Credits
BIEN 500	Special Topics in Bioengineering 1.	3
BIEN 535	Electron Microscopy and 3D Imaging for Biological Materials.	3
BIEN 540	Information Storage and Processing in Biological Systems.	3
BIEN 580	Synthetic Biology.	3
BIEN 680	Bioprocessing of Vaccines.	4
BMDE 501	Selected Topics in Biomedical Engineering.	3
BMDE 504	Biomaterials and Bioperformance.	3
BMDE 505	Cell and Tissue Engineering.	3
BMDE 508	Introduction to Micro and Nano-Bioengineering.	3
BMDE 525D1	Design of Assistive Technologies: Principles and Praxis.	3
BMDE 525D2	Design of Assistive Technologies: Principles and Praxis.	3
BMDE 650	Advanced Medical Imaging.	3
BMDE 654	Biomedical Regulatory Affairs - Medical Devices.	3

Remaining complementary course credits must come from core or non-core complementary courses chosen from BBME courses or from other courses, at the 500 level or higher. The selection of courses must have the prior written approval of the Graduate Program Director.