



Course Content

Course Code: EC3033	Course Title: Product Design	
L-T-P: 3-0-0	Credits: 3	Contact Hrs: 3
ISE Marks: 50	ESE Marks: 50	Total Marks: 100
Teaching Hrs: 3	Exam Duration: 3 hrs	

Content	Hrs
Unit I	
Chapter No. 1 - Product Design and Development Introduction, Product Development Basics, Product Development Stages, Identification of the Customer Requirements, Designing the Product, Techno-Commercial Feasibility of a Product, Pilot Production Batch, Product Assessment, Availability, Screening Test of Component, Redundancy, Effects of Environmental Conditions on Reliability, Ergonomic and Aesthetic Design Considerations	6 hrs
Chapter No. 2 - Packaging, Noise and Heat Management Introduction to Product Packaging and Storage, Estimation of Power Supply Requirements, Estimation of Power supply Sizing for CMOS Digital ICS, Power Supply Protection Devices, Transient Voltage Suppressor, Fuses, Line Filters, Noise Consideration of a Typical System, Noise in Electronic Circuits, Grounding, Shielding Guarding, Enclosure Sizing, and Supply Requirements, Selection of Material for Enclosure, Tests Carried Out on the Enclosure, Thermal Management.	6 hrs
Chapter No. 3 - PCB Design Introduction to PCBs, Layout, Issues Related to PCB Size, Interconnection Parameters, Recommendations for Power and Ground Traces Routing, PCB Design for Digital Circuits, Noise due to Ground and Supply Line, Grounds, Returns and Shields, PCB Design Rules for Analog Circuits, Design Issues Related to Supply and Ground Conductors, Multilayer Boards, Component Assembly Techniques, Testing of Assembled PCBs, Board Layout Checklist, Bare Board Testing, Testing of Multilayer PCB, Comparison of PCBs.	6 hrs
Chapter No. 4 - Hardware and software Design and Testing Methods Introduction, Logic Analyzer, Uses of Logic Analyzer, Signal Integrity, Limitations of Different Types of Analyzers, Software Design and Testing Methods, Phases of Software Design, Goals of Software Design, Testing and Debugging of Program, Selection of Language for Software Development, Assemblers, Compilers, Simulators, Emulators.	6 hrs
	6 hrs



Chapter No. 5 - Electronic Product Testing Introduction, Environmental Testing, Temperature Testing, Thermal Modeling of Components, Humidity Testing, Electrical Overstress Testing, Altitude Testing, Special Testing, Environmental Test Chambers and Rooms, Various Tests on Enclosures, EMI and EMC Related Testing, EMC and Compliance, Conducted Emission Test using Time Domain Principle, Radiated Emission Test, Importance of Standards, Standards, and Standard Developing Organizations, List of Some Standards, CE Marking and Certification, UL Marking and Certification, IEC Standards, IEC Safety Standards: CAT Standards.	
Chapter No. 6 - Product Documentation Introduction, Types of Documentation, How to Prepare an Effective Document, PCB Documentation, Lamination Process, Plating, Drilling Details, Bill of Material: A Documentation of Part List, Interconnection Diagram, Control Panel Layout, Manual Types.	6 hrs

Chapterwise Plan

Course Code and Title: EC3033 / Product Design	
Chapter Number and Title: 1 - Product Design and Development	Planned Hours: 6 hrs

Lesson Schedule:-

Lecture No. - Portion covered per hour	Planned Delivery Date	Actual Delivery Date
1. Introduction, Product Development Basics,	27/9	27/9
2. Product Development Stages, Identification of the Customer Requirements ,	30/9	30/9
3. Designing the Product, TechnoCommercial Feasibility of a Product,	31/9	30/9
4. Pilot Production Batch , Product Assessment,	4/10	30/9
5. Availability, Screening Test of Component, Redundancy, Effects of Environmental Conditions on Reliability,	7/10	30/9
6. Ergonomic and Aesthetic Design Considerations .	8/10	



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Course Code and Title: EC3032 / Product Design	
Chapter Number and Title: 2 - Packaging, Noise and Heat Management	Planned Hours: 6 hrs

