RAJASTHAN TECHNICAL UNIVERSITY, KOTA
Syllabus
III Year-VI Semester: B.Tech. Computer Science and Engineering

6CS3-01: Digital Image Processing

Credit: 2 **Max. Marks: 100(IA:30, ETE:70)**
2L+0T+0P **End Term Exam: 3 Hours**

SN	Contents	Hours
1	**Introduction:** Objective, scope and outcome of the course.	01
2	**Introduction to Image Processing:** Digital Image representation, Sampling & Quantization, Steps in image Processing, Image acquisition, color image representation.	04
3	**Image Transformation & Filtering:** Intensity transform functions, histogram processing, Spatial filtering, Fourier transforms and its properties, frequency domain filters, colour models, Pseudo colouring, colour transforms, Basics of Wavelet Transforms.	06
4	**Image Restoration:** Image degradation and restoration process, Noise Models, Noise Filters, degradation function, Inverse Filtering, Homomorphism Filtering.	07
5	**Image Compression:** Coding redundancy, Interpixel redundancy, Psychovisual redundancy, Huffman Coding, Arithmetic coding, Lossy compression techniques, JPEG Compression.	05
6	**Image Segmentation & Representation:** Point, Line and Edge Detection, Thresholding, Edge and Boundary linking, Hough transforms, Region Based Segmentation, Boundary representation, Boundary Descriptors.	05
	Total	28

RAJASTHAN TECHNICAL UNIVERSITY, KOTA
Syllabus
III Year-VI Semester: B.Tech. Computer Science and Engineering

6CS4-02:Machine Learning

Credit: 3   **Max. Marks: 100(IA:30, ETE:70)**
3L+0T+0P   **End Term Exam: 3 Hours**

SN	Contents	Hours
1	**Introduction:** Objective, scope and outcome of the course.	01
2	**Supervised learning algorithm:** Introduction, types of learning, application, Supervised learning: Linear Regression Model, Naive Bayes classifier Decision Tree, K nearest neighbor, Logistic Regression, Support Vector Machine, Random forest algorithm.	09
3	**Unsupervised learning algorithm:** Grouping unlabelled items using k-means clustering, Hierarchical Clustering, Probabilistic clustering, Association rule mining, Apriori Algorithm, f-p growth algorithm, Gaussian mixture model.	08
4	**Introduction to Statistical Learning Theory**, Feature extraction - Principal component analysis, Singular value decomposition. Feature selection – feature ranking and subset selection, filter, wrapper and embedded methods, Evaluating Machine Learning algorithms and Model Selection.	08
5	**Semi supervised learning, Reinforcement learning:** Markov decision process (MDP), Bellman equations, policy evaluation using Monte Carlo, Policy iteration and Value iteration, Q-Learning, State-Action-Reward-State-Action (SARSA), Model-based Reinforcement Learning.	08
6	**Recommended system,** Collaborative filtering, Content-based filtering Artificial neural network, Perceptron, Multilayer network, Back propagation, Introduction to Deep learning.	08
	Total	42

RAJASTHAN TECHNICAL UNIVERSITY, KOTA
Syllabus
III Year-VI Semester: B.Tech. Computer Science and Engineering

6CS4-03: Information Security System

Credit:2   **Max. Marks: 100(IA:30, ETE:70)**
2L+0T+0P   **End Term Exam: 3 Hours**

SN	Contents	Hours
1	**Introduction:** Objective, scope and outcome of the course.	01
2	**Introduction to security attacks:** services and mechanism, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stream and block ciphers.	06
3	**Modern block ciphers**: Block Cipher structure, Data Encryption standard (DES) with example, strength of DES, Design principles of block cipher, AES with structure, its transformation functions, key expansion, example and implementation. Multiple encryption and triple DES, Electronic Code Book, Cipher Block Chaining Mode, Cipher Feedback mode, Output Feedback mode, Counter mode.	06
4	**Public Key Cryptosystems with Applications:** Requirements and Cryptanalysis, RSA cryptosystem, Rabin cryptosystem, Elgamal cryptosystem, Elliptic curve cryptosystem.	06
5	**Cryptographic Hash Functions, their applications:** Simple hash functions, its requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA). Message Authentication Codes, its requirements and security, MACs based on Hash Functions, Macs based on Block Ciphers. Digital Signature, its properties, requirements and security, various digital signature schemes (Elgamal and Schnorr), NIST digital Signature algorithm.	05
6	**Key management and distribution:** symmetric key distribution using symmetric and asymmetric encryptions, distribution of public keys, X.509 certificates, Public key infrastructure. Remote user authentication with symmetric and asymmetric encryption, Kerberos. Web Security threats and approaches, SSL architecture and protocol, Transport layer security, HTTPS and SSH.	04
	Total	28

