

Course Specifications Mechanics B121

University: Benha University

Faculty: Benha Faculty of engineering

Course specifications

Programme(s) on which the course is given All

Major or minor element of programmes

Department offering the programme All

Department offering the course Department of Basic Sciences

Academic year / Level First Year – The First Semester

Date of specification approval

A- Basic Information

Title: Mechanics

Code: B121

Credit Hours:

Lecture: 2 hours

Tutorial: 2 hours

Practical: ---

Total: 4 hours

B- Professional Information

1 - Overall aims of course

By the end of this course the student will be able to:

- Evaluate the components and direction angles of vectors in two and in three dimensions
- Determine the unit vector describing the direction of a vector
- Determine the magnitude and direction of the resultant of a system of concurrent forces in plane and in space
- Evaluate the conditions of equilibrium of a particle
- Compute the vector and scalar products of vectors
- Compute the moment of a force about a point
- Compute the moment of a force about a line
- Compute the moment of a couple
- Reduction of a system of a given forces to a force – couple system at

- a given point in space
- Determine the nature of the supports of a rigid body and draw the free body diagrams
 - Evaluate the unknown reactions acting on a rigid body by solving the equations of static equilibrium
 - Formulate and solve in a logical sequence the equilibrium equations for different types of engineering structures (Trusses, frames, and machines)
 - Understand the principles of dry friction
 - Evaluate the friction forces required to keep a mechanical system in equilibrium

2- Intended learning outcomes of course (ILOs)

a. Knowledge and understanding:

- a.1 Understand The general principles of statics of particles and rigid bodies**
- a.2 Understand the equilibrium conditions of particles and rigid bodies in two and in three dimensions**
- a.3 Understand how to solve equilibrium problems of different types of engineering structures**
- a.4 Understand the principles of dry friction**

b. Intellectual skills

- b.1 Gain skills in identifying different types of static equilibrium**
- b.2 Gain skills in dealing with the statics of different types of engineering structures**

c- Professional and practical skills

- c.1 Practice in dealing with systems of concurrent and non-concurrent forces in plane and in space**
- c.2 Practice in solving static equilibrium problems of particles and rigid bodies in two and in three dimensions**
- c.3 Practice in solving the equilibrium problems of different types of structures**

d- General and transferable skills

d.1 Practice in dealing with systems of concurrent and non-concurrent forces in plane and in space

d.2 Practice in solving static equilibrium problems in two or three dimensions

d.3 Practice in solving the equilibrium problems of different types of structures

3- Contents

Topic	No. of Hours	Lecture	Tutorial/ Practical
Statics of Particles	8	4	4
Rigid Bodies: Moment of a force about a point – Moment of a force about a line- Moment of a couple – Reduction of a system of forces in three dimensions into a force couple system	16	8	8
Equilibrium of rigid bodies: Types of supports and reactions- Free body diagrams- Conditions of static equilibrium of rigid bodies in two and in three dimensions	12	6	6
Analysis of structures: Trusses, Frames, and machines	16	8	8
Friction	8	4	4

4– Teaching and learning methods

4.1- Lectures

4.2- Class tutorials

5- Student assessment methods

5.1 Homework

5.2 Quizzes and mid-term examination to assess the knowledge, understanding, learning

5.3 Final Examination

Assessment schedule

Assessment 1	Quizzes three to four times
Assessment 2	Homework
Assessment 3	Mid – Term Examination during the 8th week
Final Examination	

Weighting of assessments

Mid-term examination	30 %
Final-term examination	60 %
Attendance and assignments	10 %
Total	100 %

6- List of references

6.1- Course notes

Lectures' notes

6.2- Essential books (text books)

- i. F. P. Beer & E. R. Johnston Jr. , “Vector Mechanics for Engineers- Statics”, McGraw Hill**
- ii. R. C. Hibbler, “ Engineering Mechanics – Statics” Macmillan**
- iii. J. L. Meriam & L. G. Kraige, “Engineering Mechanics – Statics”, John Wiley And Sons**
- iv. Irving Shames, "Engineering Mechanics-Statics", Printice Hall**

7- Facilities required for teaching and learning

Data show and projector

Course coordinator: Dr. Mohamed Diao El-Din Khidr

Head of Department: Prof. Dr. Hassan Nasr Ahmad Ismail

Date: //