**Course No.:** 506-03-2-02  **Course Name: Engineering Mechanics, (DYNAMICS)**

**Academic Year: 2015-201**6  **Time Division:** 3hr. Theoretical.

**Course Description**

( 4 credit hours)

Dynamics of Particles (Kinematics and Kinetics)

Dynamics of Rigid Bodies (Kinematics and Kinetics)

**Course Intended Outcomes:**

***At the end of the course, students are expected to learn:***

 *To develop the capacity to predict the effects of force and motion,*

 *Understand the* basic fundamentals *Dynamics of Rigid Bodies,*

 *carrying out the creative design functions of engineering,*

**Course Outline:**

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| **Week** | **Description depends on the Timing table(Theoretical & Practical)** |
| **1** | **Introduction:Basic Principles; International Units & Dimensions** |
| **2** | **(i)Kinematics of Particles:- Displacement,Velocity & Acceleration** |
| **3** | **Rectilinear Motion: Constant Acceleration & Variable Acceleration** |
| **4** | **Curvilinear Motion: Rectangular Components, Projectiles** |
| **5** | **Normal & Tangential Components; Polar Components*+ Exam + Review of Exam*** |
| **6** | **Relative Motion** |
| **7** | **Constrained Motion (Pulleys)** |
| **8** | **(ii)Kinetics of Particles:- Newton's 2nd Law** |
| **9** | **Forces&Acceleration; Dyn.Free body diag.** |
| **10** | **Equations of Motion, D'Alembert Principle*+ Exam + Review of Exam*** |
| **11** | **Centrifugal Force** |
| ***12*** | **Work&Energy,Kinetic&Potential Energy** |
| **13** | **Spring Energy ,Conservation of Energy** |
| **14** | **Momentum & Impulse** |
| **15** | **Conservation of Momentum*+ Exam + Review of Exam*** |
| **16** | **(iii)Kinematics of Rigid Bodies:-** |
| **17** | **Rotation & Angular Displacement** |
| ***18*** | **Angular Velocity & Angular Acceleration** |
| **19** | **Translation Motion** |
| **20** | **Rotation about a Fixed Axis** |
| **21** | **General Plane Motion, Absolute Velocity** |
| **22** | **Relative Velocity, Instantaneous Centre** |
| **23** | **Relative Acceleration** |
| ***24*** | **(iv)Kinetics of Rigid Bodies:- Equations of Motion and Mass Moment of Inertia*+ Exam + Review of Exam*** |
| **25** | **Dynamic Free Body Diagram , Translation Motion.** |
| **26** | **Forces and acceleration in Rotation About Fixed Axis** |
| **27** | **Work & Energy*+ Exam + Review of Exam*** |
| **28** | **Angular Impulse & Angular Momentum** |
| **29** | **Conservation of Angular Momentum** |
| ***30*** | **Impact in Rigid Bodies*+ Exam + Review of Exam*** |
| **31** | **FINAL EXAM Durations** |