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CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
B.Sc. Three-Year Degree Course (Semester Wise)
Syllabus for III Year – V Semester.
COMPUTER SCIENCE.
Paper-V: DATA BASE MANAGEMENT SYSTEM.

No. of hours per week: 03 **Max Marks: 60.**

UNIT - I

Overview of Database Management System: Introduction, file-based system, Drawbacks of file-Based System, Data and information, Database, Database management System, Objectives of DBMS, Evaluation of Database management System, Classification of Database Management System, DBMS Approach, advantages of DBMS, Anis/spark Data Model, data models, Components and Interfaces of Database Management System. Database Architecture, Situations where DBMS is not Necessary, DBMS Vendors and Their Products.

UNIT- II

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, **IS A** relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, aggregation and composition, entity clusters, connection types, advantages of ER modeling.

UNIT - III

Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC). QBE, Normalization:1NF, 2NF, 3NF, BCNF.

UNIT - IV

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Table Truncation, Imposition of Constraints, Join Operation, Set Operation, View, Sub Query, Embedded SQL.

UNIT - V

PL/SQL: Introduction, Shortcoming in SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Cursors, Steps to create a Cursors, Procedure, Function, Packages, Exceptions Handling, Database Triggers, Types of Triggers.

Reference Books

1. "Database System Concepts" by Abraham Silberschatz, Henry Korth, and S.Sudarshan, McGrawhill, 2010, 9780073523323
2. "Database Management Systems" by Raghu Ramakrishnan, McGrawhill, 2002,
3. "Fundamentals of Database Systems" by R. Elmasri and S. Navathe

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Syllabus for III Year – V Semester.

COMPUTER SCIENCE.

Paper-VI: SOFTWARE ENGINEERING.

No. of hours per week: 03 **Max Marks: 60.**

UNIT - I

Introduction: Software - Characteristics, Myths, Software Engineering: A Layered Technology - Project management - Process and Project Metrics – software estimation - Empirical estimation models - Planning - Risk analysis - Software project scheduling.

UNIT - II

Requirements Analysis: Requirement Engineering Processes – Feasibility Study – Problem of Requirements – Software Requirement Analysis – Analysis Concepts and Principles – Analysis Process – Analysis Model

UNIT - III

Software Design: Software design - Abstraction - Modularity - Software Architecture - Effective modular design - Cohesion and Coupling - Architectural design and Procedural design - Data flow oriented design.

UNIT - IV

User Interface Design And Real Time System: User interface design - Human factors - Human computer interaction - Human - Computer Interface design - Interface design - Interface standards.

UNIT - V

Software Quality and Testing: Software Quality Assurance - Quality metrics - Software Reliability - Software testing - Path testing – Control Structures testing - Black Box testing - Integration, Validation and system testing - Reverse Engineering and Re-engineering.
CASE tools –projects management, tools - analysis and design tools – programming tools - integration and testing tool - Case studies.

Reference Books

1. Roger Pressman S., "Software Engineering: A Practitioner's Approach", 5th& 7th Edition, McGraw Hill, 2010.
2. "Software Engineering Principles and Practice" by Deepak Jain Oxford University Press
3. Sommerville, "Software Engineering", Eighth Edition, Pearson Education, 2007

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Syllabus for III Year – VI Semester.
COMPUTER SCIENCE.
Paper-VII: WEB TECHNOLOGIES.

No. of hours per week: 03 **Max Marks: 60.**

UNIT - I
HTML: Basic HTML, Document body, Text, Hyperlinks, adding more formatting, Lists, Tables using images. More HTML: Multimedia objects, Frames, Forms towards interactive, HTML document heading.

UNIT – II
Cascading Style Sheets: Introduction, using Styles, simple examples, Types of CSS: inline, internal, external, fonts: family, size, padding, border, your own styles, properties and values in styles.

UNIT – III
Introduction to JavaScript: What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Objects in JavaScript: Data and objects in JavaScript, regular expressions, exception handling.

UNIT – IV
Ajax: Introduction, advantages & disadvantages, Purpose, Ajax based web application, alternative of Ajax. Introduction to JSP: The problem of servlet,Anatomy of a JSP , JSP Processing.

UNIT – V
XML: defining data for web applications, basic XML, document type definition, presenting XML, document object model, Web Services.

