Template for ABET course syllabi (new format)

1. *Course number and name*
   ENGR 204: Engineering Mechanics

2. *Credits and contact hours*
   3 Credit Hours

3. *Instructor's or course coordinator's name*
   Instructor: Kwok Teh, Assistant Professor of Mechanical Engineering
   Course coordinator: Kwok Teh, Assistant Professor of Mechanical Engineering

4. *Text book, title, author, and year*
   - STATICS, Volume 1, Sixth Edition, J. L. Meriam, L. G. Kraige, John Wiley & Sons, Inc.,111 River Street, Hoboken, NJ 07030-5774
   - DYNAMICS, Textbook: Ferdinand P. Beer, E. Russell Johnston, Jr. William E. Clausen, Vector Mechanics for Engineering 8th Edition

   a. *other supplemental materials*
      - Hibbeler, R.C., Engineering Mechanics: Dynamics, 7th ed., Prentice Hall, 1997.
      - McGill, D.J. and King, W.W., Engineering Mechanics: An Introduction to Dynamics, 3rd ed., PWS-KENT, 1995.
      - Meriam, J. L., Engineering Mechanics: Dynamics, 3rd ed., Wiley, 1996.
      - Torby, B. J., Advanced Dynamics for Engineers. Holt, Rinehart, and Winston, 1984.
      - Greenwood, D. T., Principles of Dynamics, 2nd ed.. Prentice Hall, 1988.

      (Optional References).

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*

      Vector treatment of force systems, kinematics and kinetics. Centroids and moments of inertia. Equilibrium of internal stresses. Methods of acceleration. Work, energy and momentum. Kinetic differential equations. Vibrations and time response.

   b. *prerequisites or co-requisites*
      MATH 227, PHYS 220

   c. *indicate whether a required, elective, or selected elective course in the program*
      Elective for 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 student will demonstrate the ability to use vectors to represent forces
      - The student will demonstrate the ability to sum forces and moments
      - The student will demonstrate the ability to develop force and moment equilibrium equations
      - The student will demonstrate the ability to find equilibrium of frictionless pulley and cable systems.

- The student will demonstrate the ability to analyze equilibrium of truss and beam systems.
- The student will demonstrate the ability to develop shear and bending moment diagrams
- The student will demonstrate an ability to determine the centroids of areas, volumes of various shapes using both integration and summation
- The student will demonstrate an ability to determine moments of inertia about axes using both integration and summation.
- The student will demonstrate an ability to analyze the behavior of simple systems with friction.
- The student will demonstrate an ability to draw free body diagrams for the purposes of determining internal forces in members and reactions.
- The student will demonstrate a good understanding of the motion, velocity and acceleration of a point.
- The student will demonstrate a good understanding of the difference between a curve and its parameterization.
- The student will demonstrate a good understanding of the use of the instantaneous state to derive equations of motion.
- The student will demonstrate a good understanding of the meaning of the terms in F= ma.
- The student will demonstrate a good understanding of the meaning of F= ma as a law.
- The student will demonstrate a good understanding of the concepts of work, power and energy.
- The student will demonstrate a good understanding of conservative and non-conservative systems.
- The student will demonstrate a good understanding of the motion, velocity and acceleration of a point.
- The student will demonstrate a good understanding of the difference between a curve and its parameterization.
- The student will demonstrate a good understanding of the concept of angular velocity of a rigid body or reference frame.
- The student will demonstrate a good understanding of time rates of change of unit vectors in a rotating reference frame.
- The student will demonstrate a good understanding of absolute and relative velocity and acceleration in a rotating reference frame.
- The student will demonstrate the ability to compute linear momentum and moment of a rigid body.
- The student will demonstrate the ability to use Euler's laws of motion for two-dimensional problems.
- The student will demonstrate a good understanding of the concept of frequency and period for simple harmonic motion.
- The student will demonstrate a good understanding of the governing equation for the simple harmonic oscillator.

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, e, c

7. *Brief list of topics to be covered*

- Position vector its derivatives: velocity and acceleration
- Using vectors to represent forces
- Summing forces and moments
- Developing force and moment equilibrium equations
- Equilibrium of frictionless pulley and cable systems
- Analyzing equilibrium of truss and beam systems
- Determining centroids of areas, volumes and moments of inertia
- Developing shear and bending moment diagrams
- Rectilinear motion and its graphical description
- Constrained motion
- Newton’s laws of motion
- Work, power and energy
- Conservation of energy
- Impulse and momentum methods and collisions
- Conservation of momentum
- Two-dimensional rigid body kinematics
- Euler’s laws of motion
- Energy methods in rigid body motion