# GIET POLYTECHNIC, JAGATPUR, CUTTACK

## LESSON PLAN

| Discipline: ELECTRICAL | Semester: 5th | Name Of The Teaching Faculty: RUPAK KUMAR SAHOO | |
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| Subject: Power electronics(Th 5 ) | No. Of Days Per Week Class Allotted: 04 P | Semester From Date: 15.09.2022　　　　　　　　To Date: 22.12.2022 | |
| | | No. of weeks: 15 | |

| Week | Class Day | Theory Topic |
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| 1st week | 1st | **Unit1: UNDERSTAND THE CONSTRUCTION & WORKING OF POWER ELECTRONICS**<br>➤ **1.1: Construction, operation, VI characteristics & application of power diode, SCR, DIAC, TRIAC, power MOSFET, GTO & IGBT** |
| | 2nd | ➤ **1.2: Two transistor analogy of SCR**<br>➤ **1.3: Gate characteristics of SCR** |
| | 3rd | ➤ **1.4: Switching characteristics of SCR during turn on & turn off** |
| | 4th | ➤ **1.5: Turn on methods of SCR** |
| 2nd week | 1st | ➤ **1.6: Turn off methods of SCR (Line communication & Forced communication)**<br>**1.6.1: Load communication** |
| | 2nd | ➤ **1.6.2: Resonant pulse communication** |
| | 3rd | ➤ **1.7: Voltage and Current ratings of SCR** |
| | 4th | ➤ **1.8: Protection of SCR**<br>**1.8.1: Over voltage protection** |
| 3rd week | 1st | ➤ **1.8.2: Over current protection**<br>**1.8.3: Gate protection** |
| | 2nd | ➤ **1.9: Firing circuits**<br>**1.9.1: general layout diagram of firing circuits** |
| | 3rd | ➤ **1.9.2: R firing circuits** |
| | 4th | ➤ **1.9.3: R-C firing circuits**<br>**1.9.4: UJT pulse trigger circuit** |
| 4th week | 1st | ➤ **1.9.5: synchronous triggering(Ramp triggering)**<br>➤ **1.10: Design of snubber circuits** |
| | 2nd | **UNIT 2: UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS**<br>➤ **2.1: Controlled rectifiers techniques** |
| | 3rd | ➤ **2.2: Working of single phase half wave controlled converter with resistive and R-L loads** |
| | 4th | ➤ **2.3: Understand need of freewheeling diode** |
| 5th week | 1st | ➤ **2.4: Working of single phase fully controlled converter with resistive and R-L loads** |
| | 2nd | ➤ **2.5: working of three phase half wave controlled converter with resistive load** |

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| | 3rd | ➢ **2.6: Working of three phase fully controlled converter with resistive load** |
| | 4th | ➢ **2.7: Working of single phase AC regulator** |
| **6th week** | 1st | ➢ **2.8: Working principle of step up & step down chopper**<br>➢ **2.9: Control modes of chopper** |
| | 2nd | ➢ **2.10: Operation of chopper in all four quadrants** |
| | 3rd | **UNIT 3: UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS**<br>➢ **3.1: Classify inverters**<br>➢ **3.2: Working of series inverter** |
| | 4th | ➢ **3.3: Working of parallel inverter**<br>➢ **3.4: Working of single phase bridge inverter** |
| **7th week** | 1st | ➢ **3.5: Basic principle of cyclo-converter**<br>➢ **3.6: Working of single phase step up & step down cyclo-converter** |
| | 2nd | ➢ **3.7: Applications of Cyclo-converter** |
| | 3rd | **UNIT 4: UNDERSTAND APPLICATIONS OF POWER ELECTRONICS CIRCUITS**<br>➢ **4.1: Application of power electronic circuits** |
| | 4th | ➢ **4.2: List the factors affecting the speed of DC motors** |
| **8th week** | 1st | ➢ **4.3: Speed control for DC shunt motor using converter** |
| | 2nd | ➢ **4.4: Speed control for DC shunt motor using chopper** |
| | 3rd | ➢ **4.5: List the factors affecting speed of the AC motors** |
| **8th week** | 4th | ➢ **4.6: Speed control of induction motor by using AC voltage regulator** |
| **9th week** | 1st | ➢ **4.7: Speed control of Induction motor by using converters and inverters** |
| | 2nd | ➢ **4.8: Working of UPS with block diagram** |
| | 3rd | ➢ **4.9: Battery charger circuit using SCR with the help of a diagram** |
| | 4th | ➢ **4.10:  Working & application of SMPS** |
| **10th week** | 1st | ➢ **4.10:  Working & application of SMPS** |
| | 2nd | **UNIT 5: PLC AND ITS APPLICATIONS**<br>➢ **5.1: Introduction of PLC** |
| | 3rd | ➢ **5.2: Advantages of PLC** |
| | 4th | ➢ **5.2: Advantages of PLC** |
| **11th week** | 1st | ➢ **5.3: Different parts of PLC** |
| | 2nd | ➢ **5.4: Application of PLC** |
| | 3rd | ➢ **5.5: Ladder diagram** |
| | 4th | ➢ **5.6: Description of contacts and coils** |
| **12th week** | 1st | ➢ **5.6.1: Normally open** |
| | 2nd | ➢ **5.6.2: Normally closed** |
| | 3rd | ➢ **5.6.3: Energized output** |
| | 4th | ➢ **5.6.4: latched output, branching** |
| **13th week** | 1st | ➢ **5.7.1: Ladder diagram for AND gate** |
| | 2nd | ➢ **5.7.2: Ladder diagram for OR gate & NOT gate** |

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| | **3rd** | ➢ **5.8: Ladder diagram for combination circuit using NAND, NOR, AND,OR & NOT** |
| | **4th** | ➢ **5.8: Ladder diagram for combination circuit using NAND, NOR, AND,OR & NOT** |
| **14th week** | **1st** | ➢ **5.8: Ladder diagram for combination circuit using NAND, NOR, AND,OR & NOT** |
| | **2nd** | ➢ **5.9: Timers**<br>  I.     **T ON**<br>  II.    **T OFF**<br>  III.   **Retentive timer** |
| | **3rd** | ➢ **5.10: Counters: CTU, CTD** |
| | **4th** | ➢ **5.11: Ladder diagrams using timers & counters** |
| **15th week** | **1st** | ➢ **5.12: PLC instruction set** |
| | **2nd** | ➢ **5.13: Ladder diagrams for following**<br>  I.     **DOL starter & star- delta starter** |
| | **3rd** | ➢ **5.14: special control system** |
| | **4th** | ➢ **5.15: computer control : data acquisition** |