BMED 2250 Problems in Biomedical Engineering (Required)

Catalog Description: BMED 2250 Problems- Biomedical Engr I (1-6-3)  
Prerequisite(s): BMED 2210 (w.minimum grade of "C")  
Biomedical engineering problems from industrial and clinical applications are addressed and solved in small groups using problem-based learning methodologies.

Textbook: None

Prepared by: Barbara Burks Fasse

Topics Covered:
1. Team formation, peer- and self-evaluation of team work
2. Conducting literature reviews
3. Biomedical engineering statistics, sensitivity, selectivity, power
4. Experimental design to evaluate medical devices
5. Mathematical modeling as a tool for building understanding of complex biomedical engineering problems

Course outcomes:
Students who complete this course will be able to:
Outcome 1: Tackle a complex, real-world problem (Student Outcomes a, b, e, i, and j)
1.1 Define the problem and identify the problem goals
1.2 Explore the problem statement to identify critical problem features
1.3 Develop provisional models and hypotheses that frame problem-solving
1.4 Plan an attack strategy, carry it out, and evaluate the results
Outcome 2: Conduct self-directed inquiry (Student Outcome i)
2.1 Recognize inadequacies of existing knowledge, identify learning needs, set specific learning objective, and make a plan to address these objectives
2.2 Evaluate inquiry, assess reliability of sources, digest findings and communicate them effectively to self and others
2.3 Apply the newly acquired knowledge to the problem
Outcome 3: Demonstrate effective group skills (Student Outcome d)
3.1 Help group develop team skills, and willingly forego personal goals for group goals
3.2 Complete tasks on time, and avoid contributing excessive or irrelevant information
3.3 Express disappointment or disagreement directly, give emotional support to others, demonstrate enthusiasm and involvement
3.4 Monitor group progress, facilitate interaction with other members, and assess group skills of self and others
Outcome 4: Build knowledge in disciplines relevant to BME (Student Outcome a, e)
4.1 Digest finding and communicate them effectively to others
4.2 Identify deep principles for organizing knowledge
4.3 Construct an extensive knowledge base in all problem aspects
4.4 Ask probing questions to propel further analysis of problem

Outcome 5: Communicate solutions of problems (Student Outcome g)
   5.1 Generate effective written reports
   5.2 Construct and present effective oral presentations

Correlation between course outcomes and student outcomes:

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The Wallace H. Coulter Department of Biomedical Engineering Student Outcomes:

a. an ability to apply knowledge of mathematics, science, and engineering;
b. an ability to design and conduct experiments, as well as to analyze and interpret data;
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, societal, political, ethical, health and safety, manufacturability, and sustainability;
d. an ability to function on multidisciplinary teams;
e. an ability to identify, formulate, and solve engineering problems;
f. an understanding of professional and ethical responsibility;
g. an ability to communicate effectively;
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
i. a recognition of the need for, and an ability to engage in lifelong learning;
j. a knowledge of contemporary issues;
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;