

Course Title and Code	COE121 – Logic Design
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I. **Course Identification and General Information:**

Course Title	Logic Design	Course Code	COE121	Pre-requisite	CSC111
Department	Computer Engineering	Course Level	4	Credit Hours	3 (3+0)

II. **Course Description/Topics:** The following course topics will be covered.

- Historical background and contributors of digital logic
- Number systems (binary, decimal, hexadecimal), codes, base conversions
- Boolean algebra, minimization of Boolean functions
- Basic logic gates, Physical properties of logic gates; realizations of functions
- Combinational circuits: multiplexers, decoders, encoders, comparators
- Arithmetic functions (adder, subtractor); ALUs
- Latches, basic flip flops, flip flops with reset, enable; data registers
- Sequential Logic; Design of Finite State Machines (Mealy and Moore)
- Digital System modeling using Hardware Description Languages (Verilog/VHDL)

III. **Course Outcomes:** Summary of the main learning outcomes for students enrolled in the course.

- Identify the importance of digital logic design
- Work with various number systems and convert between bases
- Reduce Boolean functions and realize the functions using logic gates
- Analyze and explain uses of small- and medium-scale logic functions as building blocks
- Design and describe the operation of basic memory elements
- Analyze and synthesize synchronous sequential machines
- Apply digital system design principles and descriptive techniques
- Model and simulate a digital system using a hardware description language, such as VHDL or Verilog

IV. **Required Text:**

- Digital Design and Computer Architecture, 2/e, David Money Harris and Sarah L. Harris, Morgan Kaufmann, MA 02451, USA, 2013, ISBN: 978-0-12-394424-5

V. **References:**

- Digital Design, With an Introduction to the Verilog HDL, 5/e, M. Morris Mano and Michael D. Ciletti, Prentice Hall, New Jersey 07458, 2013. ISBN: 978-0-13-277420-8