

GUJARAT TECHNOLOGICAL UNIVERSITY

SUBJECT NAME: Advanced Computer Architecture

SUBJECT CODE: 3715501

Semester I

Type of course:

Prerequisite:

1. Fundamental of computing and Programming
2. Computer Organization and architecture
3. Microprocessor and Micro controller

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA (M)	ESE	PA(I)	
3	2	0	4	70	30	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment;

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Basic concepts of computer organization, stored program model, Classes of computer architecture, Processor vs. System architecture, Elements of computer systems – processors, memories, I/Os, disks, buses etc, Goals of computer architecture – performance, throughput, latency, power, cost. Processor performance vs. system performance, Comparison of various platforms in terms of performance and efficiency	6	10
2	Internal elements and architecture of processors, Instruction execution, Instruction set architectures, CISC vs. RISC architectures. Bus architecture, Multi Processor architecture, Memories and Caches, Cache coherency, Pipelining and data path elements	6	10
3	System architecture elements, H/W component selection and datasheet analysis, Bill of Materials, IP selection and System on Chip integration, Standard interfaces and I/Os, Analog and Mixed signal element integration. Reset and clocking elements. Multi processor system	7	20
4	Application specific processors, Packet processing, Microcontrollers, Network controllers, DSP and Multimedia processors, GPU elements	7	20
5	An overview of the latest Intel, ARM, TI, SPARC and Power PC architectures as modern SOC architectural elements	6	10

Reference Book:

1. V.C. Hamacher, Z.G. Vranesic, S.G. Zaky. "Computer Organization". 5th Edition. "Peter",
2. David A. Patterson and John L. Hennessy. Computer Organization and Design, Revised Printing, Third Edition, Third Edition:

3. Andrew S. Tanenbaum. Structured Computer Organization Prentice Hall; 5th Edition. 2005. 800p.
4. W. Stallings. "Computer Organization and Architecture. Designing and Performance". 7th Edition. Prentice Hall. 2005.
5. J.L. Hennessy, D.A. Patterson. "Computer architecture: A Quantitative Approach", 4th Edition. Morgan Kaufmann, 2006.

Course Outcome:

After learning the course the students should be able to:

1. Demonstrates state of the art I/O memory and Storage systems
2. Analyse and compare the performance of various architectures
3. Explain about multi-processor Architecture
4. Demonstrate the various application of multiprocessor
5. Identify the various application of Multi-processor
6. Identify the Modern World Architecture