

| MM 201 Statics                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      | DEPARTMENT OF MECHANICAL ENGINEERING |          |                     |       |                |             |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|--------------------------------------|----------|---------------------|-------|----------------|-------------|
| Semester                          | Methods of Education                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |      |                                      |          |                     |       | Credits        |             |
|                                   | Lecture                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Recit. | Lab. | Project / Field Study                | Homework | Other               | Total | Credit         | ECTS Credit |
| 3                                 | 42                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 14     | -    | -                                    | 44       | -                   | 100   | 4              | 4.0         |
| Language                          | Turkish                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |      |                                      |          |                     |       |                |             |
| Compulsory / Elective             | Compulsory                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |      |                                      |          |                     |       |                |             |
| Prerequisites                     | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |      |                                      |          |                     |       |                |             |
| Course Contents                   | Statics of particles: forces in plane, forces in space, equilibrium. Moment of a force, moment of a couple. Equivalent systems of forces on rigid bodies. Equilibrium in two dimensions. Equilibrium in three dimensions. Distributed forces: centroids and center of gravity. Analysis of structures: trusses, frames and machines. Internal forces in beams and cables. Friction. Moments of inertia of areas, moments of inertia of masses. Method of virtual work. |        |      |                                      |          |                     |       |                |             |
| Course Objectives                 | To develop a clear understanding of the principles of rigid body mechanics, assumptions and idealizations, equilibrium and internal force concepts, related applications.                                                                                                                                                                                                                                                                                              |        |      |                                      |          |                     |       |                |             |
| Learning Outcomes and Competences | Learning the theory and applications of engineering mechanics, applied first to a particle, then to a rigid body subjected to a coplanar system of forces, and finally to the general case of three-dimensional force systems acting on a body.                                                                                                                                                                                                                        |        |      |                                      |          |                     |       |                |             |
| Textbook and / or Reference       | 1. Engineering Mechanics-Statics, R. C. Hibbeler, Prentice Hall Inc., USA.<br>2. Vector Mechanics for Engineers-Statics, Mc-Graw Hill Comp., England.                                                                                                                                                                                                                                                                                                                  |        |      |                                      |          |                     |       |                |             |
| Assessment Criteria               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                      |          | If any, mark as (x) |       | Percentage (%) |             |
|                                   | Midterm Exams                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |      |                                      |          | X                   |       | 50             |             |
|                                   | Quizzes                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |      |                                      |          | X                   |       | 10             |             |
|                                   | Homeworks                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |      |                                      |          |                     |       |                |             |
|                                   | Projects                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |      |                                      |          |                     |       |                |             |
|                                   | Term Paper                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |      |                                      |          |                     |       |                |             |
|                                   | Laboratory Work                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                      |          |                     |       |                |             |
|                                   | Other                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |      |                                      |          |                     |       |                |             |
|                                   | Final Exam                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |      |                                      |          | X                   |       | 40             |             |
| Instructors                       | Prof. Mahmut OZBAY, Assist.Prof. Selim TURKBAS, Assoc.Prof. Ezgi GUNAY                                                                                                                                                                                                                                                                                                                                                                                                 |        |      |                                      |          |                     |       |                |             |
| Week                              | Subject                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |      |                                      |          |                     |       |                |             |
| 1                                 | GENERAL PRINCIPLES: fundemental concepts, units of measurement.                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                      |          |                     |       |                |             |
| 2                                 | FORCE VECTORS: vector operations, cartesian vectors, position vectors, addition and subtraction of cartesian vectors                                                                                                                                                                                                                                                                                                                                                   |        |      |                                      |          |                     |       |                |             |
| 3                                 | FORCE VECTORS: force vectors directed along a line, dot product. EQUILIBRIUM OF A PARTICLE: condition for the equilibrium of a particle, the free body diagram.                                                                                                                                                                                                                                                                                                        |        |      |                                      |          |                     |       |                |             |
| 4                                 | EQUILIBRIUM OF A PARTICLE: coplanar force systems, three dimensional force systems                                                                                                                                                                                                                                                                                                                                                                                     |        |      |                                      |          |                     |       |                |             |
| 5                                 | FORCE SYSTEM RESULTANTS: cross product, moment of a force, moment of a force about a specified axis.                                                                                                                                                                                                                                                                                                                                                                   |        |      |                                      |          |                     |       |                |             |
| 6                                 | FORCE SYSTEM RESULTANTS: Moment of a couple, resultant force and couple system, reduction of a simple distrubuted loading.                                                                                                                                                                                                                                                                                                                                             |        |      |                                      |          |                     |       |                |             |
| 7                                 | EQUILIBRIUM OF A RIGID BODY: equilibrium equations in two and three dimensioanal force systems, free body diagrams, two and three force members                                                                                                                                                                                                                                                                                                                        |        |      |                                      |          |                     |       |                |             |
| 8                                 | STRUCTURAL ANALYSIS: simple trusses, MIDTERM I                                                                                                                                                                                                                                                                                                                                                                                                                         |        |      |                                      |          |                     |       |                |             |
| 9                                 | STRUCTURAL ANALYSIS: frames and machines.                                                                                                                                                                                                                                                                                                                                                                                                                              |        |      |                                      |          |                     |       |                |             |
| 10                                | INTERNAL FORCES: internal forces developed in structural members, shear and moment diagrams.                                                                                                                                                                                                                                                                                                                                                                           |        |      |                                      |          |                     |       |                |             |
| 11                                | FRICTION: characteristics of dry friction, problems involving dry friction.                                                                                                                                                                                                                                                                                                                                                                                            |        |      |                                      |          |                     |       |                |             |
| 12                                | FRICTION: wedges, frictional forces on flat belts, MIDTERM II.                                                                                                                                                                                                                                                                                                                                                                                                         |        |      |                                      |          |                     |       |                |             |
| 13                                | CENTER OF GRAVITY AND CENTROID: center of gravity, center of mass and centroid for a body, composite bodies.                                                                                                                                                                                                                                                                                                                                                           |        |      |                                      |          |                     |       |                |             |
| 14                                | MOMENT OF INERTIA: moments of inertia for areas and masses, parallel-axis theorem, product of inertia for an area.                                                                                                                                                                                                                                                                                                                                                     |        |      |                                      |          |                     |       |                |             |