Reference Books
1. Uttam Kumar Roy, Web Technologies, Oxford University Press.
2. Black Book HTML 5.0
3. Complete reference HTML 5.0
4. Web Technology, PHI Publications.
5.Professional Ajax, 2nd Edition. Nicholas C. Zakas, Jeremy, Joe Fawcett,
6.Ajax: The Complete Reference 1st Edition. Thomas A. Powell

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Syllabus for III Year – VI Semester.

COMPUTER SCIENCE.

(Cluster)Paper-VIII: Elective-1: FOUNDATION FOR DATA SCIENCE.

No. of hours per week: 03 **Max Marks: 60.**

UNIT - I

Introduction to Data Science: Data science process – roles, stages in data science project – working with data from files – working with relational databases – exploring data – managing data – cleaning and sampling for modeling and validation – introduction to NoSQL. Handling Relational Data Base.

UNIT - II

Modeling Methods: Choosing and evaluating models – mapping problems to machine learning, evaluating clustering models, validating models – cluster analysis – K-means algorithm, Naïve Bayes – Memorization Methods – Linear and logistic regression – unsupervised methods.

UNIT - III

Introduction to R: Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames – reading data from files – probability distributions – Writing your own functions, statistical models in R - manipulating objects – data distribution.

UNIT - IV

Map Reduce: Introduction – distributed file system – algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce – Hadoop - Understanding the Map Reduce architecture - Writing Hadoop Map Reduce Programs - Loading data into HDFS - Executing the Map phase - Shuffling and sorting - Reducing phase execution.

UNIT - V

Delivering Results: Documentation and deployment – producing effective presentations– Introduction to graphical analysis – plot() function – displaying multivariate data – matrix plots – multiple plots in one window - exporting graph - using graphics parameters. Case studies.

Reference Books

1. Nina Zumel, John Mount, “Practical Data Science with R”, Manning Publications, 2014.
2. Jure Leskovec, AnandRajaraman, Jeffrey D.Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2014.
3. Mark Gardener, “Beginning R - The Statistical Programming Language”, John Wiley & Sons, Inc., 2012.
4. W. N. Venables, D. M. Smith and the R Core Team, “An Introduction to R”, 2013.

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COMPUTER SCIENCE.

(Cluster)Paper-VIII: Elective-2: BIG DATA TECHNOLOGY.

No. of hours per week: 03 **Max Marks: 60.**

UNIT - I

Introduction to Big Data: Introduction – distributed file system – Big Data and its importance,Big data challenges- Four V‟s in bigdata, Drivers for Big data, Big data analytics, Big data applications.

UNIT - II

Introduction to Hadoop: Big Data – Apache Hadoop&HadoopEcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

UNIT- III

Hadoop Architecture: Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read, NameNode, Secondary NameNode, and DataNode, Map and Reduce tasks, Job, Tasktrackers - Cluster Setup – SSH &Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

UNIT-IV

Hadoop Ecosystem and Yarn: Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New Features- NameNode High Availability, HDFS Federation, MRv2, YARN-Running MRv1 in YARN.

UNIT-V

Hive and HiveQL, Hbase: Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins &Subqueries, HBase concepts- Advanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper-Zookeeper Architecture - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

Reference Books

1. “Big Data” Black Book DT Editional Services Dreamtech.
2.Borislublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.
3. Chris Eaton, Dirk deroos et al. , “Understanding Big data ”, McGraw Hill, 2012.
4. Tom White, “HADOOP: The definitive Guide” , O Reilly 2012.
5. VigneshPrajapati, “Big Data Analytics with R and Hadoop”, Packet Publishing 2013.

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COMPUTER SCIENCE.

(Cluster)Paper-VIII: Elective-3: COMPUTING FOR DATA ANALYTICS.

No. of hours per week: 03 **Max Marks: 60.**

UNIT – I

Data Analytics Life Cycle:Introduction to Big data Business Analytics - State of the practice in analytics role of data scientists - Key roles for successful analytic project - Main phases of life cycle - Developing core deliverables for stakeholders.

UNIT – II

Statistics Sampling Techniques : Data classification, Tabulation, Frequency and Graphic representation - Measures of central value - Arithmetic mean, Geometric mean, Harmonic mean, Mode, Median, Quartiles, Deciles, Percentile - Measures of variation – Range, IQR, Quartile deviation, Mean deviation, standard deviation, coefficient variance, skewness.

