

GUJARAT TECHNOLOGICAL UNIVERSITY
POWER ELECTRONICS ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Power Electronics Practice - III**

Subject Code: **172404**

| Teaching Scheme | | | | Evaluation Scheme | | | |
|-----------------|----------|-----------|-------|------------------------|-----------|------------------------------------|-------------------------|
| Theory | Tutorial | Practical | Total | University Exam (E) | | Mid Sem Exam (Theory) (M) | Practical (Internal) |
| | | | | Theory | Practical | | |
| 0 | 0 | 4 | 4 | 0 | 80 | 0 | 20 |

This is a laboratory oriented subject focusing on enhancing power electronics modelling, simulation, PCB designing and simulation management skills required for Power Electronics. This is based on the topics/subjects already covered in previous semesters and subjects of current semester.

Objectives:

1. Developing capacity in students to understand the concept of power electronics system modelling.
2. Developing understanding of inter subject relationship among various subjects in students.
3. Developing capacity to find logical solution and implement the same through simulation software for some commonly used processing requirements of many electronics products.
4. Developing capacity in students to find and solve common faults arising in simulation of various power electronic circuits.
5. Developing proficiency of PCB layout design in students.
6. Enabling the students to understand the practical use of different circuits and ICs in commonly used electronic equipment.
7. Developing proficiency of understanding technical specifications of different components with the help of datasheets.
8. Developing proficiency of understanding technical specifications of various products.

Guidelines For Laboratory Work To Be Carried Out During The Semester:

The students should decide the project title for 8th semester major project and carry out base work for the same as stated below:

1. Students should be divided into groups of 3-4 students each as per divided in subject entitled "Project-I".

2. Students should simulate at least 3 power electronic circuits during the term using MATLAB or other available simulation software. At least one circuit should be in close-loop including controller, power circuit, etc.
3. They will prepare the block diagram. They will also identify inputs, outputs and their characteristics for each block. Further, they will carry out calculations for each block if required.
4. Study datasheets and practical applications of three different types of components used in power electronic circuits: a) Power Switch (e.g. Power Diode, Power Transistor, IGBT, MOSFET, SCR) b) Power Switch Driver (e.g. IR2112, HT0440, LM2722, etc.) c) Control IC for Power Electronics (e.g. LM3524, uc3824, uc3875, TL494, etc.)
5. Develop proficiency in PCB layout design using available software.
6. Students should prepare a presentation of around 25-30 slides covering all the above points.
7. Hard and soft copies of the work done (presentation, simulation program, schematic, parameter values, calculations, etc.) should be submitted to the department as term work.

Guidelines For Term Work And Assessment:

Term work as mentioned in point 7 above should be prepared by the students and should be demonstrated to teachers and other students through presentation slides as stated below:

- A Presentation should be given by each group before the viva-voce examination as per schedule decided by the concerned faculty.
- The presentation should cover the names of group members, details of the simulation work done (Ideally 3-4 slides for each simulation), details of datasheets studied (Ideally 3-4 slides for each datasheet) and PCB design details (Ideally 4-5 slides for PCB design).
- Uniform weightage should be given to the simulation work, datasheet study work, PCB design work, presentation and viva-voce along with the semester work for assessing the performance of the student in the subject.