

1. Course number and name: BMED 2250 Problems in Biomedical Engineering
2. Credits and contact hours: (1-4-0-3)
3. Prepared by: Wendy Newstetter
4. Textbook: None
5. Specific course information
 - a. Catalog description: Biomedical engineering problems from industrial and clinical applications are addressed and solved in small groups using problem-based learning methodologies.
 - b. Prerequisites or co-requisites: BMED 2110
 - c. Required
6. Specific goals for the course
 - a. INQUIRY (Student Outcomes 1, 6, 7)
 - i. Undertake targeted inquiry designed to identify the most relevant, reliable and up-to-date sources
 - ii. Use databases to find peer reviewed journal articles 1.2 Explore the problem statement to identify critical problem features
 - iii. 1.3 Evaluate the quality of sources
 - iv. 1.4 Develop and use the EndNote bibliographic application
 - v. 1.5 Maintain a real-time, sharable record of your sources and their value to you
 - b. KNOWLEDGE BUILDING (Student Outcomes 2 and 7)
 - i. Identify/define knowledge gaps and utilize enhanced inquiry skills to address them
 - ii. Develop and ask probing questions
 - iii. Search for/develop deep principles for organizing new knowledge
 - iv. Work with the team to teach and learn
 - c. PROBLEM-SOLVING (Student Outcome 5)
 - i. Define your client's problem and your team's approach
 - ii. Break problem into components, utilize white boards to publicly represent ideas, apply inquiry results to the problem, and develop hypotheses
 - iii. Understand the value of a mathematical model and develop a mathematical model to test design ideas
 - iv. Propose and build a physical model to conduct experiments for testing the predictive accuracy of a mathematical model and making evidence-based claims used to predict next-steps
 - d. TEAM BUILDING & TEAMWORK (Student Outcomes 1 and 4)
 - i. Actively listen to team members and clearly communicate ideas
 - ii. Offer support and encouragement, monitor group process and make suggestions for positive change

- iii. Fluidly assume, encourage, and distribute leadership among the group members during different phases of the work
 - e. APPLICATION OF ENGINEERING FUNDAMENTALS (Student Outcome 3)
 - i. Demonstrate the value of utilizing theory and professional practices to solve engineering problems and to report outcomes
 - ii. Recognize the interconnected nature of knowledge domains
 - f. COMMUNICATION (Student Outcome 3)
 - i. Identify and enact appropriate communication mode for specific purposes
 - ii. Exhibit professional writing and presentation skills
 - iii. Use whiteboards and other conveyances (email, social media) to negotiate ideas and communicate with associates
 - iv. Verbally engage with colleagues in supportive and encouraging ways that support team and individual progress
- 7. Brief list of topics to be covered
 - a. Team formation, peer- and self-evaluation of team work
 - b. Conducting literature reviews
 - c. Biomedical engineering statistics, sensitivity, selectivity, power
 - d. Experimental design to evaluate medical devices
 - e. Mathematical modeling as a tool for building understanding of complex biomedical
 - f. engineering problems