UNIT – III

Probability and Hypothesis Testing: Random variable, distributions, two dimensional R.V, joint probability function, marginal density function. Random vectors - Some special probability distribution - Binomial, Poison, Geometric, uniform, exponential, normal, gamma and Erlang. Moments of Binomial, Poison & Normal distribution, - Sampling distribution – Estimation - point,

UNIT – IV

Predictive Analytics: Predictive modeling and Analysis - Regression Analysis:Linear, Non Linear Regression, Lines of Regression, Multicollinearity, Correlation analysis, Rank correlation coefficient, Multiple correlation, Least square, Curve fitting and goodness of fit.

UNIT – V

Time Series Forecasting and Design of Experiments: Forecasting Models for Time series : MA, SES, TS with trend, season - Design of Experiments, one way classification, two way classification, ANOVA, Latin square, Factorial Design.

Reference Books

1. Alberto Cordoba, “Understanding the Predictive Analytics Lifecycle”, Wiley, 2014.
2. Eric Siegel, Thomas H. Davenport , “Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die”, Wiley, 2013.
3. James R Evans, “Business Analytics – Methods, Models and Decisions”, Pearson 2013.
4. R. N. Prasad, SeemaAcharya, “Fundamentals of Business Analytics”, Wiley, 2015.

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DATA SCIENCE.

Paper- V: BIG DATA TECHNOLOGY.

No. of hours per week: 03 **Max Marks: 60.**

UNIT I

Introduction to Big Data: Introduction – distributed file system – Big Data and its importance, Big Data Challenges, Four V‟s in big data, Drivers for Big data, Big data analytics, Big data applications.

UNIT II

Introduction to Map Reduce: Map reduce- Architecture, Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce – Understanding inputs and outputs of Map Reduce - Data Serialization.

UNIT- III

Hadoop Architecture: Apache Hadoop & Hadoop Eco System ,Hadoop Architecture, Moving Data in and out of Hadoop , Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., Name Node, Secondary Name Node, and Data Node, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH &Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

UNIT-IV

YARN : Schedulers - Fair and Capacity, Hadoop 2.0 New Features- Name Node High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.

UNIT-V

Hive and HiveQL, Hbase: Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Joins & Sub queries, HBase concepts- Advanced Usage, Schema Design, Advance Indexing – Introduction to PIG, Sqoop, Flume,Oozie, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

Reference Books

1. Boris lublinsky, Kevin t. Smith Alexey Yakubovich, “Professional HadoopSolutions”.

Wiley, ISBN: 9788126551071, 2015.

2. Chris Eaton, Dirk Deroos et al., “Understanding Big Data”, McGraw Hill ,201

3. Tom White, “HADOOP”: The definitive Guide”, O Reilly2012.

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DATA SCIENCE.

Paper- VI: BIG DATA ACQUISITION

No. of hours per week: 03 **Max Marks: 60.**

UNIT- I

Introduction to Big Data Acquisition: Big data framework – fundamental concepts of Big Data Management and analytics – Current challenges and trends in Big Data Acquisition.

UNIT-II

Data Collection and Transmission: Bid data collection – Strategies – Types of Data Sources – Structured Vs Unstructured data – ELT vs ETL – storage infrastructure requirements – Collection methods – Log files – sensors – Methods for acquiring network data (Libcap-based and zero-copy packet capture technology) – Specialized network monitoring software's (Wireshark, Smartsniff and Winnetcap) – Mobile equipments – Transmissionmethods-Issues.

UNIT- III

Data Pre-processing: Data pre-processing overview-Sampling- Missing Values – Outlier Detection and Treatment – Standardizing Data – Categorization – Weights of Evidence Coding – Variable Selection and Segmentation.

Unit-IV

Data Analytics: Predictive Analytics (Regression, Decision Tree, Neural Networks) – Descriptive Analytics (Association Rules, Sequence Rules), Survival Analysis (Survival Analysis Measurements, Kaplan Meir Analysis, Parametric Survival Analysis) – Social Network Analytics (Social Network Learning – Relational Neighbour Classification).

UNIT-V

Big Data Privacy and Applications: Data Masking – Privately identified Information (PII) – Privacy preservation in Big Data – Popular Big Data Techniques and tools - Map Reduce paradigm and the Hadoop system – Applications – Social Media Analytics – Recommender Systems – Fraud Detection.

