# BMED 1300 Problems in Biomedical Engineering I

**Credit:** 1-6-3

**Prerequisite(s)**
MATH 1501 (w/ minimum grade of "C") and BIOL 1510 (w/concurrency)

**Catalog Description**
Biomedical engineering problems from industrial and clinical applications are addressed and solved in small groups using problem-based learning methodologies.

**Textbooks**
None

**Objectives**
The overall objective for this course is to prepare students to tackle complex real-world problems in biomedical engineering. This requires them to become self-directed learners who possess excellent inquiry skills. They must also become serious knowledge builders. And finally they must increase their understanding of effective communication strategies while improving group skills. What they learn in this course is foundational to the curriculum they will follow for the next three years.

**Outcomes**
Specifically at the end of the courses, students should be able to do the following things:

1. Tackle a complex real-world problem (Program Outcomes 1, 4, 8 and 9)
    a. Define the problem and identify the problem goals
    b. Explore the problem statement to identify critical problem features
    c. Develop provisional models and hypotheses that frame problem-solving
    d. Plan an attack strategy
    e. Carry out strategy and evaluate it
2. Conduct self-directed inquiry (Program Outcome 8)
    a. Recognize inadequacies of existing knowledge
    b. Identify learning needs
    c. Set specific learning objectives
    d. Make a plan to address these objectives
    e. Evaluate inquiry
    f. Assess reliability of sources
    g. Digest findings and communicate effectively to self and others
    h. Apply knowledge to problem
3. Demonstrate effective group skills (Program Outcome 6)
    a. Help group develop team skills
    b. Willingly forego personal goals for group goals
    c. Avoid contributing excessive or irrelevant information
    d. Express disappointment or disagreement directly
    e. Give emotional support to others

    f. Demonstrate enthusiasm and involvement
    g. Complete tasks on time
    h. Monitor group progress
    i. Facilitate interaction with other members
    j. Assess group skills of self and others
4. Build knowledge in disciplines relevant to BME (Program Outcome 1)
    a. Digest findings and communicate them effectively to others
    b. Identify deep principles for organizing knowledge
    c. Construct an extensive knowledge base in all problem aspects
    d. Ask probing questions to propel further analysis of problem
5. Communicate solutions of problems (Program Outcome 5)
    a. Written reports
    b. Oral presentations

Students will build these skills and knowledge in the area of biomedical engineering by participating on a team that will tackle three problems. At the end of each problem cycle, the team will come to a problem resolution which two team members will present to the other teams and to BME experts. The team will write a final problem report that responds to expert suggestions and critiques. Students will also attend weekly lectures on topics relevant to the current problem and/or presentations on potential career paths for students in this major.