1. **Course number and name**  
   ENGR 306: Electromechanical Systems

2. **Credits and contact hours**  
   3 Credits

3. **Instructor’s or course coordinator’s name**  
   Instructor: R.F. Trauner  
   Course coordinator: Tom Holton

4. **Text book, title, author, and year**  
   
   a. **other supplemental materials**  
      S. Chapman, *Electric Machinery Fundamentals*  
      Mulukutlu Sarma, *Electrical Machines*  
      Dino Zorbas, *Electric Machines*  
      Syed Nasar, *Electric Machines and Electromechanics: Schaum’s Outlines*

5. **Specific course information**  
   a. **brief description of the content of the course (catalog description)**  
   b. **prerequisites or co-requisites**  
      A grade C or better in 205  
   c. **indicate whether a required, elective, or selected elective course in the program**  
      Required for Electrical Engineering, Elective for Computer, Mechanical and Electrical 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.**  
      - The students will demonstrate their ability to analyze single and three phase AC electrical circuits to obtain relevant information of interest.  
      - The students will demonstrate their understanding of phasor diagrams, power factor, electrical demand, energy consumption, etc.  
      - The students will demonstrate their understanding of energy conversion principles.  
      - The students will demonstrate their understanding of essential elements of all energy conversion systems and their external power supply requirements.  
      - The students will demonstrate their understanding of uniqueness and applicability of different members of rotating machine family.
Template for ABET course syllabi (new format)

- The students will demonstrate their ability to determine the most appropriate models for transformers and rotating machines under specified operating conditions.
- The students will demonstrate their ability to analyze, select, size, and specify transformer in order to meet design specifications.
- The students will demonstrate their ability to analyze performances and electrical behaviors of given rotating machines.
- The students will demonstrate their ability to select a specific type of rotating machines and size the rotating machine properly in order to meet application’s requirements.
- The students will demonstrate their ability to use MATLAB to analyze single and three phase electrical circuits.
- The students will demonstrate their ability to use MATLAB to solve performances and behavior of transformers and rotating machines using equivalent circuits or model.

b. 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): [c, k].

7. Brief list of topics to be covered

- Review of AC circuit and basic AC circuit concepts like power factor, phasor diagram, power measurement technique, etc.
- Magnetic Circuit Analysis
- Power Transformer: What is it and how to select and size it?
- Principles of Energy Conversion and Rotating Machines
- AC Rotating Machines
- DC Rotating Machines
- Stepper and other special purpose motors