EGGN 100 - INTRODUCTION TO ENGINEERING

COURSE DESCRIPTION
Introduction to engineering disciplines and their sub-fields, basic tools used in engineering practice, hands-on engineering projects.

COURSE OBJECTIVE
The course familiarizes students with field of engineering in general and the individual disciplines within engineering in particular. At the end of the course students are expected to be cognizant of the role of an engineer in society and are thus able to make an informed selection of a field within engineering as their major.

STUDENT LEARNING GOALS
At the completion of the course students will have gained the following knowledge and skills:
- General understanding of each engineering discipline, appreciation of the breadth of the field, and the ability to make intelligent choice of major
- Preliminary knowledge of engineering tools, such as AUTOCAD, MATLAB, and LABVIEW, used in common engineering applications
- Ability to work in multi-disciplinary teams and carry out a basic design project

TOPICS

Week 1   Introduction to Engineering
          Case histories in engineering projects – successes and failures

Week 2   Introduction to CAD tools – AUTOCAD
          Basic drawing exercises with AUTOCAD

Week 3   Introduction to engineering analysis tools – MATLAB
          Problem solving using MATLAB

Week 4   Virtual implementation tools in engineering - LABVIEW
          Collection and utilization of data using LABVIEW

Week 5   Introduction to Civil Engineering
          A representative Civil Engineering project: Design and construction of a truss-bridge with spaghetti*

Week 6   Civil Engineering design project - Continued

Week 7   Introduction to Electrical Engineering
          A representative Electrical Engineering project: Design and implementation of low-power adjustable audio amplifier circuit**

Week 8   Electrical Engineering design project - Continued

Week 9   Introduction to Computer Engineering
          A representative Computer Engineering project: Building and testing of solar powered calculator***

Week 10   Computer Engineering design project - Continued

Week 11   Introduction to Mechanical Engineering
           A representative Mechanical Engineering project: Design and building of two-wheeled
           differential drive robot****

Week 12   Mechanical Engineering design project - Continued

Week 13   Field Trip to an Engineering site
           Project reviews, demos, & presentations

Week 14   Project reviews, demos, & presentations - Continued

Week 15   Introduction to Engineering Societies

Week 16   Final Exam Week

*Civil Engineering project: Design of a truss-bridge with spaghetti
        Students will measure the strength and dimensions of spaghetti provided to them and design a truss bridge
        of 0.5 m span out of 250 grams of spaghetti. All bridges will be loaded with dead loads at the center and
        the bridge that can take the highest amount of load at the center will be the winner.
**Electrical Engineering project: Design and implementation of a low-power adjustable audio amplifier circuit
        Students will be guided to design and implement an adjustable audio amplifier circuit. This low-power
        audio amplifier circuit will be constructed based on the use of an audio power amplifier IC LM386.
        Students will implement and test this circuit first in a simulated environment and then build and test the real
        circuit.
***Computer Engineering project: Building and testing of solar powered calculator
        Students will simulate a calculator, first using professional grade simulation software and then build and
        test the calculator using digital logic gates and solar cells on a bread board. The goal of this simple hands-
        on project is to familiarize students with the fundamentals of digital logic design and give them a glimpse
        of the techniques and tools used by computer engineers on large scale complex projects.
****Mechanical Engineering project: Design and building of two-wheeled differential drive robot
        Students will build two wheeled differential drive robot with two photo-resistor sensors that will move
        forward and change direction when insufficient light is detected. The basic mission of the robot is to find
        the light and stay out of the dark.