**3.1 Establish the correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSOs) (20)  
(Program Outcomes as mentioned in Annexure I and Program Specific Outcomes as defined by the Program)**

# List of PROGRAM OUTCOMES [PO`s]

|  |  |
| --- | --- |
| **text:** |  |
| **PO1** | Engineering knowledge: An ability to apply basic knowledge of science, mathematics and engineering fundamentals in the field of Mechanical Engineering |
| **PO2** | Problem analysis: An ability to identify, formulate, review research literature and analyze mechanical engineering problems using basics principles of science, mathematics and engineering |
| **PO3** | Design/development of solutions: An ability to design for complex mechanical engineering problems using basic design concepts, analyze and process to meet the desired needs with in realistic constraints such as manufacturability , durability, sustainability and economy with appropriate consideration for the public health, safety, cultural, societal, and environmental considerations. |
| **PO4** | Conduct investigations of complex problems: An ability to design and conduct experiments using research-based knowledge and methods including design of experiments, analyze, interpret the data and results with valid conclusion. |
| **PO5** | Modern tool usage: An ability to apply the modern tools and apply appropriate techniques to synthesize, model, design, analyze, verify and optimize to solve complex mechanical engineering problems within defined specification by using suitable modern tools to satisfy the needs of the society within realistic constraints such as social, economical, political, ethical, health, safety and manufacturing. |
| **PO6** | The Engineer and Society: An ability to understand the impact of mechanical engineering solutions globally, in terms economic, societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. |
| **PO7** | Environment and sustainability: An ability to understand the principles, commitment and practice to improve product sustainable development globally in mechanical engineering with minimal environmental effect. |
| **PO8** | Ethics: An ability to understand and apply ethical principles and commitment to address professional ethical responsibilities of an engineer. |
| **PO9** | Individual and team work: An ability to function efficiently as an individual and as a group member in a team in multidisciplinary activities |
| **PO10** | Communication: An ability to communicate, comprehend and present effectively with engineering community and the society at large on complex engineering activities by receiving clear instructions for preparing effective reports and design documentation. |
| **PO11** | Project management and finance: An ability to acquire and demonstrate the knowledge of contemporary issues related to finance and managerial skills to bring up entrepreneurs and entrepreneurship. |
| **PO12** | . Life-long learning: An ability to recognize and adapt to emerging field of application in engineering and technology by developing self-confidence for continuing education and lifelong learning process. |

# PROGRAM SPECIFIC OUTCOMES [PSO's].

|  |  |
| --- | --- |
| **text:** |  |
| **PSO1** | Apply engineering knowledge & analytical skills to design components for applications in the field of machine tools and thermal & fluid systems. |
| **PSO2** | Carry out experiments on models & prototypes of mechanical systems to evaluate their performance. |
| **PSO3** | Use professional best engineering practices & strategies for operation & maintenance of mechanical systems & processes. |

**3.1.1 Course Outcomes (COs) (SAR should include course outcomes of one course from each semester of study, however, should be prepared for all courses and made available as evidence, if asked) (05)  
Note: Number of Outcomes for a Course is expected to be around 6.**

**Class: B.E. SEM VIII Subject: Design of Mechanical Systems**

|  |  |
| --- | --- |
| Course Code | Course Outcome |

**Class: B.E. SEM VIII Subject: Design of Mechanical Systems**

|  |  |
| --- | --- |
| Course Code | Course Outcome |

**Class: B.E. SEM VIII Subject: Design of Mechanical Systems**

|  |  |
| --- | --- |
| Course Code | Course Outcome |

**Class: B.E. SEM VIII Subject: Design of Mechanical Systems**

|  |  |
| --- | --- |
| Course Code | Course Outcome |

**Class: B.E. SEM VII Subject: Design of Mechanical Systems**

|  |  |
| --- | --- |
| Course Code | Course Outcome |
| 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. |

**Class: B.E. SEM VII Subject: Design of Mechanical Systems**

|  |  |
| --- | --- |
| Course Code | Course Outcome |
| 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. |

**3.1.2 CO-PO matrices of courses selected in 3.1.1 (six matrices to be mentioned; one per semester from 3rd to 8th semester) (05)**

