Department of Computer Science and Engineering
National Institute of Technology Tiruchirappalli

1. Course Outline			
Course Title	Computer Organization		
Course Code	CSPC24		
Department	CSE	**No. of Credits**	3
Pre-requisites Course Code	NIL	**Faculty Name**	Dr.C.Mala Dr. E.Sivasankar
E-mail	mala@nitt.edu, sivasankar@nitt.edu	Telephone No:	0431-2503213
Course Type	Core Course		

2. Course Overview

Computer Organization course describes the technology for building processors and memory using MIPS architecture.

3. Course Objectives

- To understand the basic hardware and software issues of computer organization
- To understand the representation of data at machine level
- To understand how computations are performed at machine level

4. Course Outcomes (CO)

- Ability to analyze the abstraction of various components of a computer
- Ability to analyze the hardware and software issues and the interfacing
- Ability to work out the tradeoffs involved in designing a modern computer system

5. Course Outcome (CO)	Aligned Programme Outcome (PO)							
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8
Ability to analyze the abstraction of various components of a computer	S	B	M	S	B	B	M	B
Ability to analyze the hardware and software issues and the interfacing	S	B	M	S	B	M	M	B
Ability to work out the tradeoffs involved in designing a modern computer system	S	M	S	S	M	S	M	B

S = 0.6 M = 0.4 B = 0.0

6. Course Teaching and Learning Activities							
L.No	Title	Type		Mode of delivery			
		L	T	C& T	PPT	VL/VC	DEMO
	UNIT I						
1.	Introduction, Technologies for building Processors and Memory	√					
2.	Performance, The Power Wall,	√		√	√		
3.	Operations of the Computer Hardware	√		√	√		
4.	Operands Signed and Unsigned numbers	√			√		
5.	Representing Instructions	√			√		
6.	Logical Operations	√			√		
7.	Instructions for Making Decisions	√			√		
8.	Solution Problems	√					√
	UNIT II						
9.	MIPS Addressing for 32 Bit Immediates and Addresses	√		√			
10.	Translating and Starting a Programs	√			√		
11.	Addition and Subtraction Problems	√		√			
12.	Multiplication Problems	√		√			
13.	Division Problems	√		√			
14.	Floating Point operations & Problems	√		√			
15.	Parallelism and Computer Arithmetic	√		√			
16.	Subword Parallelism	√			√		
17.	Streaming SIMD Extensions and Advanced Vector Extensions in x86.	√					
	UNIT III						
18.	Logic Design Conventions	√			√		
19.	Building a Data path	√			√		
20.	A Simple Implementation Scheme for lw and sw instruction	√		√	√		
21.	overview of Pipelining, Pipelined Data path, Data Hazards: Forwarding versus Stalling, Control Hazards	√			√		
22.	The ARM Cortex–A8 and Intel Core i7 Pipelines	√			√		
23.	Instruction-Level Parallelism	√					
24.	Hardware Design Language-Solution problems	√		√			√

	UNIT IV						
25.	Memory Technologies	√		√	√		
26.	Basics of Caches, Measuring and Improving Cache Performance	√			√		
27.	Dependable memory hierarchy, Virtual Machines, Virtual Memory	√			√		
28.	Using FSM to Control a Simple Cache	√			√		
29.	Parallelism and Memory Hierarchy- Redundant Arrays of Inexpensive Disks	√			√		
30.	Implementing Cache Controllers- Solution Problems	√			√		
	UNIT V						
31.	Disk Storage and Dependability	√			√		
32.	Parallelism and Memory Hierarchy: RAID levels	√			√		
33.	Performance of storage systems	√		√	√		
34.	Introduction to multi threading clusters	√			√		
35.	Message passing multiprocessors	√					
36.	Solution Problems	√					√

7. Course Assessment Methodology

Sl. No	Mode of Assessment	Week/Date	Duration	Marks
1.	Cycle Test - 1	6th week	1 Hour	20
2.	Cycle Test - 2	12th week	1 Hour	20
3.	Assignment	4th, 10th weeks		10
4.	End Semester Exam	November 2nd Week	3 Hours	50
			Total	100

8. Essential Readings (Textbooks, Reference books, Websites, Journals, etc.)

Text Books

- David A. Patterson and John L. Hennessey, "Computer organization and design, The Hardware/Software interface", Morgan Kauffman / Elsevier, Fifth edition, 2014.
- Smruti Ranjan Sarangi, "Computer Organization and Architecture", McGraw Hill Education, 2015

Reference Books

- V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation",VI th edition, Mc Graw-Hill Inc, 2012.
- William Stallings "Computer Organization and Architecture", Eighth Edition, Pearson Education, 2010.

For Senate's Consideration

(C. MALA) (E.SIVASANKAR)	(N.RAMASUBRAMANIAN)	(R. LEELA VELUSAMY)
Course Faculty	Class Committee Chairperson	HoD