

Kadi Sarva Vishwavidhyalaya, Gandhinagar

BCA Semester I

BCA105 – Part 2: Core 3

Digital Electronics

Rationale:

The objective of this course is to familiarize students with concepts of fundamentals of Information Technology and detailed working of computer and its application.

Prerequisite:

DIGITAL ELECTRONICS is to enable students to have an understanding of computer organization and architecture of digital computer. The student will be able to assemble the computer and have a better understanding of the internal working of the circuits. The knowledge component to compute a program and to understand the basic working of a digital computer by accepting binary digits as inputs, process these signals and give the required output as acquired.

Learning Outcomes: The student will be able to understand:

- Basic attributes of computer and the hardware configuration.
- Numbering systems and their conversion into different systems like binary, Hex-decimal, Octal.
- Techniques of designing logical circuits using logical GATES.

Resource Utilization:

Lecture based on Activity Oriented Classroom Teaching by availing Projector, simulator, physical bread board, jumpers, switches, etc.

Teaching and Evaluation Scheme:

Sub. Code	Sub. Type	Subject Title	Teaching Scheme		Exam Scheme				
			Cr.	Hrs. / Week	Theory		Practical		Total Marks
					Internal	External	Internal	External	
BCA 105	Core	Digital Electronics	4	4	30	70	-	-	100

UNIT-1 – Components of a Computer (25%)

Objective: To have a thorough understanding of the basic structure and operation of a digital computer. The detail operation of the arithmetic unit, control unit, memory unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication

and division is explained.

Content

Generation of Computer (1st, 2nd, 3rd, 4th & 5th), Classification of Computer System (Super – Mainframe – Personal Computer) , Computer block diagram , input device (Key Board, Mouse, Joystick, Track Ball, Light Pen, Scanner , OMR –Bar Code Reader, MICR-OCR, Processing Device (CPU, ALU, CONTROL UNIT) , Output device (Printer , Monitor , Plotter) , storage unit (RAM, ROM, PROMS, EPROM, secondary storage device (Floppy Disk, Optical Disk, Magnetic Disk, Magnetic Tape , Hard Disk).

Topic: - 2-1, 2-3, 2-4, 2-2, 2-5 TEX BOOK – 2

No. of Lectures: 10

UNIT-2 – Number systems and Codes

(25%)

Objective: Digital Computer has two signals that is either ON or OFF, ON signifies the passage of current, symbolised by “1” and OFF signifies the absence of current, symbolised by “0”. All computer data is composed of 1s and 0s, which is the binary data, called as “BIT”. Four bits is a “Nibble”. Eight bits is a “Byte”. From there we have kilobytes, megabytes, etc. Since everything is a series of 1s and 0s, the CPU has to perform every calculation in binary. But before any operations are done, numbers have to first be converted into base 2. So conversions will give an idea to students the actual working of computations

Content

Decimal odometer, Binary odometer, Number code, binary to decimal conversion, decimal to binary conversion, hexadecimal numbers, hexadecimal to binary conversion, hexadecimal to decimal conversion, decimal to hexadecimal conversion, BCD numbers.

Topic :- 1-1,1-2,1-3,1-5,1-7,1-8,1-9,1-10,1-11,1-12.TEX BOOK – 1.

No. of Lectures: 10

UNIT-3 – LOGIC GATES and ARITHMETIC LOGIC UNIT

(25%)

Objective: Digital systems are said to be constructed by using logic gates. The logic gates are the building blocks for all computers, smart phones and the whole internet.

Content

Basic Gates like OR gate, AND gate, Boolean algebra, NOR gate, De Morgan’s first theorem, NAND gate, De Morgan’s second theorem, EXCLUSIVE-OR gate, EXCLUSIVE-NOR gate, Multiplexers, inverter.

Topic: - 2-1, 2-2, 2-3, 2-4, 3-1, 3.2, 3-3, 3-4, 3-5, 3-7, 4-7, TEX BOOK – 1. No. of Lectures: 12

UNIT-4 – BOOLEAN ALGEBRA

(25%)

Objective: It formalizes the rules of logic. Boolean algebra is used to

simplify Boolean expressions which represent combinational logic circuits.

Content

Instruction Set Design (Accumulator, Stack Based, Register Based), Instruction Cycle/CPU Operation, Binary addition binary subtraction, half adders, full adders, binary adders, 2's complement adder subtracted. Flip-Flops (RS Latch , D , JK Master-Slave)

Topic: - 3.3.1,3.3.2,3.3.3,1.6.1,1.6.2-Text Book-3, 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7 , 6-1, 6-2, 6-3, 6-4, 6-5, 6-8 ,7-1 , 7-3 ,7-6 TEX BOOK – 1. No. of Lectures: 10

Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Teaching and Evaluation Scheme: The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. Students are evaluated on the basis of internal examinations which consist of Term Work such as class test, quizzes, class participation, home assignments, presentation, Bread Board, Android Apps. , Regular Attendance (i.e. Minimum 85%).

Text Books:

1. DIGITAL COMPUTER ELECTRONICS BY- MALVINO AND BROWN.(TATA McGRAW-HILL EDITION) = UNIT-1,2,3
2. “O” LEVEL, MADE SIMPLE IT TOOLS AND APPLICATION BY SATIESH JAIN(BPB PUBLICATION).
3. COMPUTER ARCHITECTURE AND ORGANIZATION BY B GOVINDARAJALU

Reference Books

1. DIGITAL PRINCIPAL AND APPLICATION BY ALBERT PAUL MALVINO AND DONALD P. LEACH(TATA McGRAW-HILL EDITION)
2. FUNDAMENTAL OF DIGITAL CIRCUITS BY A.ANAND KUMAR(PRENTICE-HALL OF INDIA)

Online MCQs Learning Resource

1. <http://www.indiabix.com/digital-electronics/boolean-algebra-and-logic-simplification/>
2. <http://www.indiabix.com/digital-electronics/integrated-circuit-technologies/>

Question Paper Scheme:

University Examination Duration: 3 Hours. Total marks: 70

Q.1-Unit-I & II	(11 Marks)
Objective / Short Questions	
Q.2-Unit-I	(12 Marks)
Descriptive / Long questions	
Q.3-Unit-II	(12 Marks)
Descriptive / Long questions	
Q.4-Unit-III & IV	(11 Marks)
Objective / Short Questions	
Q.5-Unit-III	(12 Marks)
Descriptive / Long questions	
Q.6-Unit-IV	(12 Marks)
Descriptive / Long questions	

Note: Q.2,3,5 and Q.6 must have at least 40% Internal Options (i.e. Attempt Any 3 out of 5)

X-----X