**NAME OF THE FACULTY** : RAVINDER KUMAR

**DISCIPLINE** : ECE

**SEMESTER** : IV

**SUBJECT** : POWER ELECTRONICS

**LESSON PLAN DURATION** : - 15 weeks (from January- 2020 to April- 2020)

WORK LOAD (LECTURE/PRACTICAL) PER WEEK (IN HOURS):- LECTURE-**03**, PRACTIACL-**03** PER GROUP

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| **WEEK** | **THEORY** | | **PRACTICAL** | | |
| **Lecture**  **/ Hrs** | **TOPIC**  **(Including Assignment/Test)** | **Practical**  **/ Hrs** | | **Experiment** |
| 1st | 1 | **Introduction to Thyristors** and other Power Electronics Devices | Group-1 | 1 | To plot V-I characteristic of an SCR. |
| 2 |
| 2 | Construction, Working principle of SCR | 3 |
| Group-2 | 1 | To plot V-I characteristic of an SCR. |
| 3 | Two transistor analogy of SCR, V-I  characteristics of SCR. | 2 |
| 3 |
| 2nd | 4 | SCR specifications and ratings, Different methods of SCR triggering | Group-1 | 1 | To plot V-I characteristics of TRIAC |
| 2 |
| 5 | Different commutation circuits for SCR, Series and parallel operation of SCR | 3 |
| Group-2 | 1 | To plot V-I characteristics of TRIAC |
| 6 | Construction and working principle of DIAC. | 2 |
| 3 |
| 3rd | 7 | Construction and working principle of DIAC, TRIAC | Group-1 | 1 | To plot V-I characteristics of UJT. |
| 2 |
| 8 | DIAC, TRIAC and their V-I characteristics | 3 |
| Group-2 | 1 | To plot V-I characteristics of UJT. |
| 9 | Construction, working principle of UJT, V-I characteristics of UJT. UJT as relaxation oscillator | 2 |
| 3 |
| 4th | 10 | Brief introduction to Gate Turn off Thyristor (GTO), Programmable Uni-junction Transistor (PUT), MOSFET | Group-1 | 1 | To plot V-I characteristics of DIAC |
| 2 |
| 11 | Basic idea about the selection of Heat Sink for Thyristors | 3 |
| Group-2 | 1 | To plot V-I characteristics of DIAC |
| 12 | Applications such as light intensity control, speed control of universal motors, fan regulator, battery charger. | 2 |
| 3 |
| 5th | 13 | **Assignment-1** | Group-1 | 1 | Revision Experiment Performed |
| 2 |
| 14 | **Sessional Test-1** | 3 |
| Group-2 | 1 | Revision Experiment Performed |
| 15 | Controlled Rectifiers Introduction | 2 |
| 3 |
| 6th | 16 | Single phase half wave controlled rectifier with load (R) | Group-1 | 1 | Study of UJT relaxation oscillator. And observe I/P and O/P wave forms |
| 2 |
| 17 | Single phase half wave controlled rectifier with load (R-L) | 3 |
| Group-2 | 1 | Study of UJT relaxation oscillator. And observe I/P and O/P wave forms |
| 18 | Single phase half controlled full wave rectifier with load (R) | 2 |
| 3 |
| 7th | 19 | Single phase half controlled full wave rectifier with load (R-L) | Group-1 | 1 | Observation of wave shape of voltage at relevant point of single-phase half wave controlled |
| 2 |
| 20 | Fully controlled full wave bridge rectifier. | 3 |
| Group-2 | 1 | Observation of wave shape of voltage at relevant point of single-phase half wave controlled |
| 21 | Single phase full wave centre tap rectifier | 2 |
| 3 |
| 8th | 22 | Inverters, Choppers, | Group-1 | 1 | Observation of wave shapes and measurement of voltage at relevant points in TRIAC based. |
| 2 |
| 23 | Dual Converters and Cyclo-converters | 3 |
| Group-2 | 1 | Observation of wave shapes and measurement of voltage at relevant points in TRIAC based |
| 24 | Principle of operation of basic inverter circuits | 2 |
| 3 |
| 9th | 25 | Concepts of duty cycle, series and parallel | Group-1 | 1 | Revision Experiment Performed |
| 2 |
| 26 | Inverters and their applications | 3 |
| Group-2 | 1 | Revision Experiment Performed |
| 27 | Choppers: Introduction, types of choppers (Class A) | 2 |
| 3 |
| 10th | 28 | Choppers: Introduction, types of choppers (Class B, Class C and Class D) | Group-1 | 1 | Revision Experiment Performed |
| 2 |
| 29 | **Assignment-2** | 3 |
| Group-2 | 1 | Revision Experiment Performed |
| 30 | **Sessional Test-2** | 2 |
| 3 |
| 11th | 31 | Step up and Step down choppers | Group-1 | 1 | Installation of UPS system and routine maintenance of batteries. |
| 2 |
| 32 | Dual Converters and cyclo converters: Introduction, types and basic working principle of Dual converters and cyclo  Converters. | 3 |
| Group-2 | 1 | Installation of UPS system and routine maintenance of batteries. |
| 33 | Dual converters and cyclo converters and their applications | 2 |
| 3 |
| 12th | 34 | Thyristorised Control of Electric drives: Introduction | Group-1 | 1 | Revision Experiment Performed |
| 2 |
| 35 | DC drive control, Half wave drives | 3 |
| Group-2 | 1 | Revision Experiment Performed |
| 36 | Full wave drives, Chopper drives (Speed control of DC motor using choppers) | 2 |
| 3 |
| 13th | 37 | AC drive control, Phase control | Group-1 | 1 | Revision Experiment Performed |
| 2 |
| 38 | Constant V/F operation, Cycloconverter /Inverter drives | 3 |
| Group-2 | 1 | Revision Experiment Performed |
| 39 | Un interrupted Power Supply (UPS): Introduction | 2 |
| 3 |
| 14th | 40 | UPS: Block Diagram & specifications of on-line | Group-1 | 1 | Revision Experiment Performed |
| 2 |
| 41 | UPS: Block Diagram & specifications of Off line UPS | 3 |
| Group-2 | 1 | Revision Experiment Performed |
| 42 | UPS: Block Diagram & specifications of Smart UPS | 2 |
| 3 |
| 15th | 43 | Concept of high voltage DC transmission | Group-1 | 1 | Revision Experiment Performed |
| 2 |
| 44 | **Assignment- 3** | 3 |
| Group-2 | 1 | Revision Experiment Performed |
| 45 | **Sessional Test- 3** | 2 |
| 3 |