Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NECD519	ASIC Design	3	0	0	3

Course Objective
This course focuses exclusively on digital CMOS Application Specific Integrated Circuit (ASIC) systems design and automation. The ASIC physical design flow, including logic synthesis, floor planning, placement,
Learning Outcomes
At the end of the course, the students must be able to • understand the design flow of different types of ASIC • get familiarize with the different types of programming technologies and logic devices • gain knowledge about partitioning, floor planning, placement and routing including circuit extraction of ASIC analysis, synthesis, Simulation and testing of systems • know about different high performance algorithms and its applications in ASIC.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1.	Types of ASICs, VLSI Design flow, Programmable ASICs- Antifuse, SRAM, EPROM, EEPROM based ASICs. Programmable ASIC logic cells and I/O cells. Programmable interconnects. Latest Version – FPGAs and CPLDs and Soft-core processors.	10	Acquire an understanding of the basic concept of ASIC and standard cells
2.	Trade off issues at System Level: Optimization with regard to speed, area and power, asynchronous and low power system design.	8	Get an understanding of the trade off issues during the system design
3.	ASIC physical design issues, System Partitioning, Power Dissipation, Partitioning Methods. ASIC floor planning, Placement and Routing.	6	Have a knowledge of physical design of any ASIC circuits
4.	System-On-Chip Design-SoC Design Flow, Platform-based and IP based SoC Designs, Basic Concepts of Bus-Based Communication Architectures, On-Chip Communication Architecture Standards, Low-Power SoC Design	10	Learn about the system on chip design and architecture
5.	High performance algorithms for ASICS/SoCs as case studies – Canonic Signed Digit Arithmetic, Distributed Arithmetic, High performance digital filters for sigma-delta ADC, USB controllers	8	Acquire an understanding of the high performance algorithms and systems design.
	Total	**42**	

Textbook:

1. M.J.S .Smith, -"Application -Specific Integrated Circuits" –Pearson Education, 2003.

Reference Books:

1. H.Gerez, "Algorithms for VLSI Design Automation", John Wiley, 1999
2. J..M.Rabaey, A. Chandrakasan, and B.Nikolic, "Digital Integrated Circuit Design Perspective (2/e)", PHI 2003
3. D. A.Hodges, "Analysis and Design of Digital Integrated Circuits (3/e)", MGH2004
4. Hoi-Jun Yoo, KangminLeeandJun Kyong Kim, "Low-Power NoCfor High-Performance SoCDesign", CRC Press, 2008
5. S.Pasrichaand N.Dutt," On-Chip Communication Architectures System on Chip Interconnect, Elsevier", 2008