

# ACADEMIC LESSON PLAN FOR WINTER 2025

|                        |                                               |                                                                                                       |
|------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Discipline: Electrical | Semester: 5th                                 | Name of the Teaching Faculty: Akash Behera                                                            |
| Subject: DEC & MP lab  | No. of days/ per week class allotted: 3p/week | Semester from: 14.07.2025 to 15.11.2025<br>No. of weeks: 15 weeks                                     |
| Week                   | Class/week                                    | Practical Topics                                                                                      |
| 1 <sup>st</sup>        | 1 <sup>st</sup>                               | G1. Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates.                                  |
|                        | 2 <sup>nd</sup>                               | G2. Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates.                                  |
|                        | 3 <sup>rd</sup>                               | G3. Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates.                                  |
| 2 <sup>nd</sup>        | 1 <sup>st</sup>                               | G1. Implement various gates by using universal properties of NAND & NOR gates and verify truth table. |
|                        | 2 <sup>nd</sup>                               | G2. Implement various gates by using universal properties of NAND & NOR gates and verify truth table. |
|                        | 3 <sup>rd</sup>                               | G3. Implement various gates by using universal properties of NAND & NOR gates and verify truth table. |
| 3 <sup>rd</sup>        | 1 <sup>st</sup>                               | G1. Implement half adder and Full adder using logic gates.                                            |
|                        | 2 <sup>nd</sup>                               | G2. Implement half adder and Full adder using logic gates.                                            |
|                        | 3 <sup>rd</sup>                               | G3. Implement half adder and Full adder using logic gates.                                            |
| 4 <sup>th</sup>        | 1 <sup>st</sup>                               | G1. Implement half subtractor and Full subtractor using logic gates.                                  |
|                        | 2 <sup>nd</sup>                               | G2. Implement half subtractor and Full subtractor using logic gates.                                  |
|                        | 3 <sup>rd</sup>                               | G3. Implement half subtractor and Full subtractor using logic gates.                                  |
| 5 <sup>th</sup>        | 1 <sup>st</sup>                               | G1. Implement a 4-bit Binary to Gray code converter.                                                  |
|                        | 2 <sup>nd</sup>                               | G2. Implement a 4-bit Binary to Gray code converter.                                                  |
|                        | 3 <sup>rd</sup>                               | G3. Implement a 4-bit Binary to Gray code converter.                                                  |
| 6 <sup>th</sup>        | 1 <sup>st</sup>                               | G1. Implement a Single bit digital comparator.                                                        |
|                        | 2 <sup>nd</sup>                               | G2. Implement a Single bit digital comparator.                                                        |
|                        | 3 <sup>rd</sup>                               | G3. Implement a Single bit digital comparator.                                                        |
| 7 <sup>th</sup>        | 1 <sup>st</sup>                               | G1. Study Multiplexer and demultiplexer.                                                              |
|                        | 2 <sup>nd</sup>                               | G2. Study Multiplexer and demultiplexer.                                                              |
|                        | 3 <sup>rd</sup>                               | G3. Study Multiplexer and demultiplexer.                                                              |
| 8 <sup>th</sup>        | 1 <sup>st</sup>                               | G1. Study of flip-flops.<br>i) S-R flip flop ii) J-K flip flop iii) flip flop iv) T flip flop         |
|                        | 2 <sup>nd</sup>                               | G2. Study of flip-flops.<br>i) S-R flip flop ii) J-K flip flop iii) flip flop iv) T flip flop         |
|                        | 3 <sup>rd</sup>                               | G3. Study of flip-flops.<br>i) S-R flip flop ii) J-K flip flop iii) flip flop iv) T flip flop         |

