Course Name: POWER ELECTRONICS LABORATORY
Course Code: EE693
Credit: 2

Course Objective:

- To expose students to operation and characteristics of power semiconductor devices and passive components, their practical application in power electronics.
- To provide a practical exposure to operating principles, design and synthesis of different power electronic converters.
- To introduce students to industrial control of power electronic circuits as well as safe electrical connection and measurement practices.

Course Outcomes:

At the end of the course, a student will be able to:

1. **Identify** relevant information to supplement to the Power Electronics (EE603) course.

2. **Set up** testing strategies and select proper instruments to evaluate performance characteristics of Power devices and power electronics circuits and **analyze** their operation under different loading conditions.

3. **Practice** different types of wiring and devices connections keeping in mind technical, economical, safety issues.

4. **Realize** the limitations of computer simulations for verification of circuit behavior, apply these techniques to different power electronic circuits and **evaluate** possible causes of discrepancy in practical experimental observations in comparison to theory.

5. **Prepare** professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software, and word-processing tools.

6. Primarily via team-based laboratory activities, students will **demonstrate** the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.

CO- PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	2	1	1	1	-	-	-	-	-	-	-	-
2	1	2	1	1	-	1	1	-	-	-	-	1
3	-	2	1	-	-	-	-	1	-	-	-	1
4	1	2	1	1	2	-	-	-	-	-	-	1
5	1	-	-	-	2	1	1	-	1	2	-	-
6	-	-	-	-	-	1	1	2	2	2	2	-

Correlation levels 1, 2 or 3 as defined above: 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) and "-" if there is no correlation.

Syllabus:

Experiments	Relevant COs
1. Study of the characteristics of an SCR. 2. Study of the characteristics of a Triac 3. Study of different triggering circuits of an SCR 4. Study of firing circuits suitable for triggering SCR in a single phase full controlled bridge. 5. Study of the operation of a single phase full controlled bridge converter with R and R-L load. 6. Study of performance of single phase half controlled symmetrical and asymmetrical bridge converters. 7. Study of performance of step down chopper with R and R-L load. 8. Study of performance of single phase controlled converter with and without source	CO1, CO2, CO3, CO4, CO5,

inductance (simulation) 9. Study of performance of step up and step down chopper with MOSFET, IGBT and GTO as switch (simulation). 10. Study of performance of single phase half controlled symmetrical and asymmetrical bridge converter.(simulation) 11. Study of performance of three phase controlled converter with R & R-L load. (simulation) 12. Study of performance of PWM bridge inverter using MOSFET as switch with R and R-L load. 13. Study of performance of three phase AC controller with R and R-L load (simulation) 14. Study of performance of a Dual converter. (simulation) 15. Study of performance of a Cycloconverter (simulation)	CO6.