

## MME210: MODERN ELECTRICAL AND ELECTRONICS TECHNOLOGIES

**Programme: B. Tech**

**Year: Second**

**Semester: III**

**Course: Core**

**Credits: 3**

**Hours: 42**

Quizzes: minimum 2

### Objectives and/or special features of the course (~25 words):

The objective of the course is to make mechanical engineering students sufficiently familiar with various relevant aspects of modern electrical and electronics engineering technologies.

**Prerequisite Courses: NIL**

### Course Outcomes (COs):

| After the completion of the course, the student: |  |
|--|--|
| CO1  | Should be able to describe, design and analyze the various electrical measuring instruments and transformers                                     |
| CO2  | Should be able to describe and analyze induction motors and other popularly used motors.   |
| CO3  | Should be able to describe and analyze the various electrical drives used in real-world.   |
| CO4  | Should be able to describe the various methods used in electrical heating systems  |
| CO5  | Should be able to describe the various signal-sensing and various signal-conditioning techniques (based on Operational Amplifiers or otherwise). |

**Proposed Curriculum (separated into 4-5 (not more than that) units each corresponding to approximately 10 contact hours):**

| Topics  | Lecture Hours |   |
|---|---------------|---|
| <b>UNIT – I (8 lectures)</b><br><b>1. Topic : Electrical Measuring Instruments</b>  |               |   |
| Rehash of EE fundamentals (current, voltage, power, energy, Mean Value, RMS Value, Single-Phase versus Three-Phase, etc.), Analog versus Digital Instruments, Deflection-Type versus Null-Type Instruments, Moving-Coil Galvanometer, Voltmeter, Ammeter, Ohmmeter, Multimeter, Wattmeter, Energy Meter, Cathode Ray Oscilloscope (CRO) | 8             | 8 |
| <b>UNIT – II (12 lectures)</b><br><b>2. Topic : Transformers and Motors</b>   |               |   |
| Theory and Construction of Transformers, Induction Motors, BLDC Motors, Universal Motors, Servo Motors, and Stepper Motors  | 8             | 8 |
| <b>UNIT – III (04 lectures)</b><br><b>3. Topic : Electrical Drives</b>  |               | 8 |

|   |   |   |
|---|---|---|
| Group Drive versus Individual Drive, Selection of Motors for Cranes, for Textile Mills, for Paper Mills, for Sugar Mills, for Steel Rolling Mills, for Cement Mills, and for Pumps and Blowers. | 8 |   |
| <b>UNIT – IV (04 lectures)</b><br><b>4. Topic : Electrical Heating</b>  |   |   |
| Resistance Heating, Direct Arc Furnace, Indirect Arc Furnace, Induction Heating, Dielectric Heating, High-Frequency Eddy-Current Heating  | 8 | 8 |
| <b>UNIT-V (12 lectures)</b><br><b>5. Topic : Digital Electronics</b>  |   |   |
| Transducers and sensors, ADCs and DACs, Encoders and Decoders, OPAMP-based circuits, Microprocessors and Microcontrollers.  | 8 | 8 |

### Grading Policy (With Weightage)

| Item   | Weightage (%) |
|--|---------------|
| Mid Semester Exam or Individual/Group Project            | 25            |
| End Semester Exam  | 50            |
| Continuous evaluation (Attendance Record, Quizzes, etc.) | 25            |

- **Suggested Readings: (APA Style/ IEEE format)**

**Text Books:**

1. *TBD*

**Reference Books:** TBD

**URL for the course (optional):** TBD

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**Instructor(s) name (s):** R. Tomar