**Class: B.E. SEM VIII Subject: MEC 801 - Design of Mechanical Systems**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| MEC701.1 | 3 | 3 | 3 | 2 | 3 |  |  |  | 2 | 1 |  | 2 | 3 | 2 | 3 |
| MEC701.2 | 3 | 2 | 2 | 2 | 3 |  |  |  | 2 | 1 |  | 2 | 3 | 2 | 3 |
| MEC701.3 | 2 | 2 | 2 | 2 | 3 |  |  |  | 2 | 1 |  | 2 | 3 | 2 | 2 |
| MEC701.4 | 2 | 2 | 2 | 2 | 2 |  |  |  | 2 | 1 |  | 2 | 3 | 1 | 2 |
| MEC701.5 | 2 | 2 | 2 | 2 | 1 |  |  |  | 2 | 1 |  | 2 | 2 | 1 | 2 |
| MEC701.6 | 2 | 2 | 2 | 2 | 1 |  |  |  | 2 | 1 |  | 2 | 2 | 1 | 2 |

**Class: B.E. SEM VIII Subject: MEC 801 - Design of Mechanical Systems**

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| 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 |  |  |
| MEC701.2 | 3 | 2 | 2 | 2 | 2 | 1 |  |  | 2 | 1 |  | 2 | 3 |  |  |
| MEC701.3 | 2 | 2 | 2 | 2 | 2 | 1 |  |  | 2 | 1 |  | 2 | 3 |  |  |
| MEC701.4 | 2 | 2 | 2 | 2 | 2 | 1 |  |  | 2 | 1 |  | 2 | 3 |  |  |
| MEC701.5 | 2 | 2 | 2 | 2 | 1 | 1 |  |  | 2 | 1 |  | 2 | 2 |  |  |
| MEC701.6 | 2 | 2 | 2 | 2 | 1 | 1 |  |  | 2 | 1 |  | 2 | 2 |  |  |

**Class: B.E. SEM VIII Subject: MEC 801 - Design of Mechanical Systems**

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| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| MEC701.1 | 3 | 3 | 3 | 2 | 2 | 2 |  |  |  | 1 |  | 2 | 3 | 2 | 2 |
| MEC701.2 | 3 | 2 | 2 | 2 | 2 | 1 |  |  |  | 1 |  | 2 | 3 | 2 | 2 |
| MEC701.3 | 2 | 2 | 2 | 2 | 2 | 1 |  |  |  | 1 |  | 2 | 3 | 2 | 2 |
| MEC701.4 | 2 | 2 | 2 | 2 | 2 | 1 |  |  |  | 1 |  | 2 | 3 | 2 | 2 |
| MEC701.5 | 2 | 2 | 2 | 2 | 1 | 1 |  |  |  | 1 |  | 2 | 2 | 2 | 2 |
| MEC701.6 | 2 | 2 | 2 | 2 | 1 | 1 |  |  |  | 1 |  | 2 | 2 | 2 | 2 |

**Class: B.E. SEM VIII Subject: MEC 801 - Design of Mechanical Systems**

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| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| MEC701.1 | 3 | 3 | 3 |  |  |  |  |  | 2 | 1 |  | 2 | 3 | 2 |  |
| MEC701.2 | 3 | 2 | 2 |  |  |  |  |  | 2 | 1 |  | 2 | 3 | 2 |  |
| MEC701.3 | 2 | 2 | 2 |  |  |  |  |  | 2 | 1 |  | 2 | 3 | 2 |  |
| MEC701.4 | 2 | 2 | 2 |  |  |  |  |  | 2 | 1 |  | 2 | 3 | 2 |  |
| MEC701.5 | 2 | 2 | 2 |  |  |  |  |  | 2 | 1 |  | 2 | 2 | 2 |  |
| MEC701.6 | 2 | 2 | 2 |  |  |  |  |  | 2 | 1 |  | 2 | 2 | 2 |  |

**Class: B.E. SEM VII Subject: MEC 701 - Design of Mechanical Systems**

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| 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 |

**Class: B.E. SEM VII Subject: MEC 701 - Design of Mechanical Systems**

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| 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 |

**3.1.3 Program level Course-PO matrix of all courses INCLUDING first year courses (10)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sr No | Course Code | Subject | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | MEC 801 | Design of Mechanical Systems | 2.33 | 2.17 | 2.17 |  |  |  |  |  | 2.00 | 1.00 |  | 2.00 | 2.67 | 2.00 |  |
| 2 | MEC 801 | Design of Mechanical Systems | 2.33 | 2.17 | 2.17 | 2.00 | 1.84 | 1.17 |  |  | 2.00 | 1.00 |  | 2.00 | 2.67 |  |  |
| 3 | MEC 801 | Design of Mechanical Systems | 2.33 | 2.17 | 2.17 | 2.00 | 2.17 |  |  |  | 2.00 | 1.00 |  | 2.00 | 2.67 | 1.50 | 2.33 |
| 4 | MEC 801 | Design of Mechanical Systems | 2.33 | 2.17 | 2.17 | 2.00 | 1.67 | 1.17 |  |  |  | 1.00 |  | 2.00 | 2.67 | 2.00 | 2.00 |
| 5 | MEC 701 | Design of Mechanical Systems | 2.33 | 2.17 | 2.17 | 2.00 | 2.17 | 1.17 |  |  | 2.00 | 1.00 |  | 2.00 | 2.67 | 2.00 | 2.33 |
| 6 | MEC 701 | Design of Mechanical Systems | 2.33 | 2.17 | 2.17 | 2.00 | 2.17 | 1.17 |  |  | 2.00 | 1.00 |  | 2.00 | 2.67 | 2.00 | 2.33 |

