ISE 4910 – Biomedical Engineering Design I

Course Description
Segment one of the BME senior design sequence. Introduction to patents and engineering ethics included. Practicum results in the definition of the capstone design project to be completed in BME 4920. Integrated Writing course.

Offered both face-to-face and online
Undergraduate level – 3 credit hours

Course Learning Objectives
Students enrolled in this course will learn to:
1) Gain understanding of the use of engineering tools in design and system improvement process
2) Effectively communicate proposed work, in both written and oral formats, for a design project
3) Understand the roles of creativity and strategy in the engineering design process
4) Define and prioritize objectives for a design project
5) Understand functional decompositions of design problems, and be able to differentiate between functions and the means to achieve them in a design
6) Understand the process of creating multiple design alternatives
7) Apply metrics and tools to score and rank different designs
8) Understand the process of design project management and the tools that support it
9) Appreciate the role of ethics in BME and ISE projects
10) Appreciate the role of intellectual property
11) Develop and deliver a design project proposal

Course Learning Outcomes
Upon successful completion of this course, students will:
1) Understand the use of engineering tools in design and system improvement process
2) Effectively communicate proposed work, in both written and oral formats, for a design project
3) Understand the roles of creativity and strategy in the engineering design process
4) Define and prioritize objectives for a design project
5) Understand functional decompositions of design problems, and be able to differentiate between functions and the means to achieve them in a design
6) Understand the process of creating multiple design alternatives
7) Apply metrics and tools to score and rank different designs
8) Understand the process of design project management and the tools that support it
9) Appreciate the role of ethics in BME and ISE projects
10) Appreciate the role of intellectual property
11) Develop and deliver a design project proposal

Both face-to-face and online versions of this course will follow same tentative weekly schedule

Tentative Weekly Schedule

Week 1	Course Introduction (Timeline, Logistics), Intro to Engineering Design: Concepts, Vocab. Career Development: Brandeberry Career Center (Guest Lecture), PE Licensure
Week 2	The Design Process, Engineering Notebook Requirements Professional Development (Guest Lecture), Lifelong Learning

Week 3	Problem Definition: Customer Requirements, Objectives, Constraints
	Ethics in Engineering Problem Solving
Week 4	Team Dynamics: Stages, Roles, Conflict Resolution
	Team Communications, Project Management Styles and Tools
Week 5	Professional Communications, Review Oral Presentation Rubric
	Intellectual Property, Patent Searches (Guest Lecture)
Week 6	Establishing Functions, Exploring the Design Space
	Brainstorming/Idea Generation (Guest Lecture)
Week 7	Evaluation of Designs, Metrics
	Development of a Research Proposal
Week 8	Professional Development Options: WSU MEIE Program
	Human Factors, Ergonomics in Engineering Design (Guest Lecture)
Week 9	Elevator Pitch Video Presentations
Week 10	Group Project Work: Problem Refinement
Week 11	Group Project Work: Requirements Development
Week 12	Group Project Work: Proposal Development
Week 13-15	Proposal Presentations