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| 9 <sup>th</sup>  | 1 <sup>st</sup> | G1. Realize a 4-bit asynchronous UP/Down counter with a control for up/down counting.                                                                                                          |
|                  | 2 <sup>nd</sup> | G2. Realize a 4-bit asynchronous UP/Down counter with a control for up/down counting.                                                                                                          |
|                  | 3 <sup>rd</sup> | G3. Realize a 4-bit asynchronous UP/Down counter with a control for up/down counting.                                                                                                          |
| 10 <sup>th</sup> | 1 <sup>st</sup> | G1. Realize a 4-bit synchronous UP/Down counter with a control for up/down counting.                                                                                                           |
|                  | 2 <sup>nd</sup> | G2. Realize a 4-bit synchronous UP/Down counter with a control for up/down counting.                                                                                                           |
|                  | 3 <sup>rd</sup> | G3. Realize a 4-bit synchronous UP/Down counter with a control for up/down counting.                                                                                                           |
| 11 <sup>th</sup> | 1 <sup>st</sup> | G1. Implement Mode-10 asynchronous counters.                                                                                                                                                   |
|                  | 2 <sup>nd</sup> | G2. Implement Mode-10 asynchronous counters.                                                                                                                                                   |
|                  | 3 <sup>rd</sup> | G3. Implement Mode-10 asynchronous counters.                                                                                                                                                   |
| 12 <sup>th</sup> | 1 <sup>st</sup> | G1. Study shift registers.                                                                                                                                                                     |
|                  | 2 <sup>nd</sup> | G2. Study shift registers.                                                                                                                                                                     |
|                  | 3 <sup>rd</sup> | G3. Study shift registers.                                                                                                                                                                     |
| 13 <sup>th</sup> | 1 <sup>st</sup> | G1. General Programming using 8085A development board<br>1. a. 1'S Complement. b. 2'S Complement.<br>2. a. Addition of 8-bit number. b. Subtraction of 8-bit number resulting 8/16 bit number. |
|                  | 2 <sup>nd</sup> | G2. General Programming using 8085A development board<br>1. a. 1'S Complement. b. 2'S Complement.<br>2. a. Addition of 8-bit number. b. Subtraction of 8-bit number resulting 8/16 bit number. |
|                  | 3 <sup>rd</sup> | G3. General Programming using 8085A development board<br>1. a. 1'S Complement. b. 2'S Complement.<br>2. a. Addition of 8-bit number. b. Subtraction of 8-bit number resulting 8/16 bit number. |
| 14 <sup>th</sup> | 1 <sup>st</sup> | G1. a. Decimal Addition 8-bit number. b. Decimal Subtraction 8-bit number                                                                                                                      |
|                  | 2 <sup>nd</sup> | G2. a. Decimal Addition 8-bit number. b. Decimal Subtraction 8-bit number                                                                                                                      |
|                  | 3 <sup>rd</sup> | G3. a. Decimal Addition 8-bit number. b. Decimal Subtraction 8-bit number                                                                                                                      |
| 15 <sup>th</sup> | 1 <sup>st</sup> | G1. a. Compare between two numbers. b. Find the largest in an Array                                                                                                                            |
|                  | 2 <sup>nd</sup> | G2. a. Compare between two numbers. b. Find the largest in an Array                                                                                                                            |
|                  | 3 <sup>rd</sup> | G3. a. Compare between two numbers. b. Find the largest in an Array                                                                                                                            |