Reference Books

1. BartBaesens,"AnalyticsinaBigDataWorld:TheEssentialGuidetoDataScienceand its Applications', John Wiley & Sons, 2014.
2. Min Chen. Shiwen Mao, Yin Zhang. Victor CM Leung, Big Data: Related Technologies, Challenges and Future Prospects, Springer, 2014.
3. Michael Minelli, Global.Michele Chambers AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends", John Wiley & Sons,2013.
4. Raj.Pethuru"HandbookofResearchonCloudInfrastructuresforBigDataAnalytics".

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DATA SCIENCE.
ELECTIVE II (CLUSTER-B)
Paper-VII PYTHON PROGRAMMING FOR DATA ANALYTICS

No. of hours per week: 03 **Max Marks: 60.**

UNIT -I

Python Concepts, Data Structures Classes: Interpreter – Program Execution – Statements- Expressions – Flow Controls – Functions – Numeric Types – Sequences – Strings, Tuples, Lists and – Class Definition – Constructors – Inheritance – Overloading – Text & Binary Files – Reading and Writing.

UNIT-II

Data Wrangling: Combining and Merging Data Sets – Reshaping and Pivoting – Data Transformation – String Manipulation, Regular Expressions.

UNIT-III

DATA AGGREGATION,GROUP OPERATIONS, TIMESERIESGroupByMechanics – Data Aggregation – GroupWise Operations and Transformations – Pivot Tables and Cross Tabulations - Date and Time Date Type tools – Time Series Basics – Data Ranges, Frequencies and Shifting.

UNIT-IV

Web Scraping: Data Acquisition by Scraping Web applications – Submitting a form – Fetching Web pages – Downloading Web pages through form submissions – CSS Selectors.

UNIT-V

Visualization in Python: Matplotlib package – Plotting Graphs – Controlling Graph – Adding Text – More Graph Types – Getting and Setting values –Patches.

REFERENCE BOOKS

1. Mark Lutz. "Programming Python". O'Reilly Media, 4th edition,2010.
2. Mark Lutz. "Learning Python". O'Reilly Media, 5th edition,2013
3.Tim Hall and J-P Stacey. "Python 3 for Absolute Beginners".Apress. 1st edition,2009
4. MagnusLieHetland."BeginningPython:FromNovicetoProgessional".Aprèss.Second Edition, 2005.
5. ShaiVaingast."BeginningPythonVisualizingCraftingVisualTransformationScripts". Après.2nd edition. 2014.
6. Wes Mc Kinney, "Python for Data Analysis". O'Reilly Media,2012.

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DATA SCIENCE.
ELECTIVE II (CLUSTER-B)
(Cluster)Paper-VIII: Elective-I: DATA & INFORMATION SECURITY

No. of Hours per Week: 03 **Max. Marks: 60.**

UNIT -I
Overview of Security: Protection versus security; aspects of security – data integrity, data availability, privacy; security problems, user authentication, Orange Book.

UNIT -II
Security Threats: Program threats, worms, viruses, Trojan horse, trap door, stack and buffer overflow; system threats- intrudes; communication threats- tapping and piracy.

UNIT -III
Cryptography: Substitution, transposition ciphers, symmetric-key algorithms – Data Encryption Standard, advanced encryption standards, public key encryption – RSA; Diffie-Hellman key exchange, ECC cryptography, Message Authentication – MAC, has functions.

UNIT -IV
Digital Signatures: Symmetric key signatures, public key signatures, message digests, public key infrastructures.

UNIT-V
Security Mechanism: Intrusion detection, auditing and logging, tripwire, system –call monitoring.

Reference Books
1. W. Stallings, Cryptography and Network Security Principles and Practices (4th ed.,), Prentice – Hall of India,2006.
2. C. Pfleeger and SL Pfleeger, Security in Computing (3rd ed.,), Prentice- Hall of India, 2007.
3. D. Gollamann, Computer Security, John Wiley and Sons, Ny,2002.
4. J. Piwprzyk, T. Hardjono and J. Seberry, Fundamentals of Computer Security, Springer-Verlag Berling,2003.
5. J.M. Kizza, Computer Netwrok Security, Springer,2007

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DATA SCIENCE.
ELECTIVE II (CLUSTER-B)
(Cluster)Paper-VIII: Elective-II: SPARK PROGRAMMING

No. of Hours per Week: 03 **Max. Marks: 60**

UNIT-I
Introduction to big data, properties of data different processing frame works. Introduction to Hadoop and Spark.

