R.T. M. Nagpur University, Nagpur
FOUR YEAR B.E. COURSE

B.E. SCHEME OF EXAMINATION wef: 2021-22

Scheme of Teaching & Examination of Bachelor of Engineering III Semester B.E. (Computer Science and Engineering)

Sr. No.	Course Code	Category	Course Name	Hours/ Week			Credits	Maximum Marks				
								Theory		Practical		Total
				L	T	P		Internal	University	Internal	University	
1	BECSE301T	Basic Sciences courses	Applied Mathematics – III	3	1	-	4.00	30	70	-	-	100
2	BECSE302T	Professional core courses	Object Oriented Programming with Java	3	1	-	4.00	30	70	-	-	100
3	BECSE303T	Professional core courses	Operating System	3	-	-	3.00	30	70	-	-	100
4	BECSE304T	Professional core courses	Computer Architecture & Digital System	3	1	-	4.00	30	70	-	-	100
5	BECSE305T	Professional core courses	Ethics in IT	3	-	-	3.00	30	70			100
6	BECSE306T	Humanities Social and Management Courses	Universal Human Values	2	-	-	2.00	15	35	-	-	50
7	BECSE307T	Mandatory Course	Environment Science (Audit)	2	-	-	0.00	-	-	-	-	-
8	BECSE302P	Professional core courses	Object Oriented Programming with Java Lab	-	-	2	1.00	-	-	25	25	50
9	BECSE303P	Professional core courses	Operating System Lab	-	-	2	1.00	-	-	25	25	50
10	BECSE308P	Professional core courses	Computer Workshop-I Lab	-	-	2	1.00	-	-	25	25	50
Total				19	3	6	23.00	165	385	75	75	700

Dr. S. V. Sonekar
Chairman.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR

FOUR YEAR BACHELOR OF ENGINEERING (B.E.) DEGREE COURSE

SEMESTER: III (C.B.C.S.)

BRANCH: COMPUTER SCIENCE & ENGINEERING

Subject : ***Computer Architecture & Digital System*** Subject Code : **BECSE304T**

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
3 Hrs. (Theory) 1 Hr. (Tutorial)	4	30	70	100

Aim: To understand the basic principles and the working of Computer and Digital Systems.

Prerequisite(s): Knowledge of semiconductors, transistors and concepts of physics related to digital system.

Course Objectives:

1	Discuss the basic concepts of digital system that are applicable in the designing of computer architecture
2	Explain concepts of basic processing unit of computer such as ALU, CU, MU, I/O Units and Arithmetic Operation used in computer.
3	Explain various technologies used in memory system and motivate students to design memory modules.
4	Discuss the different types of interrupts and interrupt handling mechanism.

Course Outcomes:

At the end of this course student are able:

CO1	Understand the basic concept of digital system & apply for problem solving.
CO2	Describe the Computer Architecture & addressing modes.
CO3	Understand various instruction formats.
CO4	Perform the arithmetic operations.
CO5	Design & evaluate various memory management system.
CO6	Illustrate I/O mapped & memory mapped operations.

Unit I: Motivation for Digital Systems: **[8 Hrs]**

Logic and Boolean algebra, Logic Gates & Truth Tables, Demorgan's law, Minimization of combinational circuits using Karnaugh maps. Multiplexers, Demultiplexer, Encoders, Decoders.

Unit II: Basic Structure of Computers: **[08 Hrs]**

Functional units, Von Neumann Architecture, Basic operational concepts, Bus structures Addressing modes, Subroutines: parameter passing, Instruction formats: Three- address Instructions, Two-address instructions, One- address instructions, Zero-address instructions.

Unit III: Basic Processing Unit: **[06 Hrs]**

Bus architecture, Execution of a complete instruction, sequencing of control signals, Hardwired control, Micro-programmed Control, microinstruction format.

Unit IV: Arithmetic: **[6 Hrs]**

Number representations and their operations, Addition and Subtraction with signed-magnitude, Design of Fast Adders, Array multiplier, Signed multiplication: Booth's Algorithm, Bit-pair recoding, Integer Division, Floating-point Arithmetic operations, guard bits and rounding.

Unit V: The Memory System: **[8 Hrs]**

Various technologies used in memory design, higher order memory design, Memory hierarchy, Main memory, Auxiliary memory, Cache memory, cache optimization techniques ,Memory interleaving, Virtual memory, Address Space and Memory Space, Associative memory, Page table, Page Replacement.

Input/output Organization: I/O mapped I/O and memory mapped I/O, Interrupts and Interrupts handling mechanisms, vectored interrupts, Synchronous vs. Asynchronous data transfer, Direct Memory Access.

Text books:

1. V.C.Hamacher,Z.G.Vranesic and S.G.Zaky, Computer Organisation, McGraw Hill,5thed,2002.
2. Computer Organization, Design and Architecture (IV Ed), Sajjan G. Shiva, CRCPress
3. Computer Architecture & Organization III Ed-J.P.Hayes.
4. Fundamental of Digital Electronics: A. Anand Kumar

Reference books:

1. M. Mano,"Computer System and Architecture", PHI, 1993
2. W. Stallings, "Computer Organization & Architecture", PHI, 2001.
3. Digital circuit & design: A.P.Godse