

## Lesson Plan

| Discipline:<br>ETC |                                   | Semester-5th<br>Winter-2023        | Name of the Teaching Faculty:<br>Sri.Rabindra kumar satapathy(Lect. ETC Engg)  |
|--------------------|-----------------------------------|------------------------------------|--|
| Sl. No.            | Subject-Th.5. (Power Electronics) | No. Of Days/Week class allotted:04 | Semester From date: 01.08.2023 To date: 30.11.2023 No of weeks: 17   |
|                    | Weeks/Months                      | Class Day                          | Topic  |
| 1                  | 1st week 1 Aug. To 5 Aug          | 1st                                | 1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT                                    |
|                    |                                   | 2nd                                | 1.2 Two transistor analogy of SCR.   |
|                    |                                   | 3rd                                | 1.3 Gate characteristics of SCR.   |
|                    |                                   | 4th                                | 1.4 Switching characteristic of SCR during turn on and turn off.   |
| 2                  | 2nd week 7 Aug. To 12 Aug         | 1st                                | 1.5 Turn on methods of SCR.  |
|                    |                                   | 2nd                                | 1.6 Turn off methods of SCR (Line commutation and Forced commutation)  |
|                    |                                   | 3rd                                | 1.6.1 Load Commutation   |
|                    |                                   | 4th                                | 1.6.2 Resonant pulse commutation   |
| 3                  | 3rd week 14 Aug. To 19 Aug        | 1st                                | 1.7 Voltage and Current ratings of SCR.  |
|                    |                                   | 2nd                                | 1.8 Protection of SCR  |
|                    |                                   | 3rd                                | 1.8.2 Over current protection  |
| 4                  | 4th week 21 Aug To 26 Aug         | 4th                                | 1.8.3 Gate protection  |
|                    |                                   | 1st                                | 1.9 Firing Circuits  |
|                    |                                   | 2nd                                | 1.9.1 General layout diagram of firing circuit   |
|                    |                                   | 3rd                                | 1.9.2 R firing circuits  |
| 5                  | 5th week 28 Aug. To 2 Sept        | 4th                                | 1.9.3 R-C firing circuit   |
|                    |                                   | 1st                                | 1.9.4 UJT pulse trigger circuit  |
|                    |                                   | 2nd                                | 1.9.5 Synchronous triggering (Ramp Triggering)   |
|                    |                                   | 3rd                                | 1.10 Design of Snubber Circuits  |
| 6                  | 1st week 4 Sept. To 9 Sept        | 4th                                | 2.1 Controlled rectifiers Techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter |
|                    |                                   | 1st                                | 2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.   |
|                    |                                   | 3rd                                | 2.3 Understand need of freewheeling diode.   |
|                    |                                   | 3rd                                | 2.4 Working of single phase fully controlled converter with resistive and R- L loads.  |
| 7                  | 2nd week 11 Sept. To 16 Sept      | 4th                                | 2.5 Working of three-phase half wave controlled converter with Resistive load  |
|                    |                                   | 1st                                | 2.6 Working of three phase fully controlled converter with resistive load.   |
|                    |                                   | 2nd                                | 2.7 Working of single phase AC regulator.  |
|                    |                                   | 3rd                                | 2.8 Working principle of step up & step down chopper.  |
| 8                  | 3rd week 18 Sept. To 23 Sept      | 4th                                | 2.9 Control modes of chopper   |
|                    |                                   | 1st                                | 2.10 Operation of chopper in all four quadrants.   |
|                    |                                   | 2nd                                | 3. UNDERSTAND THE INVERTERS AND CYCLO-CONVERTER  |
|                    |                                   | 3rd                                | 3.1 Classify inverters.  |
| 9                  | 4th week 25 Sept To 30 Sept       | 4th                                | 3.2 Explain the working of series inverter   |
|                    |                                   | 1st                                | 3.3 Explain the working of parallel inverter   |
|                    |                                   | 2nd                                | 3.4 Explain the working of single-phase bridge inverter  |
|                    |                                   | 3rd                                | 3.5 Explain the basic principle of Cyclo-converter.  |
|                    |                                   | 4th                                | 3.6 Solve numerical simple problems of above Circuit.  |
|                    |                                   |                                    | 3.7 Applications of Cyclo-converter.   |