**Class: B.E. SEM VIII Subject: MEC 801 - Design of Mechanical Systems**

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| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| MEC701.1 | 3 | 3 | 3 | 2 | 3 |  |  |  | 2 | 1 |  | 2 | 3 | 2 | 3 |
| MEC701.2 | 3 | 2 | 2 | 2 | 3 |  |  |  | 2 | 1 |  | 2 | 3 | 2 | 3 |
| MEC701.3 | 2 | 2 | 2 | 2 | 3 |  |  |  | 2 | 1 |  | 2 | 3 | 2 | 2 |
| MEC701.4 | 2 | 2 | 2 | 2 | 2 |  |  |  | 2 | 1 |  | 2 | 3 | 1 | 2 |
| MEC701.5 | 2 | 2 | 2 | 2 | 1 |  |  |  | 2 | 1 |  | 2 | 2 | 1 | 2 |
| MEC701.6 | 2 | 2 | 2 | 2 | 1 |  |  |  | 2 | 1 |  | 2 | 2 | 1 | 2 |

**Class: B.E. SEM VIII Subject: MEC 801 - Design of Mechanical Systems**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 |  |  |
| MEC701.2 | 3 | 2 | 2 | 2 | 2 | 1 |  |  | 2 | 1 |  | 2 | 3 |  |  |
| MEC701.3 | 2 | 2 | 2 | 2 | 2 | 1 |  |  | 2 | 1 |  | 2 | 3 |  |  |
| MEC701.4 | 2 | 2 | 2 | 2 | 2 | 1 |  |  | 2 | 1 |  | 2 | 3 |  |  |
| MEC701.5 | 2 | 2 | 2 | 2 | 1 | 1 |  |  | 2 | 1 |  | 2 | 2 |  |  |
| MEC701.6 | 2 | 2 | 2 | 2 | 1 | 1 |  |  | 2 | 1 |  | 2 | 2 |  |  |

**Class: B.E. SEM VIII Subject: MEC 801 - Design of Mechanical Systems**

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| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| MEC701.1 | 3 | 3 | 3 | 2 | 2 | 2 |  |  |  | 1 |  | 2 | 3 | 2 | 2 |
| MEC701.2 | 3 | 2 | 2 | 2 | 2 | 1 |  |  |  | 1 |  | 2 | 3 | 2 | 2 |
| MEC701.3 | 2 | 2 | 2 | 2 | 2 | 1 |  |  |  | 1 |  | 2 | 3 | 2 | 2 |
| MEC701.4 | 2 | 2 | 2 | 2 | 2 | 1 |  |  |  | 1 |  | 2 | 3 | 2 | 2 |
| MEC701.5 | 2 | 2 | 2 | 2 | 1 | 1 |  |  |  | 1 |  | 2 | 2 | 2 | 2 |
| MEC701.6 | 2 | 2 | 2 | 2 | 1 | 1 |  |  |  | 1 |  | 2 | 2 | 2 | 2 |

**Class: B.E. SEM VIII Subject: MEC 801 - Design of Mechanical Systems**

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| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| MEC701.1 | 3 | 3 | 3 |  |  |  |  |  | 2 | 1 |  | 2 | 3 | 2 |  |
| MEC701.2 | 3 | 2 | 2 |  |  |  |  |  | 2 | 1 |  | 2 | 3 | 2 |  |
| MEC701.3 | 2 | 2 | 2 |  |  |  |  |  | 2 | 1 |  | 2 | 3 | 2 |  |
| MEC701.4 | 2 | 2 | 2 |  |  |  |  |  | 2 | 1 |  | 2 | 3 | 2 |  |
| MEC701.5 | 2 | 2 | 2 |  |  |  |  |  | 2 | 1 |  | 2 | 2 | 2 |  |
| MEC701.6 | 2 | 2 | 2 |  |  |  |  |  | 2 | 1 |  | 2 | 2 | 2 |  |

**Class: B.E. SEM VII Subject: MEC 701 - Design of Mechanical Systems**

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| 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 |

**Class: B.E. SEM VII Subject: MEC 701 - Design of Mechanical Systems**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 |