Akash Behera

Signature of Teaching Faculty



### ACADEMIC LESSON PLAN FOR WINTER 2025

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|--------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discipline:<br>Electrical                              | Semester:3rd                                   | Name of the Teaching Faculty: Akash Behera                                                                                                                                        |
| Subject:<br>Introduction to electric generation system | No. of days/per week class<br>allotted:3p/week | Semester from: 14.07.2025 to 15.11.2025<br>No. of weeks:15 weeks                                                                                                                  |
| Week                                                   | Class/week                                     | Theory Topics                                                                                                                                                                     |
| 1 <sup>st</sup>                                        | 1 <sup>st</sup>                                | 1. Thermal Power Plants: Coal, Gas/Diesel and Nuclear-based<br>1.1 Layout and working of a typical thermal power plant ( coal based) with steam turbines and electric generators. |
|                                                        | 2 <sup>nd</sup>                                | 1.2 Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Coal based                                                             |
|                                                        | 3 <sup>rd</sup>                                | 1.3 safe practices of coal based thermal power plant.                                                                                                                             |
| 2 <sup>nd</sup>                                        | 1 <sup>st</sup>                                | 1.4. Layout and working of gas/diesel based thermal power plant                                                                                                                   |
|                                                        | 2 <sup>nd</sup>                                | 1.5. Properties of conventional fuel used and safe practices of gas and diesel based thermal power plant.                                                                         |
|                                                        | 3 <sup>rd</sup>                                | 1.6. Layout and working of nuclear based thermal power plant                                                                                                                      |
| 3 <sup>rd</sup>                                        | 1 <sup>st</sup>                                | 1.7. properties of conventional fuel used and safe practices of nuclear based thermal power plant.                                                                                |
|                                                        | 2 <sup>nd</sup>                                | 1.8. constituents of thermal power plant                                                                                                                                          |
|                                                        | 3 <sup>rd</sup>                                | 1.9. Functions of the following types of thermal power plants and their major auxiliaries<br>1.9.1 Coal fired boilers: fire tube and water tube                                   |
| 4 <sup>th</sup>                                        | 1 <sup>st</sup>                                | 1.9.2 Gas/diesel based combustion engines                                                                                                                                         |
|                                                        | 2 <sup>nd</sup>                                | 1.9.3 Types of nuclear reactors :Disposal of nuclear waste and nuclear shielding                                                                                                  |
|                                                        | 3 <sup>rd</sup>                                | 2. Large Hydropower Plants<br>2.1. Energy conversion process of hydro power plant ( kinetic energy to electrical energy)                                                          |
| 5 <sup>th</sup>                                        | 1 <sup>st</sup>                                | 2.2. Classification of hydro power plant: High ,medium and low head                                                                                                               |
|                                                        | 2 <sup>nd</sup>                                | 2.3. Construction and working of hydro turbines used in different types of hydro power plant<br>2.3.1. High head-Pelton turbine                                                   |
|                                                        | 3 <sup>rd</sup>                                | 2.3.2. Medium head-Francis turbine                                                                                                                                                |
| 6 <sup>th</sup>                                        | 1 <sup>st</sup>                                | 2.3.3. Low head-Kaplan turbine                                                                                                                                                    |
|                                                        | 2 <sup>nd</sup>                                | 2.4 Safe Practices for hydro power plants                                                                                                                                         |
|                                                        | 3 <sup>rd</sup>                                | 2.5 Locations of these different types of large hydro power plants in India                                                                                                       |
| 7 <sup>th</sup>                                        | 1 <sup>st</sup>                                | 3. Micro-Hydropower Plants<br>3.1 Lay out of micro hydro power plants                                                                                                             |
|                                                        | 2 <sup>nd</sup>                                | 3.2 Different types of micro-hydro turbines for different heads:<br>3.2.1 Pelton turbines                                                                                         |
|                                                        | 3 <sup>rd</sup>                                | 3.2.2 Francis turbines                                                                                                                                                            |
| 8 <sup>th</sup>                                        | 1 <sup>st</sup>                                | 3.2.3 Kaplan turbines                                                                                                                                                             |
|                                                        | 2 <sup>nd</sup>                                | 3.3 Locations of these different types of micro-hydro power plants in India                                                                                                       |
|                                                        | 3 <sup>rd</sup>                                | 3.4 safe practices for micro hydro power plant                                                                                                                                    |
| 9 <sup>th</sup>                                        | 1 <sup>st</sup>                                | 4. Economics of Power Generation and Interconnected Power System                                                                                                                  |

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|------------------|-----------------|----------------------------------------------------------------------------------------------------|
|                  |                 | 4.1.1 Related terms: connected load, firm power, cold reserve                                      |
|                  | 2 <sup>nd</sup> | 4.1.2 hot reserve, spinning reserve. Base load and peak load plants                                |
|                  | 3 <sup>rd</sup> | 4.1.3 Load curve, load duration curve, integrated duration curve                                   |
| 10 <sup>th</sup> | 1 <sup>st</sup> | 4.2 Cost of generation:<br>4.2.1 Average demand, maximum demand, demand factor,                    |
|                  | 2 <sup>nd</sup> | 4.2.2 plant capacity factor, plant use factor, diversity factor, load factor and plant load factor |
|                  | 3 <sup>rd</sup> | 4.3 Choice of size and number of generator units                                                   |
| 11 <sup>th</sup> | 1 <sup>st</sup> | 4.4 Combined operation of power station<br>4.4.1 Causes, Impact and reasons of Grid system fault   |
|                  | 2 <sup>nd</sup> | 4.4.2 State grid, national grid, brownout and blackout                                             |
|                  | 3 <sup>rd</sup> | 4.4.3 sample blackouts at national and international level.                                        |
| 12 <sup>th</sup> | 1 <sup>st</sup> | Revision - unit I                                                                                  |
|                  | 2 <sup>nd</sup> | Revision - unit I                                                                                  |
|                  | 3 <sup>rd</sup> | Revision - unit I                                                                                  |
| 13 <sup>th</sup> | 1 <sup>st</sup> | Revision - unit II                                                                                 |
|                  | 2 <sup>nd</sup> | Revision - unit II                                                                                 |
|                  | 3 <sup>rd</sup> | Revision - unit II                                                                                 |
| 14 <sup>th</sup> | 1 <sup>st</sup> | Revision - unit III                                                                                |
|                  | 2 <sup>nd</sup> | Revision - unit III                                                                                |
|                  | 3 <sup>rd</sup> | Revision - unit III                                                                                |
| 15 <sup>th</sup> | 1 <sup>st</sup> | Revision - unit IV                                                                                 |
|                  | 2 <sup>nd</sup> | Revision - unit IV                                                                                 |
|                  | 3 <sup>rd</sup> | Revision - unit IV                                                                                 |