UNIT-II
Programming with Scale, data types, conditional and control statements, functional &non-functional programming.

UNIT-III
Introduction to Spark, RPD supporting operators. Architecture of Spark, Working with data sets.

UNIT-IV
Spark Libraries, Creating machine learning and predictive models using MLib.

UNIT-V
Processing Streaming data and graph structured data using spark streaming and Graph.

Reference Books
1. Learning Spark: Lightning-Fast Big Data Analysis by Holden Karau, Andy Konwinski, Patrick Wendell, O'ReillyPublishers
2. Advanced Analytics with Spark: Patterns for Learning from Data at Scale By Sandy Ryza, Uri Laserson, Sean Owen, JoshWills
3. Spark in Action by PetarZecevic,MarkoBonaciManningPublicationsCompany, 2016

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DATA SCIENCE.

ELECTIVE II (CLUSTER-B)

(Cluster)Paper-VIII: Elective-III: BIG DATA SECURITY

No. of Hours per Week: 03 **Max. Marks: 60.**

UNIT-I

Big Data Privacy, Ethics and Security: Privacy- Re identification of Anonymous people – Why Big Data Privacy is self-regulating? – Ethics – Ownership – Ethical Guidelines - Big Data Security – OrganizationalSecurity.

UNIT-II

Security, Compliance, Auditing and Protection: Steps to secure big data– Classifying Data – Protecting – Big Data Compliance – Intellectual Configuration..

UNIT-III

Hadoop Security Design: Kerberos – Default Hadoop Model Without security- Hadoop Kerberos Security Implementation & Configuration.

UNIT-IV

Hadoop Ecosystem Security: Configuring Kerberos for Hadoop ecosystem components – Pig. Hive. Oozie, Flume, HBase, Scoop.

UNIT-V

Hadoop Ecosystem Security: Integrating Hadoop with Enterprise Security Systems- Securing Sensitive Data in Hadoop – SIEM System – Setting up audit logging in hadoop cluster.

REFERENCE BOOKS

1. Mark Van Rijmenam, "Think Bigger: Developing a successful Big Data Strategy for your Business", Amazon, 1 edition ,2014.
2. Frank Ohihorst John Wiley & Sons, " Big Data Analytics: Turning Big Data into Big Money", John Wiley & Sons2013.
3. SherifSakr,"LargeScaleandBigData:ProcessingandManagement",CRCPress.2014.
4. Sudeesh Narayanan, "Securing Hadoop", Pacjt Publishing –2013.
5. Ben Spivey, Joe Echeverria. "Hadoop Security Protecting Your Big Data Problem", O'Reilly Media ,2015.
6. Top Tips for Securing Big Data Environments :e-book

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Syllabus for III Year –V Semester.

COMPUTER APPLICATIONS.

Paper V: DATABASE MANAGEMENT SYSTEM.

No. of Hours per Week: 03 **Max. Marks: 60.**

UNIT - I

Overview of Database Management System: Introduction, Data and Information, Database, Database Management System, Objectives of DBMS, Evolution of Database Management Systems, Classification of Database Management System.

UNIT-II

File-Based System, Drawbacks of File-Based System , DBMS Approach, Advantages of DBMS, Data Models , Components of Database System, Database Architecture, DBMS Vendors and their Products.

UNIT-III

Entity–Relationship Model: Introduction, The Building Blocks of an Entity Relationship, Classification of Entity Sets , Attribute Classification, Relationship Degree, Relationship Classification, Generalization and Specialization, aggregation and composition, CODD'S Rules, Relational Data Model , Concept of Relational Integrity. Normalization:1NF,2NF,3NF,BCNF.

UNIT-IV

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data types in SQL, Data Definition Language (DDL), Selection Operation Projection Operation, Aggregate Functions, Data Manipulation Language, Table Modification, Table Truncation, Imposition of Constraints, and Set Operations.

UNIT –V

PL/SQL: Introduction, Structure of PL/SQL, PL/SQL Language Elements ,Data Types, Control Structure,, Steps to Create a PL/SQL Program, Iterative Control ,Cursors , Steps to Create a Cursor, Procedure, Function, Packages, Exceptions Handling, Database Triggers, Types of Triggers.

