
Course specifications

A- Administrative Information

Program(s) on which the course is given: **Post-graduate student of Applied Mathematics.**

Major or minor element of program: **Major, Minor**
Department offering the program **Mathematics Applied Mathematics.**

Department offering the course: **Mathematics**

Academic year / Level: Pre-Master in Applied Mathematics

Date of specification approval: September 2008

Title: Analytical Mechanics

Code: M626

Credit Hours: 2

Lecture: 2

Tutorial: 0

Practical: 0

Total:

2

B- Professional Information

1 – Overall aims of course

Upon successful completion of this course, the student should be able to understand how the Lagrange and Hamiltonian densities applied in different physical systems. The student should be able to understand how the analytical mechanics technique is applied in classical mechanics.

2 – Intended learning outcomes of course (ILOs)

a- Knowledge and understanding:

a1- In this course, we will display to cover mechanics consists in describing the general principle of mechanics

b- Intellectual skills

b1-The student should apply on the different problems to be able to gain the mathematical skills.

c-Professional and practical skills

The student should be able to solve some problems such as:-

c₁- Appreciate how to proceed the Lagrange's equation for Homonymic , the Conservation system from Hamilton's principle

c₂- Apply of Euler-Lagrange equation to build the equations of motion for motion of rigid body

d-General and transferable skills

d1- Apply the techniques PC and Internet to solve the specific topics related to the course material.

d2- The students' oral communication during presenting their own written reports.

d3- Work effectively the idea of teamwork through assigning a group of students for each report.

3- Contents

Topic	No. of hrs	Lecture
Ch. 1: Review of elementary principles and Lagrange's equations of motion	4	2
Ch. 2: Hamilton's canonical equations and Poisson bracts	6	3
Ch. 3: Canonical transformation	4	
Ch. 4:Jacobi theorems(first from and second from)	4	2
Ch. 5: Separation of variable		2
Ch. 6: Some applications	4	
	6	2
		3

4– Teaching and learning methods

- 4.1- Course notes
- 4.2- Reports Assignment
- 4.3- Oral presentations

5- Student assessment methods

- 5.1 Reports to assess skill of collecting data & ability of team work
 - to assess skill of discussing and analyzing the 5.2 Oral report
 - 5.3 mid-term exam to assess understanding and memorizing skills
 - 5.4 Final term Exam to assess overall performance
- Assessment schedule

Assessment 1 : Reports	1report/3 weeks
Assessment 2 : report defense	every 3 weeks
Assessment 3 : mid-term	7 th week
Assessment 4 : Final term	14 th week

Weighting of assessments

60 %	20 %	Mid-Term Examination
10 %		Final-term Examination
00 %		Oral Examination.
		Practical Examination
	00 %	Semester Work
	10 %	Other types of assessment
	100%	Total

Any formative only assessments
N/A

6- List of references

- 1-R. N. Tiwary and B. S. Thakur , classical mechanics Analytical Mechanics Ltd, New Delhi, 2007
- 2- Essential books(text books)

7- Facilities required for teaching and learning

Dark room equipped with overhead projector and LCD projector.

Students' computer Lab. with printing and internet facilities.

Course coordinator: Dr. Wael Saleh Amer

Head of Department: Prof. Dr. Mohamed A. Ramadan

Date: / /2010