TAMIL NADU GOVERNMENT GAZETTE

EXTRAORDINARY   PUBLISHED BY AUTHORITY

No. 41]   CHENNAI, WEDNESDAY, FEBRUARY 17, 2010
Maasi 5, Thiruvalluvar Aandu–2041

Part II—Section 2

Notifications or Orders of interest to a section of the public issued by Secretariat Departments.

NOTIFICATIONS BY GOVERNMENT

HIGHER EDUCATION DEPARTMENT

SYLLABUS FOR DIRECT RECRUITMENT OF LECTURERS
FOR GOVERNMENT ENGINEERING COLLEGES.

Secretariat, 17th February 2010.

No. II(2)/HE/111(a)/2010.

[Technical Education - Tamil Nadu Educational Service -Direct Recruitment of Lecturers in Government Engineering Colleges - Syllabi for four subjects - Approved.]

The following Government Order is published:—

[G.O. Ms. No. 30, Higher Education (I-1), 17th February 2010, Maasi 5, Thiruvalluvar Aandu-2041.]

READ:—

From the Chairman, Teachers Recruitment Board, Chennai-6 letter R.C. No. 2011/A6/2009, dated 15th December 2009.

ORDER:— **No. 30, Higher Education (I-1), 17th February 2010.**

The Government approve the Syllabi for four subjects appended to this order for Direct Recruitment of Lecturers in Government Engineering Colleges by Teacher's Recruitment Board, Chennai.

(By Order of the Governor)

K. GANESAN,
Principal Secretary to Government.

DTP—II-2 Ex. (41)—1

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Applied Electronics

DIGITAL SIGNAL PROCESSING & DIGITAL SYSTEM DESIGN:

Advanced DSP: Spectrum Estimation - Linear Estimation and Prediction - Adaptive Filters - Multirate Digital signal processing. Digital System Design: Analysis and Design of Sequential logic circuits - Sequential circuit design using Programmable devices - Fault Diagnosis and Testing. VLSI Design Techniques: MOS and CMOS system design - Subsystem Design. Embedded Systems: Embedded Hardware, Software, Peripherals and Interfacing - Analog ICs.

Digital Logic Gates – Integrated Circuits – Multilevel gate networks – NAND and NOR gates.

Multiple output network- Multiplexers - Decoders – Networks for addition and subtraction – Iterative networks – Combinational network design – Read Only Memories – Programmable Logic Devices.

Gate Delays and Timing Diagrams – Flip Flops – Analysis of Clocked Sequential Networks – State Reduction – Sequential Network Design – Code Converters- Shift Registers – Counters.

Generations of computer systems – Von Neumann Architecture – Instruction Codes: Stored program Organization – Computer Registers – Computer Instructions: Instruction formats and types – Instruction Cycle – Memory reference Instructions – Register reference instruction – Input – Output Instructions – Addressing Modes.

Fixed point arithmetic operations-Addition, subtraction, multiplication and division-Floating point arithmetic operations - Design of ALU-Bit Slice processor.

Micro programmed control unit, Basic concepts, instruction sequencing, instruction interpretation-Hard wired control.

Schemes for main memory, concept off virtual memory, paged and segmented memory systems, memory management - Cache and associative memories, basic concept of input/out-put-Programmed I/O-interrupts and DMA-I/0 processors.

Advanced architecture

Parallel processors-Pipeline processors-Multiprocessors.

Fundamentals of Computer Design - Measuring and Reporting Performance - Instruction Level Parallelism and Its Exploitation - Concepts and Challenges - Overcoming Data Hazards with Dynamic Scheduling – Dynamic Branch Prediction - Speculation - Multiple Issue Processors

Compiler Techniques for Exposing ILP - Limitations on ILP for Realizable Processors - Hardware versus Software Speculation - Multithreading: Using ILP Support to Exploit Thread-level Parallelism - Performance and Efficiency in Advanced Multiple Issue Processors.

Multiprocessors

Symmetric and distributed shared memory architectures – Cache coherence issues - Performance Issues – Synchronization issues – Models of Memory Consistency - Interconnection networks – Buses, crossbar and multi-stage switches.

Multi-core architectures

Software and hardware multithreading – SMT and CMP architectures – Design issues Intel Multi-core architecture – SUN CMP architecture – IBM cell architecture.- hp architecture.

Memory hierarchy design

Introduction - Optimizations of Cache Performance - Memory Technology and Optimizations - Protection: Virtual Memory and Virtual Machines - Design of Memory Hierarchies.

APPLIED ELECTRONICS:

DSP Architectures and Algorithms - Wavelet Transforms and Applications - Advanced Microcontrollers and Microprocessors - Parallel Computer Architectures – Application Specific Integrated Circuits - Embedded Networks - High Performance Communication Networks – Wireless Networks - Low Power VLSI - CAD of VLSI circuits – VLSI Testing.

Discriminant functions- Supervised learning - Parametric estimation-Maximum Likelihood estimation - Bayesian parameter estimation - Perceptron Algorithm-LMSE Algorithm-Prob-lems with Bayes Approach-Pattern classification by distance functions -minimum distance Pattern classifier.

Unsupervised classification

Clustering for unsupervised learning and classification ,clustering concepts C- means algorithm - hierarchical clustering - Graph theoretic approach to pattern clustering- Validity of clustering solutions.

Feature extraction and structural pattern recognition

KL Transforms - feature selection through functional approximation - Binary selection -Elements of formal grammars, syntactic description, Stochastic grammars, Structural representation.   .

AI Techniques

Search and control strategies - Uniformed search - Informed search - searching AND graphs- Matching techniques-Knowledge for recognition and classification process- visual image understanding - Expert system architectures.

