Course Specification

(Bachelor)

Course Title:	**Dynamics**
Course Code:	**362MATH-3**
Program:	**B. Sc. in Mathematics**
Department:	**Mathematics**
College:	**Science**
Institution:	**Jazan University**
Version:	**2024**
Last Revision Date:	**9/2024**

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:	03 Hours

2. Course type

A.	University ☐	College ☐	Department☒	Track☐	Others☐
B.	Required ☒		Elective☐		

3. Level/year at which this course is offered:	Level 6/ Year 2

Level 4 / Year 2

4. Course General Description

- Dynamics, Basic principles of motion.
- Laws of Motion.
- The Motion of particles in the plane.
- The motion of projectiles.
- Moments of inertia of some simple objects.
- Rigid body motion in the plane.

5. Pre-requirements for this course (if any): 212 MATH

6. Co- requirements for this course (if any): None

7. Course Main Objective(s)

- To describe and model the movement of a particle in a straight line and plane.
- To study the causes of motion and study equations of motion.
- To study moments of inertia of some forms and the motion of the elastomeric particle in a plane.
- Importance of dynamics in branches of science and engineering.
- To accustom the student to think logically and gain the necessary proper skills to resolve issues.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	45	100%
2.	E-learning		
3.	Hybrid - Traditional classroom - E-learning		
4.	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	42
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	3
5.	Others (specify)	
	Total	45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Distinguish mathematical concepts relevant to the rectilinear and curvilinear motion, Newton's second law, Linear momentum, angular momentum, projectile, central force, work and kinetic energy.	K1	Lectures, Web-based work, Classroom discussions	Written examination (Solve the problems, MCQs, true/false, proof of the theorem, Short answer), Quizzes, Assignments
1.2	Identify the background, features and structure of Mathematical problems of rectilinear and curvilinear motion, Newton's second law, Linear momentum, angular momentum, projectile, central force, work and kinetic energy.	K2	Lectures, Web-based work, Classroom discussions	Written exams (Problem-solving, MCQs, true/false, Proof, Short answer), Quizzes, Assignments
1.3	Explain notations and concepts required for the solution of rectilinear curvilinear motion, Newton's second law, projectile, Linear momentum, angular momentum, central force, work and kinetic energy.	K3	Lectures, Web-based work, Classroom discussions	Written exams (solve the problems, MCQs, true/false, Proof, Short answer), Quizzes, Assignments
2.0	Skills			
2.1	Apply theoretical, computational or practical	S1	Lectures, problem-solving,	Written exam (solve the

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	aspects relevant to course content of rectilinear and curvilinear motion, Newton's second law, Linear momentum, angular momentum, central force, work and kinetic energy, impulse of force.		web-based work, and Classroom discussions.	problems, MCQs, true/false, Proof, Short answer), Quizzes, Assignments
2.2	Compute numerical quantities for various parameters and approximate Solutions in rectilinear and curvilinear motion, Newton's second law of motion, Linear force, impulse force, work and kinetic energy momentum, angular momentum, central.	S2	Lectures, problem-solving, web-based work, and Classroom discussions.	Written exams (solve the problems, MCQs, true/false, Proof, Short answer), Quizzes, Assignments
2.3	Apply various mathematical rules, techniques and concepts in rectilinear and curvilinear motion, Newton's second law of motion, Linear momentum, angular momentum, central force, force of impulse, work and kinetic energy.	S3	Lectures, problem-solving, web-based work, and Classroom discussions.	Written exams (solve the problems, MCQs, true/false, Proof, Short answer), Quizzes, Assignments
2.4	Solve mathematical problems using critical thinking in rectilinear curvilinear motion, Newton's second law of motion, Linear momentum, angular momentum, central force, work and kinetic energy, Impulse of force.	S4	Lectures, problem-solving, web-based work, and Classroom discussions.	Written exams (solve the problems, MCQs, true/false, Proof, Short answer), Quizzes, Assignments
3.0	Values, autonomy, and responsibility			
3.1	Cultivate a mathematical attitude and nurture interest	V1	Group work, problem-solving, web-based work	Assignments and discussion
3.2	Realize the importance of responsibilities through different modes of practice, competition and related activities.	V2	Group work, problem-solving, web-based work	Assignments and discussion

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.3	Inculcating values and ethics in thought, expression and deed.	V3	Group work, problem-solving, web-based work	Assignments and discussion

C. Course Content

No	List of Topics	Contact Hours
1.	Basic concepts and principles of motion	7
2.	Laws of motion	8
3.	The Motion of Particle in the Plane	8
4.	Motion of Projectiles	8
5.	Moments of inertia of some simple objects	8
6.	Rigid body motion in plane	6
	Total	45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework and Quiz	3	5
2.	First Exam	6	20
3.	Homework and Quiz	10	5
4.	Second Exam	12	20
5.	Final Exam	15	50

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Vector Mechanics for Engineers: Dynamics, Beer & Johnston, 8th edition, McGraw-Hill, 2007.
Supportive References	Dynamics of particle and coherent body," Abu al-Nur Abdullah, Ismail Hassanein, Alrashed Library, Riyadh, Saudi Arabia, 2006.
	"General Mechanics (2) dynamics, "Fouad Zein Arab, Dar Alrateb Aljameaea, Lebanon.
Electronic Materials	**Websites dedicated to Dynamics are available on the internet.**
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom, Computer Lab, Library.
Technology equipment (projector, smart board, software)	Smart Board, Data Show, Mathematical software, MATLAB.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (Course Evaluation Survey)- Indirect peer evaluation
Effectiveness of students assessment	Students, Program assessment committee	Direct/ Indirect
Quality of learning resources	Students, Faculty members	indirect
The extent to which CLOs have been achieved	Instructor	Direct/Indirect
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	**Board Of Mathematics Department**
REFERENCE NO.	**2417**
DATE	**29/03/1446 A. H.; 2/10/2024 A. D.**