Lesson Schedule:-

Lecture No. - Portion covered per hour	Planned Delivery Date	Actual Delivery Date
7. Introduction to Product Packaging and Storage,	11/10	4/10
8. Estimation of Power Supply Requirements,	12/10	7/10
9. Estimation of Power supply Sizing for CMOS Digital ICS,	16/10	7/10
10. Power Supply Protection Devices, Transient Voltage Suppressor,	17/10	11/10
11. Fuses, Line Filters, Noise Consideration of a Typical System, Noise in Electronic Circuits, Grounding, Shielding Guarding, Enclosure Sizing, and Supply Requirements, Selection of Material for Enclosure,	20/10	3/11
12. Tests Carried Out on the Enclosure, Thermal Management.	21/10	4/11

Course Code and Title: EC3033 / Product Design	
Chapter Number and Title: 3 - PCB Design	Planned Hours: 6 hrs

Lesson Schedule:-

Lecture No. - Portion covered per hour	Planned Delivery Date	Actual Delivery Date
13. Introduction to PCBs, Layout, Issues Related to PCB Size, Interconnection Parameters,	2/11	8/11
14. Recommendations for Power and Ground Traces Routing,	3/11	10/11
15. PCB Design for Digital Circuits, Noise due to Ground and Supply Line,	4/11	10/11
16. Grounds, Returns and Shields, PCB Design Rules for Analog Circuits, Design Issues Related to Supply and Ground Conductors, Multilayer Boards, Component Assembly Techniques, Testing of Assembled PCBs, Board	8/11	11/11



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Layout Checklist, Bare Board Testing,	10/11	17/11
17. Testing of Multilayer PCB,	11/11	18/11
18. Comparison of PCBs.	11/11	18/11

Course Code and Title: EC3033 / Product Design	
Chapter Number and Title: 4 - Hardware and software Design and Testing Methods	Planned Hours: 6 hrs

Lesson Schedule:-

Lecture No. - Portion covered per hour	Planned Delivery Date	Actual Delivery Date
19. Introduction, Logic Analyzer, Uses of Logic Analyzer,	17/11	22/11
20. Signal Integrity, Limitations of Different Types of Analyzers,	18/11	24/11
21. Software Design and Testing Methods,	22/11	25/11
22. Phases of Software Design,	24/11	29/11
23. Goals of Software Design, Testing and Debugging of Program, Selection of Language for Software Development, Assemblers,	25/11	29/11
24. Compilers, Simulators, Emulators.	29/11	1/12

Course Code and Title: EC3033 / Product Design	
Chapter Number and Title: 5 - Electronic Product Testing	Planned Hours: 6 hrs

Lesson Schedule:-

Lecture No. - Portion covered per hour	Planned Delivery Date	Actual Delivery Date
25. Introduction, Environmental Testing, Temperature Testing, Thermal Modeling of Components,	1/12	2/12
26. Humidity Testing, Electrical Overstress Testing, Altitude Testing,	2/12	6/12
27. Special Testing, Environmental Test Chambers and Rooms, Various Tests on Enclosures,	6/12	8/12
28. EMI and EMC Related Testing ,EMC and Compliance,	8/12	9/12
29. Conducted Emission Test using Time Domain Principle, Radiated Emission Test,	9/12	13/12



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30. Importance of Standards, Standards, and Standard Developing Organizations, List of Some Standards, CE Marking and Certification, UL Marking and Certification, IEC Standards, IEC Safety Standards: CAT Standards.		
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Course Code and Title: EC3033 / Product Design	
Chapter Number and Title: 6 - Product Documentation	Planned Hours: 6 hrs

Lesson Schedule:-

Lecture No. - Portion covered per hour	Planned Delivery Date	Actual Delivery Date
31. Introduction, Types of Documentation,	13/12	15/12
32. How to Prepare an Effective Document, PCB Documentation,	15/12	15/12
33. Lamination Process, Plating, Drilling Details,	16/12	20/12
34. Bill of Material: A Documentation of Part List,	20/12	21/12
35. Interconnection Diagram, Control Panel Layout,	21/12	21/12
36. Manual Types.		

Date:

Course in-charge

HOD