ENGR 1A FUNDAMENTALS OF ENGINEERING

2006-2008 Catalog Description:
ENGR 001A: Fundamentals of Engineering. This course provides problem-solving skills that are needed in all areas of engineering at CSUS. Students will be exposed to the different areas of engineering and understand the relationships between them. Students will work in teams and complete hands-on laboratory experiments and projects in engineering. Students will develop effective communication skills by presenting periodic oral and written reports in this course. Computers will be used throughout. Note: Not for degree credit, Lecture two hours, Laboratory three hours. Prerequisite: Algebra & Trigonometry or permission of instructor. 3 units (Graded CR/NC).

Textbook:

Other References:

Course Objectives:
1. Develop problem-solving skills through hands on laboratory experience/projects.
2. Work collaboratively as a team member to solve problems.
3. Develop communication skills (Oral, Written).
4. Develop computer literacy.
5. Expose students who are unsure of their interest to different engineering areas and allow students who have chosen a direction to see the relationships between those areas.

Prerequisite by Topic:
Algebra & Trigonometry

Lecture Topics:
1. Engineering Disciplines and Career Paths
   History of early Engineering Disciplines, Profiles of Engineers, Engineering Disciplines
2. Succeeding in the Classroom
   Effective Study Skills, Time Management, Technical Communications
3. Problem Solving and the Design Process
   Analytic or Creative Problem Solving, Design process from concept to implementation (Functionality, Quality, Safety, Ergonomics, Appearance, Environmental Considerations, Economics)
4. The ‘Engineering Approach’ and the application of computers to perform tasks
   Examples of the Engineering Approach to Problem Solving,
5. Data Analyses
   Collecting Data, Organization and Analysis, Application of software package
6. Basic Engineering Principles
   Background information on materials, mechanical and electrical principles
   Topics covered
   a. Static and dynamics problems
   b. Materials testing
   c. Surveying
   d. Instrumentation & Measurement
   e. Analog/Digital Circuits
f. Robotics
7. Creative Thinking, Modeling, and Prototyping
Identification of relevant problems, Development of ideas for solutions, Building and Testing, Iterative approach leading to Prototyping
8. Final Presentations and reports
Students working in teams demonstrate and present their final projects

**Laboratory Topics (Typical):**
1. Surveying & Estimation
2. Kinematics
2. Simple Machines
3. Properties of Materials
4. Materials Testing
5. Energy
6. Robotics
7. Electric Circuits
8. Virtual Instrumentation
9. Optical Engineering
10. Signal processing & Measurement
11. Communications (Audio/Video)

**Contribution of Course to the Professional Education Component:**
- This is a hands-on laboratory-based course designed to motivate students to study engineering.
- Science and Design Content Distribution: Science - 2 units or 67%; Design - 1 unit or 33%.

**Relationship of Course to ABET Program Outcomes:**
- #8. Experimental work: Students are introduced to various areas of engineering through hands-on laboratory experiments.
- #10. Teamwork: Students work collaboratively on problem-solving skills.
- #11. Written communication: Students are expected to write technical reports reflecting on the laboratory activates.
- #12. Oral communication: Students work together in teams and make group presentations.
- #14. Life-long learning: Students are motivated to pursue studies in engineering through captivating hands-on laboratory experiments.

**CR Grade Requirements:**
- Attendance is required at all scheduled class and laboratory sessions
- Satisfactory participation is required in all “team” activities
- All course and laboratory assignments must be completed with a CR (credit) grade

**Course Coordinator:**
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**Office Hours:**
MF 2:00 – 3:00 p.m.
W 11:00 – noon