Mini Project (304216)

Credits: TH- 02+OR-01

Teaching Scheme:
Theory: 02 hr/week
Practical: 02 hr/week

Examination Scheme:
Oral : 50 Marks

Course Objectives

- To undertake & execute a Mini Project through a group of students, To understand the 'Product Development Cycle' through Mini Project.
- To plan for various activities of the project and distribute the work amongst team members.
- To learn budget planning for the project.
- To inculcate electronic hardware implementation skills by –
    a. Learning PCB artwork design using an appropriate EDA tool.
    b. Imbibing good soldering and effective trouble-shooting practices.
    c. Following correct grounding and shielding practices.
    d. Knowing the significance of aesthetics & ergonomics while designing electronic product.
- To develop student's abilities to transmit technical information clearly and test the same by delivery of Seminar based on the Mini Project.
- To understand the importance of document design by compiling Technical Report on the Mini Project work carried out.

Course Outcomes (COs)
The student will be able to

- Planning and implementation of hardware/ software project
- Prepare the budget for hardware requirement
- Demonstrate the project
- Work as a team member.

Maximum Group Size: Minimum 2 and maximum 3 students can form a group for the mini project.

Project Type: The selected mini project must be based on development of a prototype electronic system/product mandatorily having a hardware component with supporting software.

The Assessment Scheme will be:

a. **Continuous Assessment 50 marks** *(based on regular interaction, circuit development)*
b. **End Semester 50 marks** *(based on implementation, testing, results, poster presentation, and demonstration)*

Execution steps for Mini Projects:

1. Complete Paper work Design using datasheets specifying:
   · Selection criteria of the components to be used.
   · Specifications of system i/p and desired o/p.
   · Module based hardware design.
   · Test points at various stages in various modules
2. The circuit should be simulated using any of the standard simulation software available (either complete circuit to be simulated, if possible or an appropriate part of the circuit can be simulated)
3. Algorithm and the flow chart of the software part must be defined.
4. Result verification for hardware and testing the algorithms.
5. Comparison with the paper design to identify the discrepancies, if any. Justification of the same must be given.
6. Verified circuit should be assembled and tested on breadboard or general purpose board.
7. Simulation results and/or the snapshots indicating the current and voltage readings or detailing the test point results at various stages must be preserved and included in the project report.
8. Art work / layout of the circuit using standard layout tools.
9. Assembling and testing of circuit on final PCB.
10. Design and fabrication of suitable enclosure and outside fittings such as switches, Buttons, knobs, meters, indicators, displays etc.
11. Final testing of the circuit using the earlier defined test points.
12. Preparing Bill of components and materials.
13. Drawing entire circuit diagram (component level), outlining various blocks indicating test points, inputs and outputs at various stages on A3 graph sheet.

Domains for projects may be from the following, but not limited to:

- Instrumentation and Control Systems
- Electronic Communication Systems
- Biomedical Electronics
- Power Electronics
- Audio , Video Systems
- Embedded Systems
- Mechatronic Systems

A project report with following contents shall be prepared:

- Title
- Specifications
- Block diagram
- Circuit diagram
- Selection of components
- Simulation results
- PCB artwork
- Layout versus schematic verification report
- Testing procedures
- Enclosure design
- Test results
- Conclusion

References

Text Books:

1. Thomas C Hayes, Paul Horowitz, "The Art of Electronics", Newens Publication
2. Analog Circuit Design: Art, Science and Personalities, by Jim Williams (Editor) , EDN series for Design Engineers,
3. M Ashraf Rizvi, " Effective Technical Communication", Tata McGraw Hill Pvt. Ltd.

Reference Books:

1. Robert Boylested, " Essentials of Circuit Analysis", PHI Puublications
2. Meenakshi Raman, Sangeeta Sharma," Technical Communication, Principles and Practice", Oxford University Press
3. A.E. Ward, Angus, " Electronic Product Design", Stanley thornes Publishers, UK.

C Muralikrishna, Sunita Mishra," Communication Skills for Engineers", Pearson

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