1. Course number and name: **MME 2434 Mechanics of Materials**

2. Credits and contact hours. **4 Credit Hours, 3 Lecture Hours and 3 Lab Hours**

3. Instructor's or course coordinator's name: *S.K. Varma*

4. Text book, title, author, and year.
   Statics and Mcehanics of Materials by R. C. Hibbeler, 2016

5. Specific course information (Catalog Description):
   a. A first course in Newtonian mechanics, using vectors. Equilibrium of particles, and rigid bodies, forces in space, centroids, moments of inertia, study of stress and strain, use of stress-load equations to determine the state of stress in specific structural elements, study of combined stresses.
   b. MATH1411 with a C or better
   c. Required

6. Specific goals for the course
   a. Learning Outcomes
      - Specific outcomes of instruction:
      - Define between scalar and vector quantities (Exam I)
      - Identify the choice of application for scalar and vector quantities (Exam I)
      - Understand fundamental vector concepts (Exam I)
      - Apply concepts of matrix algebra to solving vector problems (Exam II)
      - Analyze free body diagrams using vectors (Exam II)
      - Calculate the stress, strain, and tensile properties under loading conditions (Exam III)
      - Differentiate between the various modes of loading (Exam IV)

   b. Student Outcomes:

	Outcome	**Level***	**Relevant Activities**
1.	(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics	**H**	1(a). Weekly assignments and lab activities involve mathematical and physics tools in solving equations of statics and mechanics. 1(b). Solve realistic engineering problems, requiring education of physical description to a model or mathematical representation
2.	(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare as well as global, cultural, social	**M**	Concept of Stress and Strain and their distribution helps in engineering design.

	environmental, and economic factors.		
3.	(3) an ability to communicate effectively with a range of audiences	**L**	Team presentations of assigned lab problem solutions.
4.	(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	**L**	4(a) Lecture discussions on professional ethics and practice; use of tools and reference materials required for professional examinations. 4(b) Professional and pre-professional practice and responsibility discussions.
5.	(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	**L**	Team lab assignments and presentations.
6.	(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions	**M**	Lab assignments of simple connection design and analysis of material behavior data (under loads).
7.	(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	**M**	Use of videos, problem solving and discussion in labs helps them to apply knowledge in various situations.
8.	The broad education necessary to understand the impact of engineering solutions in a blobal, economic, environmental, and societal context.	**M**	Lecture/ discussion of engineering basics; unit systems, calculation procedures; physics basics; problem solving guide and format.

*** H=high content; M=medium; L=low; 0=no significant content.**

7. Brief list of topics to be covered
    - Force vectors
    - Force and moment systems
    - Equilibrium and structural analysis
    - Geometric properties and distributed loadings
    - Internal Loadings
    - Mechanical properties of Materials
    - Axial load, Torsion, Bending
    - Combined Loadings and Stress and Strain Transformations