Reference Books:

1. Paneerselvam: Database Management Systems, PHI.
2. Godeon C. EVEREST, Database Management – McGraw Hill Book Company.
3. MARTIN, Database Management – Prentice Hall of India, New Delhi.
4. Bipin C. Desai, ―An Introduction to Database Systems‖, Galgotia Publications.
5. Korth, Database Management systems.
6. Navathe, Database Management systems.

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COMPUTER APPLICATIONS.

Paper VI: WEB TECHNOLOGIES.

No. of Hours Per Week: 03 **Max. Marks: 60.**

UNIT-I

Introduction: HTML, XML, and WWW **HTML**: Basic HTML, Document body, Text, Hyperlinks, Adding more formatting, Lists, Tables using colors and images. **More HTML**: Multimedia objects, Frames, Forms towards interactive, HTML document heading.

UNIT-II

Cascading Style Sheets: Introduction, using Styles, simple examples, your own styles, properties and values in styles, style sheet, formatting blocks of information, layers.

UNIT-III

Introduction to JavaScript: What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Data and objects in JavaScript, regular expressions, exception handling, built-in objects, events.

UNIT-IV

DHTML with JavaScript: Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images, multiple pages in single download, text only menu system.

UNIT – V

XML: defining data for web applications, basic XML, document type definition, presenting XML, document object model, Web Services.

Reference Books

1. Uttam Kumar Roy, Web Technologies, Oxford University Press.
2. Black Book HTML 5.0
3. Complete reference HTML 5.0
4. Web Technology, PHI Publications.

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COMPUTER APPLICATIONS.
Paper VII: PHP and MYSQL

No. of Hours Per Week : 03 **Max. Marks: 60.**

UNIT-I: Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. **Flow Control Functions in PHP:** Switching Flow, Loops, Code Blocks and Browser Output. **Working with Functions:** Defining Functions, Calling functions, Returning the values from User-Defined Functions, Variable Scope, Saving State between Function calls with the Static statement, more about arguments.

UNIT -II: Working with Arrays: Arrays, Creating Arrays, Some Array-Related Functions. **Working with Objects:** Creating Objects, Object Instance. **Working with Strings, Dates and Time:** Formatting Strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

UNIT -III: Working with Forms: Creating Forms, Accessing Form - Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, Working with File Uploads. **Working with Cookies and User Sessions:** Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users.

UNIT-IV: Working with Files and Directories: Including Files with include(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen(), Running Commands with exec(), Running Commands with system() or passthru(). **Working with Images:** Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

UNIT-V: Introduction to MySQL and Interacting with MySQL using PHP:
Learning basic SQL commands:Learning the MySQL datatypes, Learning the Table Creation Syntax, Using INSERT Command, Using SELECT Command, Using Where in your Queries, Using the UPDATE Command to modify records, Using the DELETE Command.**Interacting with MySQL using PHP:** MySQL Versus MySQL Functions, Connecting to MySQL with PHP, Working with MySQL Data.

Reference Book:
1. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach Yourself, Pearson Education (2007).
2. XueBai Michael Ekedahl, The Web Warrior Guide to Web Programming, Thomson (2006).

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CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
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COMPUTER APPLICATIONS.

(Cluster)Paper VIII: Elective- 1: CLOUD COMPUTING.

No. of Hours Per Week: 03 **Max. Marks: 60.**

UNIT - I

Cloud Computing Overview – Origins of Cloud computing – Cloud components - Essential characteristics – On-demand self-service, Broad network access, Location independent resource pooling, Rapid elasticity, Measured service.

UNIT - II

Cloud scenarios – Benefits: scalability, simplicity, vendors, security. Limitations – Sensitive information - Application development – Security concerns - privacy concern with a third party - security level of third party - security benefits Regularity issues: Government policies.

UNIT - III

Cloud architecture: Cloud delivery model – SPI framework, SPI evolution, SPI vs. traditional IT Model ,Software as a Service (SaaS): SaaS service providers – Google App Engine, Salesforce.com and googleplatfrom – Benefits – Operational benefits - Economic benefits – Evaluating SaaS

Platform as a Service (PaaS): PaaS service providers – Right Scale – Salesforce.com – Rackspace – Force.com – Services and Benefits.

