Syllabus

Web Data Mining

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		

E-Commerce

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
END SEMESTER EXAM			

Cryptography And Cyber Security

	Course Plan		
Module	Contents	Hours Allotted	% of marks in End-Semester Examination
I	**Introduction to Cryptography**: Services, Mechanisms and attacks-Phishing, 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%

MCA Regular syllabus – Semester 5 & 6

	Sharing Keys, Online Wallets and Exchanges, Payment Services, Transaction Fees, Currency Exchange Markets		
	SECOND INTERNAL EXAM		
VI	**Introduction to Cyber Security, E-mail Security**: Security Services for E-mail-attacks possible through E-mail – establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. **IPSecurity**: Overview of IPSec – IPv4 and IPv6-Authentication Header-Encapsulation 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- Exportability-Encoding-Secure Electronic Transaction (SET).	10	20%

Python Programming

Course Plan

Module	Contents	Hours Allotted	% of marks in End-Semester Examination
I	Introduction to Python: Features of Python, How to Run Python, Identifiers, Reserved Keywords, Variables, Input, Output and Import Functions, Operators Data Types: Numbers, Strings, List, Tuple, Set, Dictionary, Data Type Conversions. Decision Making, Loops, Nested Loops, Control Statements, Types of Loops	8	15%
II	Function Definition, Function calling, Function arguments, Lambda Functions, Recursive Functions Modules & Packages: Creating Modules, import Statement, Locating Modules, Namespaces and Scope, Packages, Date and Time Modules. Exception Handling: Built-in Exceptions, Handling Exceptions, Exception with arguments, Raising an Exception, User-defined Exception, Assertions in Python.	9	15%
	FIRST INTERNAL EXAM		
III	File Handling, Object Oriented Programming: Class definition, Creating objects, Encapsulation, Data hiding, Inheritance, Method overriding, Polymorphism.	8	20%
IV	Regular expressions: Introduction, match() function, search() function, search and replace, regular expression modifiers, regular expression patterns, Character classes, special character classes, repetition cases, findall() method, compile() method. Database Programming: Connecting to a database, Creating Tables, INSERT, UPDATE, DELETE and READ operations, Transaction Control, Disconnecting from a database, Exception Handling in Databases	9	20%
V	GUI Programming: Tkinter introduction, Tkinter and Python Programming, Tk Widgets, Tkinter examples Web Development: Python Web clients tools, Web Clients, Web Servers, Web Services.	8	15%
	SECOND INTERNAL EXAM		

MCA Regular syllabus – Semester 5 & 6

Module	Contents	Hours Allotted	% of marks in End-Semester Examination
VI	Web Frameworks : Introduction to Django, Projects and Apps in Django, The Python Application Shell, The Django Administration App, Creating an App using Django. Introduction to SciPy (https://www.scipy.org), NumPy (http://www.numpy.org), matplotlib (https://matplotlib.org). A micro project/programming assignment should be given as part of the course. Assignments may be given in machine learning using resources available at scikit-learn.org.	9	15%

Cloud Computing

	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 Virtualization- Hypervisors - 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		

Date	Subject	Module
24 Dec	Web Data Mining	1
26 Dec	Ecommerce	1
27 Dec	Cryptography	1
28 Dec	Python Programming	1
29 Dec	Cloud Computing	1
30 Dec	Web Data Mining	3
31 Dec	Ecommerce	2
1 Jan	Cryptography	2 - Half
2 Jan	Python Programming	2
3 Jan	Cloud Computing	2 - Half
4 Jan	Web Data Mining	4
5 Jan	Ecommerce	3
6 Jan	Cryptography	2 - Balance
7 Jan	Python Programming	3
8 Jan	Cloud Computing	2 - Balance
9 Jan	Web Data Mining	5
10 Jan	Ecommerce	4
11 Jan	Cryptography	3 - Half
12 Jan	Python Programming	4 - Half
13 Jan	Cloud Computing	3 - Half
14 Jan	Web Data Mining	6 - Half
15 Jan	Ecommerce	5
16 Jan	Cryptography	3 - Balance
17 Jan	Python Programming	4 - Balance
18 Jan	Cloud Computing	3 - Balance

Subject	Modules Covered	Balance
Web Data Mining	1,3,4,5,6-Half	6-Balance,2
E-Commerce	1,2,3,4,5	6
Cryptography	1,2,3	4,5,6
Python programming	1,2,3,4	5,6
Cloud Computing	1,2,3	4,5,6