**23EE22P1-Induction and Synchronous Machines Lab**

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| **Course Category:** | Professional core | **Credits:** | 1.5 |
| **Course Type:** | Laboratory | **Lecture-Tutorial-Practical:** | 0-0-3 |
| **Pre-requisite:** | Fundamentals of energy conversion and three phase connections. | **Sessional Evaluation: External Exam Evaluation:**  **Total Marks:** | 30  70  100 |

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| **Course Objectives:** | Students undergoing this course are expected to learn: | | |
| 1. To analyze various performance characteristics of 3-phase and 1-phase induction motors. 2. To evaluate the performance of 3-phase Induction Motor by obtaining the circle. diagram and equivalent circuit of 3-phase Induction Motor and single phase induction motor. 3. To adapt the power factor improvement methods for single phase Induction Motor. 4. To pre-determine the regulation of 3-phase alternator. 5. To determine the synchronous machine reactance of 3-phase alternator. | | |
| **Course Outcomes:** | After completing the course the student will be able to | | **Blooms level** |
| CO1 | Analyze various performance characteristics of 3-phase and 1-  phase induction motors | **L4** |
| CO2 | Evaluate the performance of 3-phase Induction Motor by obtaining the circle diagram and equivalent circuit of 3-phase Induction  Motor and single phase induction motor | **L4** |
| CO3 | Adapt the power factor improvement methods for single phase Induction Motor | **L3** |
| CO4 | Pre-determine the regulation of 3-phase alternator | **L3** |
| CO5 | Determine the synchronous machine reactance of 3-phase alternator | **L3** |
| **Course Content:** | Minimum of 10 experiments to be conducted out of the following:  **List of Experiments:**   1. Brake test on three phase Induction Motor. 2. Circle diagram of three phase induction motor. 3. Speed control of three phase induction motor by V/f method. 4. Equivalent circuit of single-phase induction motor. 5. Power factor improvement of single-phase induction motor by using capacitors. 6. Load test on single phase induction motor. 7. Regulation of a three -phase alternator by synchronous impedance & MMF methods. 8. Regulation of three-phase alternator by Potier triangle method. 9. V and Inverted V curves of a three-phase synchronous motor. 10. Determination of Xd, Xq& Regulation of a salient pole synchronous generator. 11. Determination of efficiency of three phase alternator by loading with three phase induction motor. 12. Parallel operation of three-phase alternator under no-load and load | | |

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|  | conditions.  13. Determination of efficiency of a single-phase AC series Motor by conducting Brake test. |
| **e-reference** | 1. https://em-coep.vlabs.ac.in/List%20of%20experiments.html 2. <http://mct.asu.edu.eg/uploads/1/4/0/8/14081679/lab1.pdf> 3.<http://www.dissidents.com/resources/LaboratoryManualForEmbeddedControllers.pdf> |