

BME 495 – Capstone Design I

3 Credits, 5 Contact hours

Instructor: Joel Schesser, Ph.D.

Textbook(s)/Materials Required:

Class lecture notes

Description:

To provide students with the guidance to choose a capstone design topic and advisor and to prepare the design proposal. The course introduces the student to the definition of design as well as introducing issues of intellectual property, bioethics and safety, and professional societies. This portion of the project includes library research, time and cost planning, oral and written reports, as well as construction, troubleshooting and demonstration of a working prototype.

Prerequisites: BME 372 or BME 420 or BME 351, senior standing, and permission of instructor

Co requisite: none

Objectives:

1. Project Implementation: Define the development of a biomedical engineering technology-based project. Develop engineering documentation for the selected project.
2. Use effective research and critical thinking skills while developing an understanding of ethical issues in research and design.
3. Perform multi-disciplinary teamwork, including written and verbal communication skills, while monitoring project progress using planning and milestone management.

Topics:

Industry Standard Product Development
Identifying Customer Needs
Market and Technical Product research
Teamwork Skills
Design Evaluation
Establishing Product Requirements
Project management and Microsoft Project
Intellectual Property
Animal and human subject testing
Budget and risk analysis

Professional Component: Biomedical Engineering Core Topics

Performance Criteria	Specific Activity During the Course	Assessment Methods/Metrics
Course Objective 1: Identify a biomedical problem or need and propose the design of a biomedical engineering technology-based project to meet those needs using the engineering design process, using standard engineering methods to document the customer needs/requirements, competitive analysis, high level specifications, design specifications, design concepts, and a project plan with schedule, tasks, budget and risk analysis.		
C-1 Ability to design a system, component, or process to meet needs with realistic constraints	Generating Design Concepts from Customer Needs and Requirements to explore tradeoffs in the design process.	Customer Needs and Design Concepts sections
C-2 Identify constraints for a given design	Competitive Analysis and Identifying Constraints that will affect the design, including several relevant fields such as regulatory issues, size, weight, time, cost, safety, testing with animals or human subjects, working with tissues, etc.	Final Report
Course Objective 3: Perform multi-disciplinary teamwork, including written and verbal communication skills, while monitoring and updating project progress using planning and milestone management.		
D-1: Ability to function on multidisciplinary teams	Evaluation of Teamwork and Sharing Responsibilities	Presentation evaluation sheet, "Teamwork" item
E-1 Ability to identify, formulate, and solve engineering problems	Evaluation of Design meeting customer needs	Final Report
F-1 Understanding of professional and ethical responsibility	Plagiarism and engineering ethics studies	Proper annotation of research materials Ethical Dilemma homework essay
G Ability to communicate effectively	Professional meeting attendance and identification of skills to acquire	Midterm and Final Presentations
H: Broad education to understand effect of engineering solutions in a global, economic, environmental, and societal context	Market Research, Product and Development costs evaluations	Final Report
I: Recognition of and ability to engage in lifelong learning	Industry-wide professional technical engineering documentation skills	Final Report
J-1: Knowledge of contemporary issues	Understanding Customer Needs	Final Report Customer Assessment