

Biomedical Engineering Graduate Concentration – Winter 2017
Medical Product Development
Advisor: Jan Stegemann, Ph.D.

MEDICAL PRODUCT DESIGN AND DEVELOPMENT (both courses are required):

BIOMEDE 599.002	Graduate BME Innovative Design Team (3) (I)
BIOMEDE 599.004	Graduate BME Innovative Design Team (4) (II)

GENERAL (both courses are required):

BIOMEDE 500	Biomedical Engineering Seminar (1) (I, II)
BIOMEDE 550	Ethics and Enterprise (1) (I)

MATHEMATICS (select one course):

MATH 450	Advanced Mathematics for Engineers I (4) (I,II,IIIb)
MATH 454	Boundary Value Problems for Partial Differential Equations (3) (I,II,IIIa)
MATH 462	Mathematical Models (3) (II)
MATH 463	Mathematical Modeling in Biology (3) (I)
MATH 471	Introduction to Numerical Methods (3) (I,II,IIIb)
MATH 550	Introduction to Adaptive Systems (3) (I)
MATH 555	Introduction to Functions of a Complex Variable with Applications (3) (I,II)
MATH 556	Applied Functional Analysis (3) (I)
MATH 557	Applied Asymptotic Analysis (3) (II)
MATH 558	Applied Nonlinear Dynamics (3) (I)
MATH 559	Topics in Applied Mathematics (3)
MATH 561	Linear Programming I (3) (I,II)
MATH 562	Continuous Optimization Methods (3) (II)
MATH 563	Advanced Mathematical Methods in Biology (3) (II)
MATH 564	Topics Math Biology (3)
MATH 571	Numerical Linear Algebra (3) (I,II)
MATH 572	Numerical Methods for Differential Equations (3) (II)
MATH 651	Topics in Applied Mathematics I (3)
MATH 656	Introduction to Partial and Differential Equations (3) (I)
MATH 657	Nonlinear Partial Differential Equations (3)
MATH 756	Advanced Topics in Partial Differential Equations (3)
MECHENG 501	Math Methods in Mechanics (3) (II)
MECHENG 564	Linear Systems Theory (4) (I)

BIOINSTRUMENTATION (select one course):

BIOLCHEM 516	Intro Biochemistry Lab (3) (I)
BIOMEDE 458	Biomedical Instrumentation and Design (4) (I, II)
BIOMEDE 510	Medical Imaging Laboratory (3) (II)
IOE 432	Industrial Engineering Instrumentation Methods (3) (I)
MCDB 429	Cellular & Molecular Biology Lab (3) (II)

STATISTICS (select one course):

BIOMEDE 503	Statistical Methods for Biomedical Engineering (3) (II)
BIOSTAT 602	Biostatistical Inference (4) (II)
BIOSTAT 650	Applied Statistics I: Linear Regression (4) (I)
BIOSTAT 651	Applied Statistics II: Extensions for Linear Regression (3) (II)
EECS 501	Probability and Random Processes (4) (I,II)
IOE 461	Quality Engineering Principles and Analysis (3) (I)
STATS 470	Introduction to the Design of Experiments (4) (I)
STATS 500	Applied Statistics I (3) (I)
STATS 525	Probability Theory (3) (I)

NOTE: BME graduate students can only take EECS 501 in the winter term.

LIFE SCIENCE (two courses are required – at least one course must be outside of the College of Engineering):

Required:

BIOMEDE 519 Quantitative Physiology (4) (I)

Select one course:

ANAT 403 Human Anatomy (5) (I,II)
ANAT 541 Mammalian Reproductive Physiology (4) (II)
BIOLCHEM 451 Advanced Biochemistry I (4) (I)
BIOLCHEM 515 Introductory Biochemistry (3) (I, II)
BIOLCHEM 550 Macromolecular Structure and Function (3) (I)
BIOPHYS 520 Methods of Biophysical Chemistry (3) (I)
CANC BIO 553 Molecular Biology of Cancer (3) (I)
CANC BIO 554 Cancer Pathogenesis and Treatment (3) (II)
CDB 530 Cell Biology (3) (I)
CDB 550 Histology (4) (II)
CDB 581 Development Genetics (3) (I)
CDB 583 Organogenesis: Stem Cells to Regenerative Biology (3) (II)
KINESLGY 522 Clinical Neurophysiology and Neuroimaging (3)
KINESLGY 545 Metabolic Responses to Exercise (3)
MCDB 422 Brain Development, Plasticity, and Circuits (3) (I)
MCDB 423 Introduction to Research in Cellular and Molecular Neurobiology (3) (I) (II)
MCDB 427 Molecular Biology (4) (I) (II)
MCDB 428 Cell Biology (4) (I) (II)
MCDB 429 Cellular and Molecular Biology Laboratory (3) (II)
MCDB 435 Intracellular Trafficking (3) (II)
MICRBIOL 540 Human Immunology (3) (II)
NEUROSCI 570 Human Neuroanatomy I (3) (I)
NEUROSCI 601 Principles Neuro I (3) (I)
NEUROSCI 602 Princ Neurosc II (3) (II)
PATH 581 Tissue, Cellular and Molecular Disease (4) (II)
PHYSIOL 592 Integrated Neuroscience (2-4) (II)

TECHNICAL ELECTIVES (two courses required, and total credits for concentration must be at least 30)

Note: Courses with 499/599 designation are in pilot phase and may not be offered in the term indicated. Check to ensure these classes are offered and fit in your schedule.

BIOMEDE 499.002 Clinical Observation and Needs Finding (2) (IIIa)
BIOMEDE 504 Cellular Biotechnology (3) (II) [***NOT OFFERED in W17]
BIOMEDE 523 The Business of Biology (3) (I)
BIOMEDE 587 Technology, Innovation, Law, and Regulation (2) (I)
BIOMEDE 588 Global Quality Systems and Regulatory Innovation (2) (II)
BIOMEDE 599.007 Regulatory Issues in Medical Device Design (3) (II)

BIOINF 622 Translational Research (2) (I)
BE 608 Health Care Markets and Public Policies (1.5) (I)
CHE 517 Biochemical Engineering (3) (I)
DESCI 502 Design Process Models (3) (II)
ENTR 599.008 IP Strategy (3) (I)
ENTR 599.011 Technology-inspired Models for Success (3) (I)
ENTR 599.014 Introduction to Innovation Careers (2) (I)
ENTR 599.018 Interpersonal Relations (3) (I)
ENTR 599.019 Business Math (1.5) (I)
ENTR 599.020 Project Management (3) (I)
ES 512 Business Basics for Graduate Engineers (3) (II)
ES 720 Commercialization of Biomedicine (1.5) (II)
ME599 Design for Global Health (3) (II)

KEY AND ADDITIONAL NOTES:

Course Department and Number Course Name (# of credits) (term offered)

Terms: I - fall, II - winter, III - spring-summer, IIIa - spring half, IIIb - summer half

If a term is not listed after the course, please contact the department for course offering information.

Every effort is made to make sure that the course offering information listed on the concentration is correct. Students can also refer to the [Schedule of Classes](#) or the department for the current offering.