

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	Final Exam	Total
MCA-103	Computer Architecture & VLSI Design	PCC	4	4	0	0	40	60	100

Course Outcomes

At the end of the course the student will be able to	
CO1	Understand components of digital electronics, logical organization and the computer arithmetic.
CO2	Minimize the expressions using Karnaugh map method and implement them using Logic Gates.
CO3	Design and analyze various combinational and sequential circuits
CO4	Understand the organization and structure of computer memory.
CO5	Understand the basic parts of a VHDL model

Detailed Syllabus**Section-A**

UNIT-1: Digital Systems and Number Representation: Von Neumann architecture, digital and analog systems. Number system, their types & conversions; Decimal, Binary, Octal, Hexadecimal; Binary Arithmetic: Binary arithmetic operations, Representation of negative numbers; 1's complement and 2's complement, Code Representation: BCD code & Excess-3 and their rules of arithmetic operations.

(10 Hrs)

UNIT-2: Logic Gates and Boolean algebra: AND, OR, NOT, NAND, XOR, NOR, XNOR gates, Boolean laws and their Expressions. Representation in SOP, POS form and their simplifications, K-map, code converters, Error detection & correction: Hamming code.

(10 Hrs)

UNIT-3: Combinational and sequential Circuits : Half & Full adders & subtractors, parallel adders, Encoder, decoder, Multiplexer De-Multiplexer, Flip-flops and their types, level clocking and edge triggered clocking, Registers and their types, bi-directional register.

(10 Hrs)**Section-B**

UNIT-4: Memories and bus structure: Basic memory cell, Memory hierarchy, characteristics, memory types and accessing techniques, static and dynamic Memory, cache memory. Memory address map to CPU, bus structure, memory-mapped and I/O mapped technique, Modes of I/O transfers, instruction & interrupt life cycle.

(10 Hrs)

UNIT -5: VHDL components and tools: Introduction to VHDL, need and importance of VHDL, characteristics, basic components of VHDL -entities, architectures, configuration, package, library, simple VHDL program. Understanding tools and environments- GHDL VHDL simulator, Xilinx ISE (FPGA synthesis tool set), IMAGE simulation accelerator (FPGA based co-simulation environment).

(10 Hrs)**Textbooks**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Fundamentals of Digital Circuits	Anand Kumar	PHI	4th (2016)
2	Digital Electronics	A. K. Maini	Wiley India	1st (2007)
3	Digital Electronics	Kharate	Oxford	1st (2012)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Digital Design	M. Morris Mano	Pearson	5th (2012)
2	Computer System Architecture	M. M. Mano	Pearson	3rd (2012)