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|  | **Mutah University**  **Detailed Syllabus Form** | Description: C:\Users\lamasat.lamasat-PC\Pictures\Picture1.png |

**First :** Course Information**:**

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| --- | --- |
| * Course Number:0302315 | * Course Title: Classical Mechanics II |
| * Credit Hours:3 | * College: Science |
| * Pre-requisite:0302214 | * Department: Physics |
| * Instructor: Dr. Emad Jaradat | * Semester&AcademicYear: First 2016/2017 |
| * the time of the lecture:12.3-2.00 | * Office Hours: Sun, Tues: 12-1 Mon, Wed: 10-11 |

**Second :** General Course Description

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| This course covers the following topics: Some methods in The calculus of variation. Hamilton’s principle-Lagrangian and Hamiltonian dynamics. Motion in noninertial reference frame. Dynamics of rigid bodies. Coupled oscillations. Canonical transformation. |
|  |

**Third :** Course Objectives

* To present a modern treatment of classical mechanics systems in such a way that the transition to the quantum theory of physics can be made with the least possible difficulty
* To develop a strategy in solving Lagrange and Hamilton equations of state
* To acquaint students to tensor analysis and it is application to moment of inertia

**Fourth:** Expected Learning Outcomes

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**Fifth :** Course Plan Distribution & Learning Resources

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| **Learning Resources** | **Topics to be Covered** | **Week**  **No.** |
| Chapter 6 | Some Methods in The Calculus of variation  Euler’s equation, second form of Euler equation, functions with several dependent variables, Euler equation when conditions are imposed. |  |
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| Chapter 7 | Hamilton’s Principle-Lagrangian and Hamiltonian Dynamics:  Hamilton’s principle, Lagrange equation of motion, Lagrange equation with undetermined multipliers, kinetic theory, Hamilton’s equations |  |
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| Chapter 10 | Motion in noninertial reference frame  Rotating coordinate systems, centrifugal and Coriolis forces, motion relative to the earth. |  |
| Chapter 11 | Dynamics of Rigid Bodies  Inertia tensor, angular momentum, principle axes of inertia, properties of inertia tensor, Eulerian angles, Euler’s equation for rigid body, free motion of a symmetric top, stability of rigid body rotations |  |
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| Chapter 12 | Coupled Oscillation  Two coupled harmonic oscillator, weak coupling, general problem of coupled oscillations, normal coordinates, molecular vibrations, the loaded string |  |
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**Sixth :** Teaching Strategies and Methods

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| --- | --- |
| **Teaching Strategies and Methods** | No |
|  | **1** |
|  | **2** |
|  | **3** |
|  | **4** |
|  | **5** |

**Seventh :** Methods of Assessment

|  |  |  |  |
| --- | --- | --- | --- |
| **Proportion of Final Evaluation** | **Evaluation Methods of** | **Week & Date** | **No.** |
|  |  |  | **1.** |
|  |  |  | **2.** |
|  |  |  | **3.** |
|  |  |  | **4.** |
|  |  |  | **5** |
|  |  |  | **6** |
| **(100%)** |  | **Total** | |

**Eighth :** Required Textbooks

**- Primary Textbook:**

Classical Dynamics of Particles and Systems, J. B. Marion and S. T. Thornton

**-** **Secondary References**

* Mechanics, 3rd edition by Symon

**Ninth :** General Instructions

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| **Additional Notes, Office hours, Incomplete Exams, Reports, Papers, …etc** | **No** |
|  | **1** |
|  | **2** |
|  | **3** |
|  | **4** |
|  | **5** |