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| Module | Contents | Hours Allotted | % of marks in  End  -  Semester  Examination |
| I | Introduction - World Wide Web - Web Data Mining - Data Mining - Web Mining - Data Mining Foundations - Basic Concepts of Association Rules Apriori Algorithm - Data Formats for Association Rule Mining - Basic  Concepts of Sequential Patterns - Mining Sequential Patterns based on  Generalised Sequential Pattern (GSP) Algorithm Text : 1 | 8 | 15 |
| II | Supervised Learning - Basic Concepts - Decision Tree Induction - Classifier Evaluation - Rule Induction - Classification based on Associations - Support Vector Machines - Linear SVM - Separable Case -Non Separable Case -  Unsupervised Learning - Basic Concepts - K-Means Clustering -  Representation of Clusters - Hierarchical Clustering Text : 1 | 12 | 25 |
|  | FIRST INTERNAL EXAM |  |  |
| III | Information Retrieval and Web Search - Basic Concepts of IR - IR Models Boolean Model, Vector model, Statistical Language Model - Evaluation Measures Text : 1 | 8 | 15 |
| IV | Text and Web Page Pre-Processing - Stopword Removal, Stemming, Other Pre-Processing Tasks for Text, Web Page Pre-Processing, Duplicate  Detection - Inverted Index and its Compression - Latent Semantic Indexing  Text : 1 | 8 | 15 |
| V | WebSearch - Metasearch: Combining Multiple Rankings - Web Spamming -  Web Crawling - A Basic Crawler Algorithm - Implementation Issues  Text : 1 | 8 | 15 |
|  | SECOND INTERNAL EXAM |  |  |
| VI | Web Usage Mining - Data Collection and Preprocessing - Data Modelling for Web Users Mining - Discovery and Analysis of Web Usage Patterns Recommender Systems and Collaborative Filtering  Text : 1 | 8 | 15 |
|  | END SEMESTER EXAM |  |  |

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|  | Course Plan |  |  |
| Module | Contents | Hours Allotted | % of    marks in  End  -  Semester  Examination |
| I | Introduction to e-Commerce- e-Commerce v/s e-Business, Types of  E-Commerce, E-commerce Infrastructure  Text : 1 | 6 | 15 |
| II | Business Models and Concepts - B2C, B2B, C2C, C2B -Brokerage Model, Aggregator Model, Info-mediary Model, Community Model, Value Chain Model, Manufacturer Model, Advertising Model, Subscription Model,  Affiliate Model  Text: 2 | 10 | 20 |
|  | FIRST INTERNAL EXAM |  |  |
| III | E-Security: E-Commerce Security Environment, Security Threats,  Technology Solutions, SSL, Protecting Networks- Firewalls, Proxy-Servers  Text :1 | 8 | 15 |
| IV | E-Payment: Types of Payment Systems, Credit card E-Commerce  Transactions- How an Online Card Transaction works - Credit Card E-  Commerce Enablers - Limitations of Online Credit Card Payment Systems,  Secure Electronic Transaction Protocol  Text :1 | 8 | 15 |
| V | E-Commerce digital payment systems in B2C-Digital Wallets- Digital Cash  -Online stored Value Systems -Digital Credit Card Payment systems -  Digital Checking Payment systems - B2B Payment systems  Text :1 | 10 | 20 |
|  | SECOND INTERNAL EXAM |  |  |
| VI | E-Marketing: Basic Marketing Concepts, Internet Marketing Technologies, B2C and B2B-Commerce, Marketing and Branding  Strategies, Online Market Research  Text :1 | 8 | 15 |
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| Course Plan | | | |
| Module | Contents | Hours Allotted | % of marks in    End  -  Semester  Examination |
| I | Introduction to Cryptography: Services, Mechanisms and attacksPhishing, ransomware, DoS attack, OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography). | 8 | 15% |
| II | Mathematical Background: Elementary number theory: Prime numbers, Fermat’s and Euler’s theorems, Testing for primality, Modular Arithmetic: Congruences, Chinese remainder theorem.    Finite fields: Review of groups, rings and fields; Finite fields of the form GF(p), Polynomial Arithmetic, Finite fields of the form GF(2").Discrete logarithms Euclidean Algorithms. | 12 | 15% |
| FIRST INTERNAL EXAM | | | |
| III | Conventional Symmetric Key Encryption: Block ciphers and Stream Ciphers, Modes of operation (ECB, CBC, CFB, OFB), multiple encryption, Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES.    Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management – Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography. | 8 | 20% |
| IV | Hash Functions and MAC: Properties of hash functions, birthday attack, hash-cash, Message Authentication Code Algorithms, MAC protocols, HMAC, CBC-MAC.    Digital Signatures: Classification of signature schemes, RSA signature, Digital Signature Standard, one time signature schemes, attacks on Digital Signatures, Blind Signatures. | 8 | 15% |
| V | Cryptocurrencies and Bitcoins: A Simple Cryptocurrency: GoofyCoin, ScroogeCoin, How Bitcoin Achieves Decentralization: Centralization vs. Decentralization, Distributed consensus, Consensus without identity.    Mechanics of Bitcoin: Bitcoin transactions, Bitcoin Scripts, Applications of Bitcoin scripts, Bitcoin blocks, The Bitcoin network, How to Store and Use Bitcoins: Simple Local Storage, Hot and Cold Storage, Splitting and | 8 | 15% |

Sharing Keys, Online Wallets and Exchanges, Payment Services,

Transaction Fees, Currency Exchange Markets

SECOND INTERNAL EXAM

Introduction to Cyber Security, E-mail Security: Security Services for Email-attacks possible through E-mail – establishing keys privacyauthentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME.

VI 10 20%

IPSecurity: Overview of IPSec – IPv4 and IPv6-Authentication HeaderEncapsulation Security Payload (ESP)-Internet Key Exchange. Web Security: SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSL Attacks fixed in v3- ExportabilityEncoding-Secure Electronic Transaction (SET).

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|  | Course Plan |  |  |
| Module | Contents | Hours Allotted | % of marks in  End  -  Semester  Examination |
| I | Defining Cloud Computing - Cloud Types- Characteristics of Cloud Computing - Open Standards - Value of Cloud for Enterprises Understanding Cloud Architectures - Understanding Services and  Applications by Type - IaaS vs. PaaS vs. SaaS | 8 | 15 |
| II | Virtualization Technologies - Load Balancing and VirtualizationHypervisors - Machine Imaging - Porting Applications- Capacity Planning Baselines and Metrics - Network Capacity - Scaling - Exploring Platform as a Service - Using Google Web Services | 8 | 15 |
|  | FIRST INTERNAL EXAM |  |  |
| III | Using the prominent cloud services - Google Cloud Services - Amazon Web Services - Microsoft Cloud Services - Google Cloud Services -  Demonstration/Tutorial on exploring cloud services on either Amazon/Azure/Google Cloud platform | 8 | 15 |
| IV | Managing the Cloud - Cloud Management Products - Industry Standards - Understanding Cloud Security - Securing the Cloud - Establishing Identity and Presence | 8 | 20 |
| V | Understanding Service Oriented Architecture - Moving Applications to the Cloud - Working with Cloud-Based Storage - Working with Productivity Software - Using Webmail Services - Communicating with the Cloud - Using Media and Streaming | 10 | 20 |
|  | SECOND INTERNAL EXAM |  |  |
| VI | Working with Mobile Devices - Smartphones accessing cloud services -  Cloud Mobile Web Service - Service Types - Service Discovery Microservice architecture | 8 | 15 |
|  | END SEMESTER EXAM |  |  |