

## Faculty of Engineering & Technology

### Mechanics 1

#### Information :

**Course Code :** MEC 121

**Level :** Undergraduate

**Course Hours :** 2.00- Hours

**Department :** Faculty of Engineering & Technology

#### Area Of Study :

Know and understand vector Algebra in two and three dimensions.  
Apply vector mechanics to solve and analyze static problems.  
Identify the reaction supports and draw the free body diagram.  
Solve practical engineering applications in static involving the equilibrium of particles and rigid bodies under general force systems.

#### Description :

Applications on space vectors, Resultant of forces, Moment of a force, Equivalent couples, Equivalent systems, Equations of equilibrium of a rigid body, Types of supports, Equilibrium of plane systems (Trusses and frames), Equilibrium of space systems acting on rigid bodies, The mass center of a system of particles and laminas of different shapes, The mass moment of inertia of system of particles and laminas.

#### Course outcomes :

##### a. Knowledge and Understanding: :

- |     |  |
|-----|--|
| 1 - | Recognize vector and scalar quantities in statics.                           |
| 2 - | Explain vector analysis operations.  |
| 3 - | Describe equilibrium engineering conditions for particles and rigid bodies.  |
| 4 - | Identify proper reactions of supports of rigid bodies in static equilibrium. |
| 5 - | Define the difference between trusses and frames.                            |

##### b. Intellectual Skills: :

- |     |   |
|-----|---|
| 1 - | Solve static equilibrium problems.                                    |
| 2 - | Think logically and creatively in applying conditions of equilibrium. |

##### c. Professional and Practical Skills: :

- |     |   |
|-----|---|
| 1 - | Applying the concepts of transferring force in engineering mechanics. |
| 2 - | Make drawings and free-body diagrams to solve equilibrium problems .  |

##### d. General and Transferable Skills: :

- |     |  |
|-----|--|
| 1 - | Communicate effectively                        |
| 2 - | Effectively manage tasks, time, and resources. |

### **Course Topic And Contents :**

<b>Topic</b>	<b>No. of hours</b>	<b>Lecture</b>	<b>Tutorial / Practical</b>
Applications on space vectors	4	1	1
Resultant of forces	4	1	1
Moment of a force, Equivalent couples	4	1	1
Equivalent couples,	4	1	1
Equivalent system	4	1	1
Equations of equilibrium of a rigid body	4	1	1
Types of supports	4	1	1
Equilibrium of plane systems(Trusses and frames)	4	1	1
Equilibrium of space systems acting on rigid bodies	4	1	1
Frames	4	1	1
Trusses	4	1	1
The mass center of a system of particles	4	1	1
The mass center of laminas of different shapes	4	1	1
The mass moment of inertia of system of particles	4	1	1
The mass moment of inertia of system of laminas	4	1	1

### **Teaching And Learning Methodologies :**

Interactive Lecturing

Discussion

Problem solving

### **Course Assessment :**

<b>Methods of assessment</b>	<b>Relative weight %</b>	<b>Week No</b>	<b>Assess What</b>
Final Exam	40.00		
Mid- Exam 1I	25.00		- Oral discussion to asses the ability of following the lecture.
Mid- Exam I	15.00		- Oral discussion to asses the ability of following the lecture.
Performance	10.00		
Quizzes+Assignment	10.00		- Oral discussion to asses the ability of following the lecture.

### **Course Notes :**

Course and instructor notes.

### **Recommended books :**

1. J.L MERIAM, L.G. KRAIGE, ENGINEERING MECHANICS % STATICS + 7th EDITION IN SI VERSION.
2. Beer, F.P., Johnson, E.R. and Eisenberg, E. R., "VECTOR MECHANICS FOR ENGINEERS: STATICS", Mc Graw-Hill, 10th ed. in SI units, 2012.

**Periodicals :**

[www.mhhe.com/beer\\_johnston7](http://www.mhhe.com/beer_johnston7)  
[www.prenhall.com/onekey](http://www.prenhall.com/onekey)

**Web Sites :**

[www.mhhe.com/beer\\_johnston7](http://www.mhhe.com/beer_johnston7)  
[www.prenhall.com/onekey](http://www.prenhall.com/onekey)