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

2. **Credits and contact hours**  
   3 Credit Hours: two 50-minute lecture sessions/week and one 2-hour-45-minute laboratory session/week

3. **Instructor’s or course coordinator’s name**  
   Instructor: Kwok Siong Teh, Associate Professor of Mechanical Engineering  
   Course coordinator: Kwok Siong Teh, Associate Professor of Mechanical Engineering

4. **Text book, title, author, and year**  
   a. **other supplemental materials**  

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

   b. **prerequisites or co-requisites**  
      MATH 227: Calculus II, and  
      PHYS 220: General Physics with Calculus (I)

   c. **indicate whether a required, elective, or selected elective course in the program**  
      Lower Division Engineering 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

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): a, c, e, g, h, i, j, k.

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