**110Teaching Plan for Academic Year Odd Semester 2023 – 2024**

Name of the faculty member: Dr Pradeepkumar Suryawanshi

Branch: Mechanical Engineering

Course Code and Name: MEC 701 – Design of Mechanical Systems

Class and Semester: B.E. SEM VII

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| Scope and Objective | 1. To familiarize with the concept of system and methodology of system design  2. To study system design of various systems such as snatch block, belt conveyors, engine system, pumps and machine tool gearbox |

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| Course Outcomes | MEC 701.1 The learner will be able to Identify the different parts of the hoisting mechanism, belt conveyors, gear boxes, diesel & petrol engine and pumps.  MEC 701.2 The learner will be able to Explain the operating principles of Hoisting mechanism, belt conveyors, gear boxes, diesel & petrol engine and pumps.  MEC 701.3 The learner will be able to Use the basic components to form a suitable power transmission system to satisfy given requirements.  MEC 701.4 The learner will be able to Finalize the dimensions of the system components.  MEC 701.5 The learner will be able to Select appropriate prime movers for the system.  MEC 701.6 The learner will be able to Design the hoisting mechanism, belt conveyors, gear boxes, diesel & petrol engine and pumps with a specific application. | Remembering  Understanding  Appling  Analyzing  Evaluating  Creating |

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| Text Book/Resources | 1. Johnson R.C., .Mechanical Design Synthesis with Optmisation Applications., Von- Nostrand-Reynold Pub 2. Machine Design· An Integrated Approach . Robert L. Norton – Pearson education. 3. Material Handling Equipments by N. Rudenko, Peace Publication 4. Machine Desgin by Reshetov, Mir Publication 5. Karassik, I., et al., Pumps Handbook, McGraw-Hill, New York 6. Design of Machine Elements - V.B. Banadari, Tata McGraw Hill Publication 7. Recommended Data Books – Design Data: Data Book of Engineers by PSG College, Kalaikathir Achchagam 8. Recommended Data Books – For Design of Engine parts, Design Data by Kale A. V.and Khandare S. S. 9. Gear Design Handbook- Gitin Maitra |

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| **Scheme of Evaluation** | |
| Lectures | 4 hrs/wk |
| Theory paper | 80 marks |
| Internal Assessment (Average of Two Tests) | 20 marks |
| Term Work | -NA- |
| Practical | -NA- |
| Oral | -NA- |
| Total Marks | **100 marks** |

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| **Teaching Plan** | | | | |
| **Module No.** | **Title of Module** | **Lectures Planned** | **Lectures Actual** | **Learning Outcomes** |
| 1. | Methodology & Morphology of design | **08** |  | This chapter will introduce the students to basics of optimum design |
| 2. | Design of Transmission Gearbox | **08** |  | The students will be able to design single and two stage gear box with spur, helical, bevel and worm & worm wheels |
| 3. | Design of Hoisting mechanism | **12** |  | The students will be able to understand and know the various types of Material handling Equipment and on that basis design an appropriate hoisting mechanism |
| 4. | Design of belt Conveyors | **08** |  | The students will be able to know belt conveying equipment & various parts, and design an appropriate belt conveyor system |
| 5. | Engine Design (Petrol and Diesel) | **08** |  | The students will be able to learn the basic parameters of the petrol and diesel engine, get familiar with design data book (KK) and design engines for a given situation |
| 6. | Design of Pumps | **08** |  | The students will be able to learn function, concepts and different parts of gear and centrifugal pump, and design these pumps. |
|  | **Total** | **52** |  |  |

