MedTech
Innovation +
Entrepreneurship

MS MedTech Curriculum 2022-23

Summer

BME 501 Biomedical Innovation and Entrepreneurship I – Needs Discovery (4 hrs)
This course utilizes clinical immersion to identify medical device and other healthcare opportunities. Students will be exposed to diverse healthcare environment and learn to quickly triage opportunities based on financial, regulatory and intellectual property landscapes. An integrated seminar series will feature experts in the medical device, pharmaceutical and healthcare industries as well as local entrepreneurs.

Fall

BME 502 Biomedical Innovation and Entrepreneurship II – Design & Innovation (4 hrs)
This course teaches iterative innovation processes focused on medical device and pharmaceutical development. Students will walk through a product development process including ideation, prototype creation, experimentation, supporting design and risk documentation, with an eye towards verification and validation testing to support a regulatory submission. Specifically, students will learn how to identify and quantify opportunities based on customer desired outcomes and to translate these outcome statements into user and functional requirements to create criteria against which solutions can be evaluated. Using a framework for identifying uncertainty and risk, students will develop a series of iterative prototypes, each aimed at reducing specific risks or converting uncertainties to facts. Finally, students will develop a minimum "awesome" product and the documentation required to evaluate that product to support submission to a regulatory body for market entry.

MBA 576 Technology Evaluation and Commercialization I (3 hrs)
Evaluation of a portfolio of technologies to determine the best alternatives for commercialization through technology based high growth new business startup. Includes technology portfolio analysis, development of technology-product-market linkages and creation of value propositions.

BME 590 Medical Device Materials and Manufacturing (3hrs)
This prototyping course will immerse students in state-of-the-art medical device materials and manufacturing methods. Students will explore metals and polymers that are commonly used in medical devices. The course will also introduce common manufacturing methods and design guides for each material. Students will be responsible for the design and manufacture of components and subassemblies to demonstrate an understanding of the techniques.

BEC 575 Global Regulatory Affairs for Medical Products (3 hrs)
This lecture-based course introduces students to the quality systems used to meet the regulatory requirements for developing, testing, manufacturing, and selling medical products in the global marketplace. It provides a general background for those going into the medical products field, but is especially useful to students preparing for a career in the Regulatory Affairs or Quality Assurance Department within a pharmaceutical, biomanufacturing, or medical device company. BEC 575 students must have graduate standing.

Spring

BME 503 Biomedical Innovation and Entrepreneurship III – Product Development (4 hrs)

This course covers project management for new biomedical-related products from accessing various streams of funding to allocation of resources for rapid prototyping and scale-up manufacturing. Students will participate in frequent visits to local biotech companies and prototyping facilities. An integrated seminar series will feature best practices from entrepreneurs and industry practitioners.

Technical Elective (select one course: 3hrs)

This elective will allow each student to acquire in-depth knowledge in an area of their choosing. Students will select a minimum of three credit hours of 500-level or 700-level technical coursework from the following course prefixes: BME, CHE, CE, ECE, ISE, MSE, MAE, or NE as approved in conjunction with the program advisor. Examples of electives include, but are not limited to, BME 512 Biomedical Signal Processing, BME 525 Bioelectricity, BME 540 Nanobiotechnology Processing, Characterization, and Applications, BME 544 Orthopedic Biomechanics, BME 560 Medical Imaging: X-ray, CT, and Nuclear Medicine Systems, BME 570 ImmunoEngineering, BME 583 Tissue Engineering Technologies, BME 584 Tissue Engineering Fundamentals, BME 790 Grad Biochemistry, BME 590 Wearable Biosensors, BME 590 Functional Tissue Engineering, BME 590 Advanced Drug Delivery Systems, BME 590 Introduction to Nanobiomaterials, BMME 740 Advanced Biomaterials, BMME 770 Physiology and Methods in Genomics, BMME 775 Image Processing and Analysis, BMME 790 Graduate Systems Physiology, BMME 795 Information Processing in the Central Nervous System, BMME 810 Digital Nuclear Imaging, BMME 840 Rehabilitation Engineering Design.

MBA 577 Technology Evaluation and Commercialization II (3 hrs)

This course is a continuation of MBA/MSE 576. Topics include refinement of technology-product-market linkages, development of Voice of Customer data and analysis, continued development of a strong business plan suitable for funding opportunities as a new business startup.

MBA 572: Venture Opportunity Analysis Analytics (3 hrs)

Application of the process-based model for new business startups to multiple clients. Emphasis is placed on data gathering, data analysis and data interpretation in the context of evaluating opportunities for new business. Students work in teams on a variety of projects with technology commercialization clients such as Wolfpack Investment Network and Office of Technology Commercialization and New Ventures.