Template for ABET course syllabi (new format)

1. *Course number and name*
   ENGR 416 – Mechatronics Lab

2. *Credits and contact hours*
   1 Credit.

3. *Instructor's or course coordinator's name*
   Instructor: Phil Frances.
   Course coordinator: .V.Krishnan, Professor of Mechanical Engineering

4. *Text book, title, author, and year*
   Richard H. Barnett, Sarah A. Cox, Larry D.O'Cull, Embedded C Programming and the Atmel AVR, Thomson Delmar Learning, 1st edition 2002

   a. *other supplemental materials*

      Bolton, W.,Mechatronics,3rd Edition. Addison Wesley Longman Publishing, New York, NY, 2003.
      (Optional References).

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Experiments connected with mechatronic concepts. Programming robot tasks. Comparison and analysis of human and robot motion. Optical encoders, motor selection and tuning.

   b. *prerequisites or co-requisites*
      ENGR 415.

   c. *indicate whether a required, elective, or selected elective course in the program*
      Elective for Electrical and Mechanical Engineering.

6. *Specific goals for the course*
   a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.
      - Students will learn how to use sensor outputs to the range needed by common controllers. Students will learn when the amplification of RC or active filters are necessary for sensor use.
      - Students will learn how to program an 8-bit Atmel microcontroller using the gnu c compiler and a bootloader, and how to debug the program using the atmel simulator.
      - Students will learn how to write a ladder-logic program and run it on the school's PLC systems.
      - Students will learn how to create a simulink block diagram with DSPACE inputs and outputs, and implement a control law using the DSPACE system and matlab.
      - Students will control the various motors using the controllers (Micro, PLC or PC) from the previous labs.

   explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

Course addresses ABET Student Outcome(s): a, b ,c ,d ,k.

7. *Brief list of topics to be covered*
    - Sensors, amplification and filters.
    - Microcontrollers(Atmel) in control and automation.
    - Use of PLCs for mechatronic systems.
    - Personal computers (DSPACE) for control and automation.
    - Motors: DC Motors, stepper motors, hobby servo motors.