UNIT - IV

Infrastructure as a Service (IaaS): IaaS service providers – Amazon EC2, GoGrid – Microsoft soft implementation and support – Amazon EC service level agreement – Recent developments – Benefits Cloud deployment model : Public clouds – Private clouds – Community clouds - Hybrid clouds - Advantages of Cloud computing.

UNIT - V

Virtualization: Virtualization and cloud computing - Need of virtualization – cost, administration, fast deployment, reduce infrastructure cost – limitations - Types of hardware virtualization: Full virtualization - partial virtualization - para virtualization - Desktop virtualization: Software virtualization – Memory virtualization - Storage virtualization – Data virtualization – Network virtualization Microsoft Implementation: Microsoft Hyper V – Vmware features and infrastructure – Virtual Box - Thin client.

Reference Books

1. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte, Robert Elsenpeter TATA McGraw- Hill , New Delhi – 2010
2. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
3. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier
4. Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press.

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COMPUTER APPLICATIONS.

(Cluster)Paper VIII: Elective-II: E- COMMERCE.

No. of Hours per Week: 03 **Max. Marks: 60.**

UNIT-I

Introduction to E-Commerce: Scope, Definition, e-Commerce and the Trade Cycle, Electronic Markets, Electronic Data Interchange, Internet Commerce. Business Strategy in an Electronic Age: Supply Chains, Porter's Value Chain Model, Inter Organizational Value Chains, Competitive Strategy, First Mover Advantage - Sustainable Competitive Advantage, Competitive Advantage using E-Commerce - Business Strategy.

UNIT-II

Business-to-Business Electronic Commerce: Characteristics of B2B EC, Models of B2B EC, Procurement Management by using the Buyer"s Internal Market place, Just in Time Delivery, Other B2B Models, Auctions and Services from traditional to Internet Based EDI, Integration with Back-end Information System, Role of Software Agents for B2B EC, Electronic marketing in B2B, Solutions of B2B EC, Managerial Issues, Electronic Data Interchange (EDI), EDI: Nuts and Bolts, EDI and Business.

UNIT-III

Internet and Extranet : Automotive Network Exchange, Largest Extranet, Architecture of the Internet, Intranet and Extranet, Intranet software, Applications of Intranets, Intranet Application Case Studies, Considerations in Intranet Deployment, Extranets, Structures of Extranets, Extranet products and services, Applications of Extranets, Business Models of Extranet Applications, Managerial Issues. Electronic Payment Systems: Issues and Challenges.

UNIT-IV

Public Policy: From Legal Issues to Privacy : Legal Incidents, Ethical and Other Public Policy Issues, Protecting Privacy, Protecting Intellectual Property, Free speech, Internet Indecency and Censorship, Taxation and Encryption Policies, Other Legal Issues: Contracts, Gambling and More, Consumer and Seller Protection in EC.

UNIT-V: Infrastructure For EC : Network of Networks, Internet Protocols, Web- Based client/Server, Internet Security, Selling on the Web, Chatting on the Web, Multimedia delivery, Analyzing Web Visits, Managerial Issues, Equipment required for establishing EC Sites – Problems in Operation – Future of EC.

Reference Books

1. David Whiteley, "E-Commerce", Tata McGraw Hill, 2000.
2. E Business by ParagKulakarni and SunithaJahirabadkar from Oxford University Press.
3. E Business by Jonathan Reynolds from Oxford University Press.
4. Eframi Turban, Jae Lee, David King, K. Michael Chung, "Electronic Commerce", Pearson Education, 2000.
5. R. Kalakota and A. B. Whinston, Frontiers of Electronic Commerce, Addison Wesley.
6. David Kosiur, Understanding Electronic Commerce, Microsoft Press.

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B.A (AE) Three-Year Degree Course (Semester Wise)
Syllabus for III Year – V Semester.
COMPUTER APPLICATIONS.
(Cluster)Paper VIII: Elective-III: UNIX.

No. of Hours per Week: 03 **Max. Marks: 60.**

UNIT-I
Overview of UNIX Operating System, basic features of Unix operating System, File Structure, CPU Scheduling, Memory Management, File System Implementation of Operating System Functions in UNIX.

UNIT -II
Starting Of Unix and Text Manipulation and user-to-user communication User Names and Groups, Logging In, Format of Unix Commands, Changing your password, Unix Documentation,

UNIT –III
Files and Directories:, File permission, Basic Operation on Files, Changing Permission Modes, Standard files , Processes Inspecting Files, Operating On Files, Printing Files, Rearranging Files, Sorting Files, Splitting Files, Translating Characters, On line communication, Off line communication.

