MECHANICS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credit
			Hrs/Week	Hrs/Sem	Hrs/Week	Hrs/Sem		
I		Core	6	90	6	90	0	5

COURSE OBJECTIVES:

The students will be able to

- Develop the knowledge of mechanical systems under generalized co-ordinates systems, virtual work, energy and momentum
- Study mechanics developed by Newton, Lagrange, Hamilton, Jacobi and theory of relativity due to Einstein

COURSE OUTCOMES:

On the successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level(K1-K4)
CO1	Acquire the knowledge about configuration space, generalized co-ordinates and virtual work	K2
CO2	Apply Lagrange's equation to solve complex mechanical problems in effective manner	K3
CO3	Explain the Hamiltonian formulation of a mechanical system	K3
CO4	Identify, explain and evaluate the Jacobi equation and seperability	K4
CO5	Analyze the Canonical transformations	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	S	S	M
CO2	M	S	M	S	S	M
CO3	S	S	M	S	M	S
CO4	M	M	S	S	M	S
CO5	M	S	S	M	S	S

S- Strong, M – Medium, L - Low

UNIT – I - MECHANICAL SYSTEMS **18 hrs**

The mechanical systems – Generalized co-ordinates – Constraints – Virtual work – Energy and Momentum

Chapter 1: Section: 1.1 to 1.5

UNIT – II - LAGRANGE'S EQUATIONS **18 hrs**

Derivation of Lagrange's equations – Examples – Integrals of motion.

Chapter 2: Section: 2.1 to 2.3

UNIT – III - HAMILTON'S EQUATIONS **18 hrs**

Hamilton's Principle – Hamilton's equations – Other Variational Principle.

Chapter 4: Section: 4.1 to 4.3

UNIT – IV - HAMILTON'S – JACOBI THEORY **18 hrs**

Hamilton's Principle Function – Hamilton – Jacobi Equation – Separability

Chapter 5: Section: 5.1 to 5.3

UNIT – V - CANONICAL TRANSFORMATION **18 hrs**

Differential forms and Generating functions – Special Transformations – Lagrange and Poisson brackets

Chapter 6: Section: 6.1 to 6.3

DISTRIBUTION OF MARKS: THEORY 90% AND PROBLEMS 10%

TEXT BOOK:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	D.Greenwood	Classical Dynamics	Prentice Hall of India, New Delhi	1985

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	H.Goldstein	Classical Mechanics	[2nd edition] Narosa publishing house-New Delhi	-
2.	N.C.Rane and P.S.C.Joag	Classical Mechanics	Tata McGraw Hill	1991

WEB SOURCES:

1. https://www.springer.com>journal

2. https://revisionmaths.com/advanced-level-maths-revision/advanced-level-mechanics

TEACHING METHODOLOGY:

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5 .PPT Presentations