Akash Behera

Signature of Teaching Faculty

### ACADEMIC LESSON PLAN OF WINTER 2025

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|--------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Discipline:<br>Electrical                  | Semester: 1 <sup>st</sup>                                          | Name of the Teaching Faculty: Akash Behera, Biswanita sahoo                                                     |
| <b>Subject:</b><br>FEEE LAB<br>,(SEC- A&C) | No. of days/per<br>week class<br>allotted:4p (2<br>hour each)/week | Semester from: 06.08.2025 to 04.12.2025<br>No. of weeks:15 weeks                                                |
| Week                                       | Class/week                                                         | LAB Topics                                                                                                      |
| 1 <sup>st</sup>                            | 1 <sup>st</sup>                                                    | Classify different type of magnetic material by calculating permeability using B-H curve.                       |
| 2 <sup>nd</sup>                            | 1 <sup>st</sup>                                                    | Classify different type of magnetic material by calculating permeability using B-H curve                        |
| 3 <sup>rd</sup>                            | 1 <sup>st</sup>                                                    | Classify different type of magnetic material by calculating permeability using B-H curve                        |
| 4 <sup>th</sup>                            | 1 <sup>st</sup>                                                    | Classify different type of magnetic material by calculating permeability using B-H curve                        |
| 5 <sup>th</sup>                            | 1 <sup>st</sup>                                                    | Calculate voltage, current and power in 1-phase and 3-phase circuit by connecting different load ( R, R-L, R-C) |
| 6 <sup>th</sup>                            | 1 <sup>st</sup>                                                    | Calculate voltage, current and power in 1-phase and 3-phase circuit by connecting different load ( R, R-L, R-C) |
| 7 <sup>th</sup>                            | 1 <sup>st</sup>                                                    | Calculate voltage, current and power in 1-phase and 3-phase circuit by connecting different load ( R, R-L, R-C) |
| 8 <sup>th</sup>                            | 1 <sup>st</sup>                                                    | Calculate voltage, current and power in 1-phase and 3-phase circuit by connecting different load ( R, R-L, R-C) |
| 9 <sup>th</sup>                            | 1 <sup>st</sup>                                                    | Determine the transformation ratio(K) other parameters of single phase transformer.                             |
| 10 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Determine the transformation ratio(K) other parameters of single phase transformer.                             |
| 11 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Determine the transformation ratio(K) other parameters of single phase transformer.                             |
| 12 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Determine the transformation ratio(K) other parameters of single phase transformer.                             |
| 13 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Distinguish various electronic components and measure values using multimeter,                                  |
| 14 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Distinguish various electronic components and measure values using multimeter,                                  |
| 15 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Distinguish various electronic components and measure values using multimeter,                                  |
| 16 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Distinguish various electronic components and measure values using multimeter,                                  |
| 17 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Draw the input and output characteristics of transistor and Diodes and identify the region of operation.        |
| 18 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Draw the input and output characteristics of transistor and Diodes and identify the region of operation.        |
| 19 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Draw the input and output characteristics of transistor and Diodes and identify the region of operation.        |
| 20 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Draw the input and output characteristics of transistor and Diodes and identify the region of operation.        |
| 21 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Make Star and Delta connection in starter to run induction motor                                                |
| 22 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Make Star and Delta connection in starter to run induction motor                                                |
| 23 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Make Star and Delta connection in starter to run induction motor                                                |
| 24 <sup>th</sup>                           | 1 <sup>st</sup>                                                    | Make Star and Delta connection in starter to run induction motor                                                |

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