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| 11 | 1st week 02 Oct. To 07 Oct | 1st | 4.1 List applications of power electronic circuits.   |
|    |                            | 2nd | 4.2 List the factors affecting the speed of DC Motors.  |
|    |                            | 3rd | 4.3 Speed control for DC Shunt motor using converter.   |
|    |                            | 4th | 4.4 Speed control for DC Shunt motor using chopper.   |
| 11 | 2nd week 9 Oct. To 14 Oct  | 1st | 4.5 List the factors affecting speed of the AC Motors.  |
|    |                            | 2nd | 4.6 Speed control of Induction Motor by using AC voltage regulator  |
|    |                            | 3rd | 4.7 Speed control of induction motor by using converters and inverters (V/F control).   |
|    |                            | 4th | 4.8 Working of UPS with block diagram   |
| 12 | 3rd week 16 Oct. To 20 Oct | 1st | 4.9 Battery charger circuit using SCR with the help of a diagram  |
|    |                            | 2nd | 4.10 Basic Switched mode power supply (SMPS) - explain its working & applications   |
|    |                            | 3rd | 5. PLC AND ITS APPLICATIONS<br>5.1 Introduction of Programmable Logic Controller(PLC)   |
|    |                            | 4th | 5.2 Advantages of PLC   |
| 13 | 1st week 30 Oct. To 04 Nov | 1st | 5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC.  |
|    |                            | 2nd | 5.4 Applications of PLC   |
|    |                            | 3rd | 5.5 Ladder diagram  |
|    |                            | 4th | 5.6 Description of contacts and coils in the following states<br>i) Normally open ii) Normally closed iii) Energized output iv) latched Output v) branching |
| 14 | 2nd week 06 Nov. To 11 Nov | 1st | 5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate   |
|    |                            | 2nd | 5.8 Ladder diagrams for combination circuits using NAND, NOR, AND, OR and NOT   |
|    |                            | 3rd | 5.9 Timers-i) T ON ii) T OFF and iii) Retentive timer   |
|    |                            | 3rd | 5.10 Counters-CTU, CTD  |
|    |                            | 4th | 5.11 Ladder diagrams using Timers and counters  |
|    |                            | 1st | 5.12 PLC Instruction set  |
| 15 | 3rd week 13 Nov. To 18 Nov | 2nd | 5.13 Ladder diagrams for following<br>(ii) Stair case lighting (iii) Traffic light  |
|    |                            | 3rd | 5.14 Special control systems Basics DCS & SCADA systems   |
|    |                            | 4th | 5.15 Computer Control-Data Acquisition, Direct Digital Control System (Basics only)   |
|    |                            | 1st | 5.12 PLC Instruction set  |
| 16 | 4th week 20 Nov. To 25 Nov | 2nd | 5.13 Ladder diagrams for following<br>(ii) Stair case lighting (iii) Traffic light  |
|    |                            | 3rd | 5.14 Special control  |
|    |                            | 4th | 5.15 Computer Control-Data Acquisition, Direct Digital Control  |
|    |                            | 1st | 4.5 List the factors affecting speed of the AC Motors.  |
| 17 | 5th week 27 Nov. To 30 Nov | 2nd | 4.6 Speed control of Induction Motor by using AC voltage regulator  |
|    |                            | 3rd | 4.7 Speed control of induction motor by using converters and  |
|    |                            | 3rd | 4.8 Working of UPS with block diagram   |
|    |                            | 4th | 5.15 Computer Control-Data Acquisition, Direct Digital Control  |

  
 Signature of the Teacher