ANDHRA PRADESH

RECRUITMENT OF ASSISTANT PROFESSORS IN THE UNIVERSITY
SYLLABUS FOR THE SCREENING TEST

DESIGN TECHNOLOGIES
SUBJECT CODE – 72

UNIT 1:

Programming, Advanced Data Structures& Algorithms

Programming in C& Java, Arrays, Stacks, Queues, Linked Lists, Trees, Binary Search Trees, Graphs, Searching, Sorting, Hashing., Asymptotic Worst Case Time and Space Complexity, Algorithm Design Techniques: Greedy, Dynamic Programming, and Divide-and-Conquer, Graph Traversals, Minimum Spanning Trees, Shortest Paths.

UNIT 2:

Data Base Management Systems

ER-Model, **Relational Model:** Relational Algebra, SQL, Integrity Constraints, Normal Forms, File Organization, Indexing (e.g., B and B+ Trees), Transactions and Concurrency Control.

UNIT 3:

Software Engineering

Software Process Models, Software Requirements: Functional and Non-Functional Requirements, Software Requirement and Specification (SRS) Document, Software Design: Abstraction, Architecture, Patterns, Modularity, Cohesion and Coupling, Software Quality Assurance, Risk Management, Risk Mitigation, Monitoring and Management (RMMM), Estimation and Scheduling of Software Projects:Constructive Cost Model (COCOMO), Software Testing, Software Configuration Management.

UNIT 4:

Artificial Intelligence

Approachesto AI: State space representations of problems, Heuristic Search Techniques, Game Playing, Min-Max Search, Alpha Beta cutoff Procedures, Agents and objects; Agents

& Expert Systems, Generic Structure of Multiagent System, Semantic web, Agent communication. **Fuzzy Sets:** Notion of Fuzziness, Membership functions, Fuzzification and defuzzification, operations on fuzzy sets, fuzzy functions and linguistic variables, fuzzy relations, Fuzzy rules and Fuzzy inference, Fuzzy rule based Systems.**Natural Language Processing:** Grammar and Language, Parsing Techniques, Semantic Analysis and Pragmatics

UNIT 5:

Machine learning: Supervised, Unsupervised learning, Logistic regression, perceptron, support vector machines, Bayes and Naive Bayes classification, Nearest Neighbor classifier, decision trees, Ensemble Methods, Clustering – K-means, DBSCAN, BIRCH, Density based Clustering, Artificial Neural Networks.

UNIT 6:

Climatology and Materials & Constructions

Passive methods of Cooling, roof pond desiccant cooling evaporative Cooling, and earth sheltered buildings etc. Site Planning (including landscaping) and building planning and design considering climate factors Detailed appraisal/analysis of climatological performance of an existing residence and or a workplace; followed by redesigning or the same to improve climatological performance. Properties and characteristics of Binding materials – Gypsum: properties of gypsum plaster, building products made of gypsum and their uses. Lime: Manufacture of lime, classifications of limes, properties of lime- putty-characteristics and usage Cement: Raw materials used, Process of Manufacturing, Chemical composition, Bogues Compounds - Types of cement, Tests on cement – Uses of cement.

UNIT 7:

Design and Drawing I & II

Principles of design in 2-D and 3-D -unity, balance, symmetry proportion, scale, hierarchy, rhythm, contrast, harmony, focus, etc. use of grids creating repetitive patterns. Principles of composition-using grids, symmetrical/asymmetrical, rule of thirds, center interested. Assignment: to compose patterns using grids and to incorporate the principles. Color theory, color wheel Characteristics of perspective drawings: perspective so simple geometric solids and spaces and complex geometries. Advanced examples in one point or parallel perspective, two point or angular perspective, introduction to three point perspective.

UNIT 8:

Building Byelaws

Concept to flaw source of law (i.e. custom, legislation, precedents) separation of powers judiciary, legislation and executives.Meaning of terms of law, legislation, ordinance, bill, act, regulations and bye laws.Brief introduction to legislation process as per Indian constitution-division of subjects between center and states.Articles 19(1) (f), 19(5) and31.Provisions regarding land, property and planning components of state and central Government to enact town-planning acts.Case of ManikalChootalvs H.G. Makavana. Administrative law Delegation of powers principles of Natural justice, its bearing on planning laws. Model Town planning Act-Planning agencies at National, State and local levels, their functions and inter-relationships, Contents and preparation of development plans.

UNIT 9:

Multimedia Processing Techniques, Basic Tools: Text Editing and Word Processing Tools, Multimedia Authoring Tools: Types of Authoring Tools, Sound: The Power of Sound – Multimedia System Sounds, color- Image File formats, Video: Integrating Computers and Television – shooting and Editing Video.

UNIT 10:

Image Processing Spatial domain filtering, filtering in frequency domain- fourier transform-Discrete Fourier transform (DFT),Fast Fourier transform(FFT), convolution, correlation, sampling theorem and its applications. Color image processing, image compression- lossy and error free techniques, Image segmentation- boundry detection, region based segmentation.

UNIT 11:

Internet of Things

Fundamentals of IoT for communication- IoT Network Architecture and Design, simplified IoT Architecture Micro electro mechanical systems and its applications for IoT applications-sensors, Networks, connecting smart objects, communication criteria, challenges in OT security.