GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/ Spec.	Computer Science & Engineering Computer Science & Engineering (Big Data and Analytics) Computer Science & Engineering (Cyber Security) Computer Science & Engineering (Artificial Intelligence and Machine Learning)
Semester	II	Version	1.0.0.0
Course Code	2PCC-CSE-1102	Course Name	COMPUTER ORGANIZATION
Effective from Academic Year	2026-27	Effective for the batch admitted in	July 2026
Course Category	PCC		

Teaching, Learning, and Examination Scheme

Teaching & Learning Scheme							Examination scheme (Marks)					
Hours (per week)				Cr	SL	TSL	Theory			Practical		
L	TU	P	TTH				CE	SEE	Total	CE	SEE	Total
3	0	2	5	4	45	120	50	50	100	25	25	50

L: Lecture, TU: Tutorial, P: Practical, TTH: Total Teaching Hours/Week, Cr: Credit, SL: Min. Self Learning/Term Work Hours/Sem, TSL: Min. Total Teaching & Learning Hours/Sem, CE: Continuous Evaluation, SEE: Semester End Examination,

Pre-requisites

Fundamentals of Digital Electronics

Course Outcomes

COs	After completing the Course, students will be able to
CO1	Understand the organization of a Computer system
CO2	Learn the input/output and Memory related concept
CO3	Understand instruction set architecture and data types
CO4	Apply the knowledge of combinational and sequential logical circuits to design a computer architecture.

Theory Syllabus

Unit	Content	Hrs
1	**Computer Organization and Architecture Foundation** Introduction to Computer Architecture, viz. – Harvard, Von Neumann Architecture, Basic Computer Organization: Registers and Bus.	4
2	**Register Transfer and Micro operations** Register Transfer Language, Register transfer, Bus and Memory transfer, Arithmetic Micro operations, Logic Micro-operations, Shift Micro operations, Arithmetic Logic Shift Unit	5
3	**Basic Computer Architecture** Instruction codes, Computer registers, computer instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-output and interrupt, Completecomputer description	5
4	**Micro programmed control** Control Memory, Address Sequencing, Microprogram Example, design of control Unit	5
5	**Central processing unit** Introduction, General Register Organization, Stack Organization, Instruction format, Addressing Modes, data transfer and manipulation, Program Control, Reduced InstructionSet Computer (RISC), Complex Instruction Set Computer (CISC)	6
6	**Pipelining** Parallel processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline.	5
7	**Computer arithmetic** Introduction, Addition and subtraction, Multiplication and Division Algorithms (Booth Multiplication Algorithm), Floating Point Arithmetic, Decimal Arithmetic Unit and Operations.	5
8	**Input – Output organization** Input-output interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPUIOP communication	5

9	**Memory Organization** Memory Sub System, Memory hierarchy, Main memory, Auxiliary memory, Flash memory, Associative memory, Cache memory, Virtual memory.	5

Practical Content
Practical will be based on topics like arithmetic and logic operations, memory cell counter bus system, ALU, and memory organisation

Text Books	
1	Computer System Architecture By M. MorrisMano, Pearson Publication

Reference Books	
1	Structured Computer Organization: By Tanenbaum
2	Computer Organization and ArchitectureBy Stallings, Pearson Publicatio.
3	Computer Organization and Design by P. Pal Chaudhury, PHI Publication.

ICT/MOOCs Reference	
1	Course Name: Computer Architecture Link: https://nptel.ac.in/courses/106/105/106105163/

Mapping of Cos, POs, and PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	3	0	2	2	3	3	0	1	1	1	2	1	1	2
CO2	1	2	2	0	2	2	0	2	1	2	2	2	2	2
CO3	3	2	2	1	1	1	3	2	2	0	1	2	3	3
CO4	2	2	1	0	3	0	3	1	1	2	0	2	3	3

Unit	Unit Title	Aligned COs	Learning Hours	BTL Level
1	Computer Organization and Architecture Foundation	1,2	4	R,U
2	Register Transfer and Micro operations	2	5	U,N
3	Basic Computer Architecture	1,2,3	5	R,U,N
4	Microprogrammed control	2,3	5	N,R,E
5	Central processing unit	2,3,	6	U,N,E
6	Pipelining	2,3,4	5	N,E
7	Computer arithmetic	3,4	5	E,A,C
8	Input – Output organization	3,4	5	C,A,N
9	Memory Organization	3,4	5	A,N,E

Note:

- Version 1.0.0.0 (First Digit= New syllabus/Revision in Full Syllabus, Second Digit=Revision in Teaching Scheme, Third Digit=Revision in Exam Scheme, Forth Digit= Content Revision)
- L=Lecture, TU=Tutorial, P= Practical/Lab., TW= Term work, DT= Direct Teaching, Lab.= Laboratory work CE= Continuous Evaluation, SEE= Semester End Examination
- 1 Hour Lecture = 1 Credit, 1 Hour Tutorial = 1 Credit, 2 Hours Practical = 1 Credit, 2 Hours Internship/Project/Seminar = 1 Credit
- As per NCrF/NEP 2020, Minimum Self-Learning or Term Work Hours per Semester should be calculated in such a way that 1 Credit should have minimum 30 Hours of Teaching and Self Learning Engagement per semester