Semester-I

3EC1122 Digital VLSI Design [3 0 2 4]

Course Outcomes (COs):

At the end of the course, the students will be able to -

1. Comprehend the various VLSI design styles, approaches, and IC fabrication process from the designers' viewpoint.
2. Design the static and dynamic digital VLSI circuits.
3. Develop small digital design including layout preparation
4. Analyze the speed, power, and area for CMOS-based design

3EC1118 Analog and Mixed Signal Design [3 0 2 4]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Comprehend and Design different Analog & Mixed signal circuits for various applications as per the user specifications
2. Analyze the differential amplifier and operational amplifier.
3. Design a circuit using Operational amplifier for Biomedical Applications with given specifications.

3EC1123 Semiconductor Devices Physics and Modeling [2 0 2 3]

Course Outcomes (COs):

At the end of the course, the students will be able to -

1. Comprehend the semiconductor physics, MOSFET operation and Scaling of MOSFET
2. Design MOSFETs of different gate lengths with lambda rules using TCAD tools for VLSI circuits
3. Analyse different models of MOSFETs for VLSI circuits
4. Implement the different MOSFETs for VLSI circuits

3EC1120 Advanced Digital System Design using Programmable Logic [3 0 2 4]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Implement the design from specification to net list level using hardware description language
2. Implement the digital designs on FPGA in context of synthesis, device utilization and speed and power optimization
3. Optimize the design using the concepts of simulation, synthesis and Place & Route

3EC1121 VLSI Physical Design [3 0 2 4]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Apply the concepts of graph theory
2. Comprehend and apply various algorithms to circuit partitioning Floor planning, Placement and Routing
3. Implement the VLSI physical design using CAD tools

3EC1124 Scripting Languages for VLSI Design [0 0 2 1]

Course Outcomes (COs):

At the end of the course, the students will be able to –

1. Develop the scripts for front-end RTL/Testbench code compilation and simulation flows
2. Design and develop the scripts for Running tests in regressions, analyzing failures, debug automation connectivity checks, netlist parsing, automatic generation/modification any RTL module/stubs, etc.
3. Automate Synthesis, P&R tools interfacing and backend flow.

Semester - II

3EC1223 VLSI Design Testing and Verification [3 0 2 4]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Apply the concepts of testing to improve the quality and yield of IC.
2. Develop the test bench for given behavioral and RTL design.
3. Develop the test set for given circuit using various test generation methods for digital circuits.
4. Identify the Design-for-Testability and Built-In-Self-Test methods for combinational and sequential CMOS circuits.

3EC12D1XX-Department Elective I

3EC12D101 VLSI Signal Processing [3 0 0 3]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Apply the concepts of testing to improve the quality and yield of IC.
2. Develop the test bench for given behavioral and RTL design.
3. Develop the test set for given circuit using various test generation methods for digital circuits.
4. Identify the Design-for-Testability and Built-In-Self-Test methods for combinational and sequential CMOS circuits.

3EC12D106 Low Power VLSI Design [3 0 0 3]

Course Outcomes (COs):

At the end of the course, the students will be able to -

1. Analyze the static and dynamic power dissipation for CMOS digital designs.
2. Estimate power dissipation at different abstraction levels using simulation and probability techniques.
3. Apply low power schemes at architecture and circuit level.

3EC12D103 Characterization of Semiconductor Materials and Devices [3 0 0 3]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Comprehend the concept of material science and impact on device current voltage characteristic.
2. Perform the device characterization.
3. Apply the techniques to reduce the device parasitic.

3EC12D104 CMOS RF Circuit Design [3 0 0 3]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Evaluate receiver architectures based on the RF performance parameters.
2. Analyse high frequency MOS based circuits working under Linear or Saturation Region.
3. Design and implement RF integrated circuits using active and passive components for given specifications.

3EC12D105 Advanced Topics in VLSI Design [3 0 0 3]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Comprehend the recent VLSI technology trends.
2. Analyse the scaling limit of CMOS Design and issues related to high density designs.
3. Analyse the possible solutions of scaling limits of CMOS and research trends in VLSI technology and design.

3EC12D2XX-Department Elective II

3EC12D201 IC Fabrication Technology [3 0 0 3]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Comprehend use of materials and parameters involved in the wafer preparation.
2. Illustrate and list the processes involved in fabrication of VLSI circuits.
3. Visualize the complete VLSI fabrication flow from wafer preparation to packaging.

3EC12D206 Memory Technology [3 0 0 3]

Course Outcomes (COs):

At the end of the course, the students will be able to -

1. Comprehend the architecture of RAM and non-volatile memory.
2. Apply reliability modelling and failure modes to memory design.
3. Design the memory cell using advanced technology.

3EC12D203 Deep SubMicron CMOS IC [3 0 0 3]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Design the small scale MOS digital circuits and cells for given specifications.

2. Apply scaling methods to digital logic design and determine performance parameters.
3. Design deep submicron CMOS logic using lambda rule.

3EC12D204 VLSI System on Chip [3 0 0 3]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Analyze modeling styles for design of system on chip.
2. Design data path architectures and solve intra-chip communication issues for given system on chip.
3. Apply partitioning and floor planning algorithms for effective system on chip design.
4. Utilize System Verilog, TLM, and System C for modeling and testing of system on chip.

3EC12D3XX-Department Elective III

3EC12305 Advanced Topics in VLSI Testing and Verification [2 0 2 3]

Course Outcomes (COs):

At the end of the course, the students will be able to -

1. Use the concept of Object-Oriented Programming for verification
2. Develop the higher level testbench using System Verilog
3. Choose effective methods for verification of complex digital designs.

3EC12306 Advanced Processor Architecture [2 0 2 3]

Course Outcomes (COs):

At the end of the course, the students will be able to -

1. Comprehend architecture of modern controller and bus protocols for embedded systems.
2. Apply the compiler techniques to exploit the instruction-level parallelism.
3. Analyze the performance of symmetric and distributed shared memory-based multiprocessors.

3EC12D303 Reconfigurable Computing [2 0 2 3]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Comprehend the concept of reconfigurable computing, architectures and types of reconfigurations.
2. Apply the concepts of reconfiguration on the systems design for given specification /design.
3. Evaluate the digital systems designed using reconfigurable architectures for their performance.
4. Implement embedded systems on reconfigurable hardware for given specifications.

3EC12D304 MEMS Design [2 0 2 3]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Comprehend the concepts of advanced Micro/Nano fabrication technologies.
2. Develop the applications of MEMS in area of optical, modulators, switches, and displays.
3. Apply design techniques of RF MEMS switches, relays, varactor, phase shifter, antennas.

3SS1201 Research Methodology and IPR [2 0 0 2]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Formulate a research problem for a given engineering domain.
2. Analyse the available literature for given research problem.
3. Develop technical writing and presentation skills.
4. Comprehend concepts related to patents, trademark and copyright.

3EC1224 Minor Project [0 0 10 5]

Course Outcomes (COs):

At the end of the course, students will be able to -

1. Identify the issues related to the recent trends in the field of embedded systems.
2. Formulate the problem definition, analyse and do functional simulation of the same.
3. Design, implement, test and verify the engineering solution related to the problem definition.
4. Compile, comprehend and present the work carried out.