**Initial CO-PO Mapping**

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| **CO-PO MAPPING** | | | | | | | | | | | | | **CO-PSO Mapping** | | |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | PSO2 | PSO3 |
| **MEC701.1** | 2 | 2 | 2 | 2 | 2 | 2 |  |  | 2 | 1 |  | 2 | 2 | 2 | 2 |
| **MEC701.2** | 2 | 2 | 2 | 2 | 2 | 1 |  |  | 2 | 1 |  | 2 | 2 | 2 | 2 |
| **MEC701.3** | 2 | 2 | 2 | 2 | 1 | 1 |  |  | 2 | 1 |  | 2 | 2 | 2 | 2 |
| **MEC701.4** | 2 | 2 | 2 | 2 | 1 | 1 |  |  | 2 | 1 |  | 2 | 2 | 2 | 2 |
| **MEC701.5** | 2 | 2 | 2 | 2 | 1 | 1 |  |  | 2 | 1 |  | 2 | 2 | 2 | 2 |
| **MEC701.6** | 2 | 2 | 2 | 2 | 1 | 1 |  |  | 2 | 1 |  | 2 | 2 | 2 | 2 |
| **Total** | 12 | 12 | 12 | 12 | 8 | 7 |  |  | 12 | 6 |  | 12 | 12 | 12 | 12 |
| **Average** | 2.00 | 2.00 | 2.00 | 2.00 | 1.33 | 1.17 |  |  | 2.00 | 1.00 |  | 2.00 | 2.00 | 2.00 | 2.00 |

GAP Identified:

1. Practical approach to design of mechanical systems

2. Matlab programming for design problems

3. Remaining current with latest design and developments

Activities Planned:

1. Guest lecture by experts

2. Teaching Matlab programming for design problems

3. Assignment on review of a Research papers on chosen topic

**Revised CO-PO Mapping:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO-PO MAPPING** | | | | | | | | | | | | | **CO-PSO Mapping** | | |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | PSO2 | PSO3 |
| **MEC701.1** | 3 | 3 | 3 | 2 | 3 | 2 |  |  | 2 | 1 |  | 2 | 3 | 2 | 3 |
| **MEC701.2** | 3 | 2 | 2 | 2 | 3 | 1 |  |  | 2 | 1 |  | 2 | 3 | 2 | 3 |
| **MEC701.3** | 2 | 2 | 2 | 2 | 3 | 1 |  |  | 2 | 1 |  | 2 | 3 | 2 | 2 |
| **MEC701.4** | 2 | 2 | 2 | 2 | 2 | 1 |  |  | 2 | 1 |  | 2 | 3 | 2 | 2 |
| **MEC701.5** | 2 | 2 | 2 | 2 | 1 | 1 |  |  | 2 | 1 |  | 2 | 2 | 2 | 2 |
| **MEC701.6** | 2 | 2 | 2 | 2 | 1 | 1 |  |  | 2 | 1 |  | 2 | 2 | 2 | 2 |
| **Total** | 14 | 13 | 13 | 12 | 13 | 7 |  |  | 12 | 6 |  | 12 | 16 | 12 | 14 |
| **Average** | 2.33 | 2.17 | 2.17 | 2.00 | 2.17 | 1.17 |  |  | 2.00 | 1.00 |  | 2.00 | 2.67 | 2.00 | 2.33 |

**Attainment Tools:**

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| **CO** | **Attainment Tools** |  | **Attainment** |
| **MEC701.1** | **IA-1, IA-2, ESE** |  |  |
| **MEC701.2** | **IA-1, ESE** |  |  |
| **MEC701.3** | **IA-1, ESE** |  |  |
| **MEC701.4** | **IA-2, ESE** |  |  |
| **MEC701.5** | **Assignment, ESE** | Rubrics for Assignment |  |
| **MEC701.6** | **Mini-Project, ESE** | Rubrics for assessment of mini projects |  |
| **Average** |  |  |  |

**Attainment Levels:**

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| --- | --- |
| **Level** | **Criteria** |
| **1** | **50 % Students score above 40%** |
| **2** | **60 % Students score above 40%** |
| **3** | **70 % Students score above 40%** |

Date and Signature of the Faculty:

Name of the Faculty: Dr Pradeepkumar Suryawanshi

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| --- | --- | --- | --- |
| **Approved by:** | **Name** | **Date** | **Signature** |
| **Head of the Department** | Dr Pradeepkumar Suryawanshi |  |  |
| **Dean Academics** |  |  |  |
| **Principal** | Dr Sudhakar Mande |  |  |