RAJASTHAN TECHNICAL UNIVERSITY, KOTA
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III Year-VI Semester: B.Tech. Computer Science and Engineering

6CS4-04: Computer Architecture and Organization

Credit: 3   **Max. Marks: 100(IA:30, ETE:70)**
3L+0T+0P   **End Term Exam: 3 Hours**

SN	Contents	Hours
1	**Introduction:** Objective, scope and outcome of the course.	01
2	**Computer Data Representation:** Basic computer data types, Complements, Fixed point representation, Register Transfer and Micro-operations: Floating point representation, Register Transfer language, Register Transfer, Bus and Memory Transfers (Tree-State Bus Buffers, Memory Transfer), Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logical shift unit. Basic Computer Organization and Design Instruction codes, Computer registers, computer instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-output and interrupt, Complete computer description, Design of Basic computer, design of Accumulator Unit.	10
3	**Programming The Basic Computer:** Introduction, Machine Language, Assembly Language, assembler, Program loops, Programming Arithmetic and logic operations, subroutines, I-O Programming. Micro programmed Control: Control Memory, Address sequencing, Micro program Example, design of control Unit.	7
4	**Central Processing Unit:** Introduction, General Register Organization, Stack Organization, Instruction format, Addressing Modes, data transfer and manipulation, Program Control, Reduced Instruction Set Computer (RISC)Pipeline And Vector Processing, Flynn's taxonomy, Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction, Pipeline, RISC Pipeline, Vector Processing, Array Processors.	8
5	**Computer Arithmetic:** Introduction, Addition and subtraction, Multiplication Algorithms (Booth Multiplication Algorithm), Division Algorithms, Floating Point Arithmetic operations, Decimal Arithmetic Unit. Input-Output Organization, Input-Output Interface, Asynchronous Data Transfer, Modes Of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPUIOP Communication, Serial communication.	8
6	**Memory Organization:** Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory. Multipreocessors: Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-processor Communication and Synchronization, Cache Coherence, Shared Memory Multiprocessors.	8
	Total	42

RAJASTHAN TECHNICAL UNIVERSITY, KOTA
Syllabus
III Year-VI Semester: B.Tech. Computer Science and Engineering

6CS4-05: Artificial Intelligence

Credit: 2   Max. Marks: 100(IA:30, ETE:70)
2L+0T+0P   End Term Exam: 3 Hours

SN	Contents	Hours
1	**Introduction:** Objective, scope and outcome of the course.	01
2	**Introduction to AI and Intelligent agent:** Different Approach of AI, Problem Solving : Solving Problems by Searching, Uninformed search, BFS, DFS, Iterative deepening, Bi directional search, Hill climbing, Informed search techniques: heuristic, Greedy search, A* search, AO* search, constraint satisfaction problems.	03
3	**Game Playing:** Minimax, alpha-beta pruning, jug problem, chess problem, tiles problem.	06
4	**Knowledge and Reasoning:** Building a Knowledge Base: Propositional logic, first order logic, situation calculus. Theorem Proving in First Order Logic. Planning, partial order planning. Uncertain Knowledge and Reasoning, Probabilities, Bayesian Networks.	06
5	**Learning:** Overview of different forms of learning, Supervised base learning: Learning Decision Trees, SVM, Unsupervised based learning, Market Basket Analysis, Neural Networks.	07
6	**Introduction to Natural Language Processing:** Different issue involved in NLP, Expert System, Robotics.	05
	Total	28

RAJASTHAN TECHNICAL UNIVERSITY, KOTA
Syllabus
III Year-VI Semester: B.Tech. Computer Science and Engineering

6CS4-06: Cloud Computing

Credit: 3   Max. Marks: 100(IA:30, ETE:70)

