



MS MedTech Curriculum 2024-25

Summer

BME 501 MedTech 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 MedTech 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.

BME 504 Medical Device Materials and Manufacturing (3 hrs)

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.

MBA Elective 1 (3 hrs)

This elective is focused on acquiring knowledge and skills in entrepreneurship, small business finances and/or management. Students are encouraged to enroll in either MBA 576 (recommended NCSU course) or GRAD 718 (recommended UNC-CH course). Other courses may be taken if approved by the program director.

Spring

BME 503 MedTech 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.

MBA Elective 2 (3 hrs)

This elective is focused on acquiring knowledge and skills in entrepreneurship and/or small business finances. Students who have taken MBA 576 at NCSU in the fall are encouraged to enroll in MBA 577. Other courses may be taken if approved by the program director.

BME 650 Internship in Biomedical Engineering or MBA Elective 3 (3 hrs)

Students can choose between BME 650, which requires completion of an internship with a medical technology company/consultancy, or 3 credit hours of MBA electives from the 'Elective and Practicum' courses in the Poole College of Management at NC State or from the 'Health Care' or 'Strategy and Entrepreneurship' tracks in the Kenan-Flagler Business School at UNC-Chapel Hill. Other courses may be taken if approved by the program director.

Technical Elective (select one course: 3 hrs)

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 director.

NOTES:

- The Graduate School at UNC-CH offers a number of courses in [Innovation, Leadership and Management](#) that can be used to satisfy the MBA electives with program director approval.
- Students interested in enrolling in UNC-CH MBA courses need to complete the [Non-MBA Interest Form](#). Enrollment is not guaranteed and depends on availability of seats.
- MBA courses offered by the Kenan-Flagler Business School at UNC-Chapel Hill ([course catalog](#)) are typically 1.5-2.0 credit hours each. Students may need multiple MBA courses at UNC-CH in order to meet the overall credit hour requirements of the program.