Annexure No.	31 Q
SCAA Dated	29.02.2008

BHARATHIAR UNIVERSITY, COIMBATORE – 641 046 M. Sc INFORMATION TECHNOLOGY (CBCS)

Subject Title: INFORMATION CODING TECHNIQUES (ELECTIVE 1) (for the candidates admitted during 2008-09 batch and onwards)

Course Number: 08CSEFE01

Number of Credits: 4

Subject Description:

This course presents the Information Entropy Fundamentals, Data and Voice Coding, error control coding and encryption coding techniques

Goal:

To enable the students to learn the fundamentals of information coding techniques

Objectives:

On successful completion of the course the students should have:

- Understood the Information Entropy Fundamentals.
- Learnt various coding techniques

UNIT I

INFORMATION ENTROPY FUNDAMENTALS: Introduction, Information and Uncertainty, what is 'information', information – properties, amount of information, entropy, Shannon's Theorem,

Entropy coding – Shannon Fano coding, Huffman coding

UNIT II

DATA AND VOICE CODING: arithmetic codes, voice coding, PCM, Delta modulation, adaptive delta modulation, linear predictive coding, differential PCM, coding speech at low bit rate, silence coding, sub-band coding

UNIT III

AUDIO AND VIDEO CODING: Introduction, Linear predictive coding principles, perpetual coding, MPEG Audio coder, MPEG video standards, MIDI

UNIT IV

ERROR CONTROL CODING: Introduction – rationale, types of codes, discrete memory less, examples, methods of error control, types of errors, Important term definitions; Linear block codes – Hamming codes, syndrome decoding, other linear block codes; cyclic codes, convolution coding

Number of Credits: 4

UNIT V

PRINCIPLES OF DATA COMPRESSION: Basic principles, lossless/lossy, entropy coding, source encoding, Compression of Test – Static Huffman coding, dynamic HC, Arithmetic coding, L-Z coding, Compression of Image – GIF, TIFF, Digitized documents, JPEG

REFERENCES:

- 1. J.S. Chitode "Information coding techniques" Technical Publications , Pune, Jan 2006.
- 2. Viterbi "Information Theory and Coding", Tata McGrawHill publications

Subject Title : ADVANCED COMPUTER ARCHITECTURE (CORE PAPER 2) (for the candidates admitted during 2008-09 batch and onwards)

Course Number: 07CSEFC02 Subject Description

This Course presents the Advanced Computer Architecture emphasizing parallel processing, solving problems in parallel and SIMD processors.

Goals : To enable the students to learn the parallel processing and SIMD arrays.

Objectives

On successful completion of the course the students should have:

- Understood the trends and principles of parallel processing in computers.
- Gained problem solving skills using parallel algorithms.

Contents

UNIT I

Introduction to parallel processing – Trends towards parallel processing – Parallelism in uniprocessor Systems – Parallel Computer structures – Architectural Classification schemes – Flynn' Classification – Feng's Classification – Handler's Classification – Parallel Processing Applications

UNIT II

Solving Problems in Parallel: Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison of Temporal and Data Parallel Processing – Data parallel processing with specialized Processor – Inter-task Dependency. Instructional Level Parallel Processing – Pipelining of Processing Elements – Delays in Pipeline Execution – Difficulties in Pipelining **UNIT III**

Principles Linear Pipelining – Classification of Pipeline Processors – General Pipeline and Reservation tables – Arithmetic Pipeline – Design Examples – Data Buffering and Busing structure – Internal forwarding and Register Tagging – Hazard Detection and Resolution – Job sequencing and Collision prevention – Vector processing requirements – Characteristics – Pipelined Vector Processing methods

UNIT IV

SIMD Array Processors – Organization – Masking and Data routing – Inter PE communications – SIMD Interconnection Networks – Static Vs Dynamic – Mesh connected Illiac – Cube interconnection network – Shuffle-Exchange and Omega networks - Multiprocessor Architecture and programming Functional structures – interconnection Networks.

UNIT V

Parallel Algorithms: Models of computation – Analysis of Parallel Algorithms Prefix Computation – Sorting – Searching – Matrix Operations.

REFERENCE BOOKS

- 1. Kai Hwang, Faye A. Briggs, "Computer Architecture and Parallel Processing" Mc Graw Hill Book Company, 1985.
- 2. V. Rajaraman, C. Siva Ram Murthy, "Parallel Computers Architectures and Programming", PHI, 2003.
- 3. Kai Hwang, "Advanced Computer Architecture –Parallelism, Scalability, Programmability", TataMcgraw Hill, 2001.
- 4. Michael J. Quinn, "Parallel Computing Theory and Practice", TMCH, Second Edition, 2002.

Barry Wilkinson, Micheal Allen, "Parallel Programming: Techniques and Applications", Prentice Hall, 1999.