**Course No.: 506-03-4-02**  **Course Name: Automatic Mechanical Vibration**

**Academic Year:** 2015-2016  **Time Division:** 2hr. Theoretical - 2hr. Practical.

**Course Description**

( 5 credit hours)

***This course will be cover the***:

To teach the student the mechanical Vibrations in machine and other mechanical application, the methods of measurement and the methods of reduction for un useful associated vibrations with examples and problems.

**Course Intended Outcomes:**

***At the end of the course, students are provided with a basic knowledge of:***

 *Understand the basics of of the vibration in machines,*

 *Understand analysis of the* measurement and the methods of reduction for un useful associated vibrations

 *Understand the* mechanical application *of vabriation.*

*.***Course Outline:**

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| ***Week*** | ***Description depends on the Timing table(Theoretical &Limited Practical)*** |
| **1** | **Introduction, Basic Concepts** |
| **2** | **Introduction, Basic Concepts** |
| **3** | **Free Undamped Vibration** |
| **4** | **Free Undamped Vibration** |
| **5** | **Harmonic Motion *Exam + Review of Exam*** |
| **6** | **Harmonic Motion** |
| **7** | **Equation of Motion** |
| **8** | **Equation of Motion** |
| **9** | **Energy Method** |
| **10** | **Damped Free Vibration *Exam + Review of Exam*** |
| **11** | **Over-Damped & Under-Damped Vibration** |
| **12** | **Critically Damped Vibration** |
| **13** | **Forced Vibration Systems** |
| **14** | **Rotating Unbalanced Vibration** |
| **15** | **Motion Support *Exam + Review of Exam*** |
| **16** | **Vibration Isolation** |
| **17** | **Vibration Measurment** |
| **18** | **Vibration Measurment** |
| **19** | **Forced Vibration [Damped & Undamped]** |
| **20** | **Forced Vibration [Damped & Undamped]** |
| **21** | **Damped & Undamped Vibration of Rotating Shafts** |
| **22** | **Damped & Undamped Vibration of Rotating Shafts** |
| **23** | **Damped & Undamped Vibration of Rotating Shafts** |
| **24** | **Continues Vibratio *Exam + Review of Exam* n** |
| **25** | **Continues Vibration** |
| **26** | **Energy Methods for Calculating Frequency** |
| **27** | **Energy Methods for Calculating Frequency *Exam + Review of Exam*** |
| **28** | **Reilgh's Method, Reilgh's-Ritz Method** |
| **29** | **Application of Finite Element Method in Vibration** |
| **30** | **Application of Finite Element Method in Vibration *Exam + Review of Exam*** |
|  | **FINAL EXAM Durations** |

**Textbooks:**

**1. Mechanical Vibrations ,third edition by S.S Rao 1995**

**Suggested references:**

**Theory of mechanical Vibration ,by W.T Thomson**