**University of Management and Technology**

**Course Outline**

Course code ….**ME122…** Course title ………..**Engineering Mechanics I: Statics……**

|  |  |
| --- | --- |
| Program | BS Mechanical Engineering |
| Credit Hours | 03 |
| Duration | One Semester |
| Prerequisites | NIL |
| Resource Person | Dr Muhammad Asad |
| Counseling Timing  (Room# C-3/16) | 1400-1700 Hrs (Monday to Friday) |
| Contact | muhammad.asad@umt.edu.pk |

**Chairman`s signature………………………………….**

**Dean’s signature…………………………… Date………………………………………….**

**Learning Objective:**

* To gain basic understanding of various engineering structures in equilibrium.
* To develop knowledge regarding physical phenomena in mathematical terms.
* To build foundation for advanced topics in Engineering

**Learning Methodology:**

Theoretical concepts shall be imparted with common engineering examples. Emphasis will be such that students can easily perform engineering design basic calculations. This shall be imparted with rigorous design engineering problems. Laboratory work shall further strengthen the students to handle Engineering Statics problems.

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Quizzes 15% (4 Quiz Each 5% best 3 out of 4)

Assignments 10% (2 Assignments)

Mid Term 25%

Attendance & Class Participation

Term Project

Presentations

Final exam 50%

Total 100%

**Recommended Text Books:**

Engineering Mechanics by R.C. Hibbler 11th Edition.

**Reference Books:**

* Engineering Mechanics by J.L. Meriam
* Vector Mechanics for Engineers by Beer and Johnston

**Calendar of Course contents to be covered during semester**

Course code **ME122** Course title **Engineering Mechanics-I: Statics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Course Contents** | | **Reference Chapter(s)** |
| 1 | **Introduction to Statics:**   * Mechanics * Fundamental Concepts * Newton`s Laws * Measurements & System of Units | | **Ch 1** |
| 2 | **Force System (Two and three Dimension):**   * Force & Force Vectors * Addition of Coplanar Forces * Position Vectors | | **CH # 2** |
| 3 | **Force System (Two and three Dimension):**   * Dot Product * Rectangular Components | | **CH # 2, 4** |
| 4 | **Force System (Resultants):**   * Moment & Couples * Moment of Force : Scalar Formulation * Moment of Force : Vector Formulation * Resultant of Forces | | **CH # 4** |
| 5 | **Equilibrium**   * Equilibrium of a Particle * Free Body Diagram * Mechanical System * Isolation and Equilibrium equations for two and three dimensional system | | **CH# 3** |
| 6 | **Equilibrium**   * Rigid Body Equilibrium * Free Body Diagrams | | **CH# 5** |
| 7 | **Equilibrium**   * Rigid Body Equilibrium * Equations of Equilibrium (3D) * Two and three forces member | | **CH# 5** |
| 8 | **Mid Term Examination** | |  |
| 9 | **Structures**   * Plane Trusses | | **CH# 6** |
| 10 | **Structures**   * Method of Joints * Zero Force Members | | **CH# 6** |
| 11 | **Structures**   * Method of sections * Frames and machine analysis | | **CH# 6** |
| 12 | **Structures**   * Internal Forces in Structural Members * Forces in beams and Cables | | **CH# 7** |
| 13 | **Special Concepts in Mechanics**   * Center of gravity, Center of mass & Centroid * Moment of Inertia (mass & area) & Radius of Gyration | | **CH# 9, 10** |
| 14 | | **Friction**   * Type of Friction and its application * Characteristics of Dry Friction | **CH# 8** |
| 15 | | **Friction**   * Friction on wedges , screws and flat belts | **CH# 8** |
| 16 | | **Final Examination** |  |