MSBME Advising Worksheet *(rev. 6/9/25)*

Focus Areas

Biomaterials

For students with an interest in biomaterials for the development of constructs with polymers and stem cells for tissue regeneration (heart, chronic wounds, bone, central nervous system); nanoparticles for treating several types of cancer and atherosclerosis. Emphasis is placed on the selection of biomaterials and cell types to optimize tissue regeneration, diseased tissue targeting and treatment.

Required Courses (13 credit hours):

BME 6421 Biotransport - 3 cr
BME 6440 Biomaterials - 4 cr
BME 6450 Tissue Egr & Regenerative Med - 3 cr
BME 6460 Nanomedicine Fundamentals - 3 cr

Orthopedic and Medical Devices

For students interested in aspects of medical devices such as the design and manufacturing of orthopedic implants, biomechanics and modeling, or human factors of medical instrumentation and devices. Biomechanics, and biocompatibilities of devices that aim to improve the quality of life of patients with conditions such as trauma, degenerative disease, fractures, and joint arthritis, with the goal to restore functionality and mobility and reduce pain, while considering patient safety and product usability.

Required Courses (17 credit hours):

BME 6440 Biomaterials - 4 cr
BME 6550 Bioinstrumentation - 4 cr
BME 6470 Design of Medical Devices - 3 cr
BME 7210 Orthopedic & Prosthetic Egr - 3 cr OR
BME 7220 Experimental Orthopaedic Egr - 3 cr
BME 7371 Failure Analysis of Medical Devices - 3 cr

Elective options

Math/Statistics Intensive Courses (6 cr required)**		Semester	Credits
IHE 6150*	Advanced Probability & Statistics for Engineers*	F	3
IHE 7050*	Design & Analysis of Egr Experiments* (even yrs-alternates w/IHE 7020)	S	3
IHE 7300*	Research Methods in HFE*	S	3
IHE 7510*	Data Mining*	F	3
MTH/STT/CS**	As approved by advisor	F/S	3

Elective Courses		Semester	Credits
BME 6310*	Ergonomics*	F	3
BME 6421	Biotransport	S	3
BME 6440	Biomaterials	F	4
BME 6450	Tissue Egr & Regenerative Medicine (even yrs-alternates w/BME 6460)	S	3
BME 6460	Nanomedicine Fundamentals (odd yrs-alternates w/BME 6450)	F	3
BME 6470	Design of Medical Devices	F	3
BME 6550	Bioinstrumentation	F	4
BME 6703	Medical Imaging	F	3
BME 6850*	Six Sigma for Engineers*	F	3
BME 7210	Orthopaedic & Prosthetic Engineering	F	3
BME 7220	Experimental Orthopaedic Engineering	S	3
BME 7371	Failure Analysis of Medical Devices	S	3
BME 7380	From Neurons to Behavior in Health & Disease	S	3
BME 7850*	Lean Process Improvement for Engineers*	S	3
BME 7980	Special Topics	TBA	3
BME 6990/7990	Independent Study in BME (max 4 cr)	F/S/R	1-4
IHE 6300*	Fundamentals of Human Factors Engineering*	F	3
IHE 6320*	Human-System Interaction & Design Thinking Principles*	S	3
IHE 6330*	Engineering in Occupational Safety and Health*	S	3
IHE 6400*	Engineering Economy*	F	3
IHE 6510*	Computer Applications in IHE*	S	3
IHE 6830*	Engineering Project Management & Applications*	R	3
IHE 7020*	Systems Engineering & Analysis* (odd yrs-alternates w/IHE 7050)	S	3
IHE 7340*	User Experience Design for Mobile Computing*	F	3
IHE 7810*	Engineering Health Systems*	TBA	3

MSBME program of study requirements (all focus areas)

Minimum 30 credit hours total, to include:	24 cr minimum BIE Department coursework, 9 or more of which must be 7000-level 6 cr minimum math/statistics-intensive coursework**; 4 cr max independent study ▪ 8 cr max thesis

NOTES:

* = offered in class and online

**** Students who are considering a PhD in Engineering should consider fulfilling the MSBME math requirements with MTH/STT coursework, which is required in the PhD program.**

Students who earn credit for the 4000-level section of a course listed above are ineligible to earn credit for the 6000-level section.