BANGALORE UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, UVCE, BENGALURU B.Tech. PROGRAMME IN COMPUTER SCIENCE AND ENGINEERING

Course Code	**18CSOE51C**					
Category	Engineering Science Courses: Open Elective					
Course title	**COMPUTER ORGANIZATION AND ARCHITECTURE-THEORY**					
Scheme and Credits	No. of Hours/Week					Semester - V (Non CSE/ISE)
	L	T	P	SS	Credits	
	2	2	0	0	3	
CIE Marks: 50	SEE Marks: 50		Total Max. Marks: 100			Duration of SEE: 03 Hours
Prerequisites (if any): NIL						

COURSE OBJECTIVES:

The course will enable the students to

Understand the various components and views of a computer system.
Learn the design of arithmetic logic unit, memory unit, processing unit and I/O unit.
Familiarize with the complexities involved in the design of a computer system.
Compare the various computer systems.
Design efficient computer systems.

UNIT I: INTRODUCTION **10 Hours**

The General Purpose Machine: Structure of a Digital Computer, The general purpose machine, The Perspectives of a Computer System: The machine/assembly language programmer's view, The computer architect's view, The computer system logic designer's view, Historical perspective. Machines, Machine Languages and Digital Logic: Classification of computers and their instructions, Computer instruction sets. Informal description of the simple RISC computer SRC, Formal description of SRC using register transfer notation, RTN, Description of addressing modes with RTN, Register transfer and logic circuits : from behaviour to hardware.

UNIT II: COMPUTER ARITHMETIC AND ARITHMETIC UNIT **09 Hours**

Number systems and radix conversion, Fixed-point arithmetic, Floating-point arithmetic.

UNIT III: MEMORY SYSTEM DESIGN **09 Hours**

Components of the Memory System, Semiconductor RAM Memories, Read-only memories, Speed, Size and cost, Cache memories, Performance considerations, Virtual memories, Secondary Storage.

UNIT IV: PROCESSOR DESIGN **10 Hours**

Some Fundamental Concepts, Execution of a complete Instruction, Multiple-Bus Organization, Hardwired Control, Microprogrammed Control. Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets, Datapath and Control Considerations, Superscalar Operation.

UNIT V: I/O AND PERIPHERAL DEVICES **10 Hours**

Accessing I/O devices, Interrupts, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces, Display devices, Printers, Input Devices.

TEXT BOOKS:

Vincent P Heuring & Harry F Jordan, T G Venkatesh, "Computer Systems Design and Architecture",2014, Pearson Education Limited.

Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Computer Organisation, Fifth Edition, July 2017, McGraw Hill Education.

REFERENCE BOOKS:

William Stallings, Computer Organization and Architecture, Fourth Edition, PHI.
M.Mano, Computer Architecture, Prentice Hall.
Hayes, Computer Architecture & Organization, Third Edition, TMH.
Patterson, Computer Architecture, PH

e-BOOKS/ONLINE RESOURCES:

www.freebookcentre.net/ComputerScience.../Computer-Organization-and-Architectur.
https://www.pdfdrive.com/computer-organization-and-architecture-books.html
www.freetechbooks.com/computer-organization-and-architecture-f56.html

MOOCs:

https://www.classcentral.com/course/nptel-computer-organization-and-architecture-a-pedagogical-aspect-9824

COURSE OUTCOMES:

The students at the end of the course, will be able to

CO1: Understand the design principles of a computer system.
CO2: Design and analyze the performance of the arithmetic logic unit, memory unit, input / output unit and processing unit of a computer system.
CO3: Compare the various computer systems and build an efficient computer system.
CO4: Analyse the bottlenecks in a computer system.
CO5: Modify the design to improve the performance of a computer system.

SCHEME OF EXAMINATION:

<table>
<tr><td rowspan="2">CIE – 50 Marks</td><td>Test I (Any Three Units) - 20 Marks</td><td>Quiz I – 5 Marks</td><td>25 Marks</td><td rowspan="2">Total: 50 Marks</td></tr>
<tr><td>Test II (Remaining Two Units) - 20 Marks</td><td>Quiz II – 5 Marks</td><td>25 Marks</td></tr>
<tr><td rowspan="3">SEE – 100 Marks</td><td colspan="2">Q1 (Compulsory): MCQs or Short answer type questions for 15 Marks covering entire syllabus.</td><td>15 Marks</td><td rowspan="3">Total: 100 Marks</td></tr>
<tr><td colspan="2">Q2 & Q3 from Units which have 09 Hours are compulsory.</td><td>17*2= 34 Marks</td></tr>
<tr><td colspan="2">Q4 or Q5, Q6 or Q7 and Q8 or Q9 from Units which have 10 Hours shall have Internal Choice.</td><td>17*3= 51 Marks</td></tr>
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Note: SEE shall be conducted for 100 Marks and the Marks obtained is scaled down to 50 Marks.

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