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
      iii. Explore the problem statement to identify critical problem features
      iv. Evaluate the quality of sources
      v. Develop and use the EndNote bibliographic application
      vi. 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