3L+0T+0P   End Term Exam: 3 Hours

SN	Contents	Hours
1	**Introduction:** Objective, scope and outcome of the course.	01
2	**Introduction:** Objective, scope and outcome of the course. Introduction Cloud Computing: Nutshell of cloud computing, Enabling Technology, Historical development, Vision, feature Characteristics and components of Cloud Computing. Challenges, Risks and Approaches of Migration into Cloud. Ethical Issue in Cloud Computing, Evaluating the Cloud's Business Impact and economics, Future of the cloud. Networking Support for Cloud Computing. Ubiquitous Cloud and the Internet of Things.	06
3	**Cloud Computing Architecture:** Cloud Reference Model, Layer and Types of Clouds, Services models, Data centre Design and interconnection Network, Architectural design of Compute and Storage Clouds. Cloud Programming and Software: Fractures of cloud programming, Parallel and distributed programming paradigms-Map Reduce, Hadoop, High level Language for Cloud. Programming of Google App engine.	10
4	**Virtualization Technology:** Definition, Understanding and Benefits of Virtualization. Implementation Level of Virtualization, Virtualization Structure/Tools and Mechanisms, Hypervisor VMware, KVM, Xen. Virtualization: of CPU, Memory, I/O Devices, Virtual Cluster and Resources Management, Virtualization of Server, Desktop, Network, and Virtualization of data-centre.	10
5	**Securing the Cloud:** Cloud Information security fundamentals, Cloud security services, Design principles, Policy Implementation, Cloud Computing Security Challenges, Cloud Computing Security Architecture . Legal issues in cloud Computing. Data Security in Cloud: Business Continuity and Disaster Recovery , Risk Mitigation , Understanding and Identification of Threats in Cloud, SLA-Service Level Agreements, Trust Management.	08
6	**Cloud Platforms in Industry:** Amazon web services , Google AppEngine, Microsoft Azure Design, Aneka: Cloud Application Platform -Integration of Private and Public Clouds Cloud applications: Protein structure prediction, Data Analysis, Satellite Image Processing, CRM	07
	Total	42

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RAJASTHAN TECHNICAL UNIVERSITY, KOTA
Syllabus
III Year-VI Semester: B.Tech. Computer Science and Engineering

6CS5-13: Ecommerce & ERP

Credit: 2
2L+0T+0P

Max. Marks: 100(IA:30, ETE:70)
End Term Exam: 3 Hours

SN	Contents	Hours
1	**Introduction:** Objective, scope and outcome of the course.	01
2	**Introduction to E-Commerce:** Defining Commerce; Main Activities of Electronic Commerce; Benefits of E-Commerce; Broad Goals of Electronic Commerce; Main Components of E-Commerce; Functions of Electronic Commerce – Communication, Process Management, Service Management, Transaction Capabilities; Process of E-Commerce; Types of E-Commerce; Role of Internet and Web in E-Commerce; Technologies Used; E-Commerce Systems; Pre-requisites of E-Commerce; Scope of E-Commerce; E-Business Models.	03
3	**E-Commerce Activities:** Various Activities of E-Commerce; Various Modes of Operation Associated with E-Commerce; Matrix of E-Commerce Types; Elements and Resources Impacting E-Commerce and Changes; Types of E-Commerce Providers and Vendors; Man Power Associated with E-Commerce Activities; Opportunity Development for E-Commerce Stages; Development of E-Commerce Business Case; Components and Factors for the Development of the Business Case; Steps to Design and Develop an E-Commerce Website.	05
4	**Internet – The Backbone for E-Commerce:** Early Ages of Internet; Networking Categories; Characteristics of Internet; Components of Internet – Internet Services, Elements of Internet, Uniform Resource Locators, Internet Protocol; Shopping Cart, Cookies and E-Commerce; Web Site Communication; Strategic Capabilities of Internet.	07
5	**ISP, WWW and Portals:** Internet Service Provider (ISP); World Wide Web (WWW); Portals – Steps to build homepage, Metadata; Advantages of Portal; Enterprise Information Portal (EIP).**E-Commerce & Online Publishing:** This unit explains the concept of online publishing, strategies and approaches of online publishing, and online advertising.	07
6	**XML and Data Warehousing:** Definition of eXtensible Markup Language (XML); XML Development Goals; Comparison between HTML and XML; Business importance in using XML Based Technology; Advantages, Disadvantages and Applications of XML; Structure of an XML Document; XHTML and X/Secure; Data Warehousing; Data Marts and Operational Data Stores. **E-Marketing:** Traditional Marketing; E-Marketing; Identifying Web Presence Goals – Achieving web presence goals, Uniqueness of the web, Meeting the needs of website visitors, Site Adhesion: Content, format and access; Maintaining a Website; Metrics Defining Internet Units of Measurement; Online Marketing; Advantages of Online Marketing.	05
		28

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