Recent advances and image applications

Learning of neural pattern recognition - Fuzzy logic - Fuzzy pattern classifiers - image segmentation - Credit scoring - Techniques for colon endoscope - Target classification of Cancer cells.

Fundamentals of image processing

Introduction – Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Color Fundamentals and Models, File Formats, Image operations – Arithmetic, Geometric and Morphological.

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain : Filtering in Frequency Domain – DFT, FFT, DCT – Smoothing and Sharpening filters – Homo morphic Filtering.

Image segmentation and feature analysis

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Threshold – Region Based Segmentation – Morphological Water Sheds – Motion Segmentation, Feature Analysis and Extraction.

Multi resolution analysis and compressions

Multi Resolution Analysis : Image Pyramids – Multi resolution expansion – Wavelet Transforms.

Image Compression : Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards.

Applications of image processing

Image Classification – Image Recognition – Image Understanding – Video Motion Analysis – Image Fusion – Steganography – Digital Compositing – Mosaics – Colour Image Processing.

Introduction to soft computing and neural networks

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

Genetic algorithms

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

Neural networks

Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks.

Fuzzy logic

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making

Neuro-fuzzy modeling

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control

ADVANCED MEMORY & HIGH SPEED SEMICONDUCTOR DEVICES:

High speed Semiconductor devices - Nano Science & Technology - CMOS imagers - Sensors - Compound Semiconductor devices - Low power, Low noise analog RF and Mixed signal ICs - Advanced Memory systems - Broad Band Technologies - Space Technology - Cloud Computing.

Production Engineering

MANUFACTURING PROCESSES: Mechanics of machining, single and multi-point cutting tools, tool geometry and materials, tool life and wear; principles of non-traditional machining processes. Basics of casting processes – basic and advanced welding processes - rapid prototyping processes- fundamentals of hot and cold working processes – special forming processes

MECHANICAL PROPERTIES AND TREATMENT OF MATERIALS: Plastic deformation in poly phase alloys - Strengthening mechanisms - Brittle and ductile fractures - fracture toughness – fatigue failure - fatigue strength and the S-N diagram - Creep mechanisms. Heat treatment of critical mechanical elements - case hardening - mechanical surface treatment and coating - modern materials and alloys.

DESIGN FOR MANUFACTURE: General design principles for manufacturability - strength and mechanical factors- process capability - feature and geometric tolerances - assembly limits -datum features - factors influencing form design - design features to facilitate machining and casting – design for assembly and environment - design for energy efficiency

FLEXIBLE MANUFACTURING SYSTEMS AND SUPPLY CHAIN MANAGEMENT: Definition of FMS- Types and configurations – concepts - Types of flexibility and performance measures. Supply chain - Logistics- concepts, definitions, approaches, factors affecting logistics- basic tasks of supply chain.

METROLOGY AND NON-DESTRUCTIVE TESTING: Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; Tool Maker's microscope - co-ordinate measuring machines - universal measuring machine - machine vision technology. Radiography – ultrasonic and acoustic emission techniques.

MAINTENANCE AND MONITORING: Maintenance objectives and functions – types of maintenance - Condition based maintenance system- Machine diagnostics – objectives - monitoring strategies - condition monitoring techniques – vibration monitoring instruments. Reliability function – failure rate – mean time between failures (MTBF) – mean time to failure (MTTF)

COMPUTER SIMULATION OF MANUFACTURING SYSTEMS: Design of simulation models of discrete systems - design of systems for production, and distribution. Knowledge acquisition for Expert system, features of Expert systems

Fluid power systems and Finite element analysis: Basics of finite element analysis - hydraulic and pneumatic systems – applications

TOOL DESIGN AND COMPOSITE MATERIALS: Metal cutting tools – single-point cutting tools – milling cutters – tooling materials - design of jigs and fixtures. Need for the composite materials - types of fiber and resin materials and their properties - types of composites - application of composite

PRODUCTION PLANNING AND CONTROL SYSTEMS: Aggregate production planning and Master Production Schedules – Material Requirements Planning (MRP) - capacity planning – shop floor control – inventory control – Manufacturing Resources Planning – Just in Time Production system – Lean production – Agile manufacturing - Business Process Re-engineering. Use of Control chart for defects -   p, np Chart – C Charts-Correlation - Regression - Multiple and Partial Correlation- Partial Regression.

ROBOTICS AND CIM: Fundamentals of robotics- classification- overview of drives, sensors, grippers and manipulators, selection of robots - applications. Computer integrated manufacturing - process planning techniques – CAPP – retrieval and generative system. Group technology - part families – parts description and coding – production flow analysis – cellular manufacturing.

TOTAL QUALITY MANAGEMENT: Quality, quality planning, quality control, quality assurance, quality management- Total quality management –International standard for quality systems -structure of ISO 9000 series quality system standards – implementation of ISO 9000 - quality costs- quality auditing

OPERATIONS RESEARCH: Use of conditional probability- Addition, Multiplication Theorems - Theorem of Total Probability- Random variables - Probability Density Function - Poisson, Normal and Binomial distributions - Basics of linear programming, simplex method, simple queuing models, PERT and CPM. Introduction to modern optimization techniques. Design of experiments- Factorial experiments - fractional replication - Taguchi methods - Use of orthogonal arrays.

LATEST IN AUTOMOTIVE AND AEROSPACE ENGINEERING: - launch of chandraayan –global warming - green house effect - ozone layer depletion - global recession - stock market - information technology and its societal effect – entrepreneurship – institutions for industrial funding – industrial growth in India - duties and responsibilities of various ministries of Indian Government – Indian Nobel laureate – CAD/CAM software packages – statistical process control packages -   Nano technology.