UNIT-IV vi Editors-General characteristics, Adding text and Navigation, changing text, searching for text, copying and Moving text, Features of Ex, Line Editors Ex and Ed, Stream editor SED, changing several file s in SED, AWK.

UNIT -V: Shell Programming: Programming in the Bourne and C-Shell, Wild Cards, Simple Shell program, variables, Programming Construct, Interactive Shell scripts, Advanced Features, Unix Compiler, Maintaining program System Administration Define system Administration, Booting the system, Maintaining User Accounts, File System, and special files, Backup and Restoration.

References Books:
1. Unix and shell Programming by B.M Harwani, OXFORD University Press
2. Unix Concept and application- Sumitabhadas
3. Unix Shell Programming-YashwantKanetkar
4. Unix Programming Environment- RobPike
5. Unix in a Nutshell- DonillGily

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B.Com(CA) Three-Year Degree Course (Semester Wise)
Syllabus for III Year –V Semester.
COMPUTER APPLICATIONS.
Paper V: DATABASE MANAGEMENT SYSTEM.

No. of Hours per Week: 03 **Max. Marks: 60.**

UNIT - I
Overview of Database Management System: Introduction, Data and Information, Database, Database Management System, Objectives of DBMS, Evolution of Database Management Systems, Classification of Database Management System.

UNIT-II
File-Based System, Drawbacks of File-Based System , DBMS Approach, Advantages of DBMS, Data Models , Components of Database System, Database Architecture, DBMS Vendors and their Products.

UNIT-III
Entity–Relationship Model: Introduction, The Building Blocks of an Entity Relationship, Classification of Entity Sets, Attribute Classification, Relationship Degree, Relationship Classification, Generalization and Specialization, aggregation and composition, CODD'S Rules, Relational Data Model, Concept of Relational Integrity, Normalization:1NF, 2NF, 3NF, BCNF.

UNIT-IV
Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data types in SQL, Data Definition Language (DDL), Selection Operation Projection Operation, Aggregate Functions, Data Manipulation Language, Table Modification, Table Truncation, Imposition of Constraints, Set Operations.

UNIT –V
PL/SQL: Introduction, Structure of PL/SQL, PL/SQL Language Elements ,Data Types, Control Structure,, Steps to Create a PL/SQL Program, Iterative Control ,Cursors , Steps to Create a Cursor, Procedure, Function,Packages,Exceptions Handling, Database Triggers, Types of Triggers.

Reference Books:

1. Paneerselvam: Database Management Systems, PHI.
2. Godeon C. EVEREST, Database Management – McGraw Hill Book Company.
3. MARTIN, Database Management – Prentice Hall of India, New Delhi.
4. Bipin C. Desai, ―An Introduction to Database Systems‖, Galgotia Publications.
5. Korth, Database Management systems.
6. Navathe, Database Management systems.

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Syllabus for III Year – VI Semester.
COMPUTER APPLICATIONS.
Paper VI: WEB TECHNOLOGIES.

No. of Hours Per Week: 03 **Max. Marks: 60.**

UNIT - I
HTML: Basic HTML, Document body, Text, Hyperlinks, adding more formatting, Lists, Tables using images. More HTML: Multimedia objects, Frames, Forms towards interactive, HTML document heading.

UNIT – II
Cascading Style Sheets: Introduction, using Styles, simple examples, Types of CSS: inline, internal, external, fonts: family, size, padding, border, your own styles, properties and values in styles.

UNIT – III
Introduction to JavaScript: What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Objects in JavaScript: Data and objects in JavaScript, regular expressions, exception handling.

UNIT – IV
DHTML with JavaScript: Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images, multiple pages in single download, text only menu system.

UNIT – V
XML: Defining data for web applications, Basic XML, document type definition, presenting XML, document object model, Web Services.

References:

1. Harvey M. Deitel and Paul J. Deitel, "Internet & World Wide Web How to Program", 4/e, Pearson Education.

2. Uttam Kumar Roy, Web Technologies from Oxford University Press

3. Jason Cranford Teague —Visual Quick Start Guide CSS, DHTML & AJAX", 4/e, Pearson Education.

4. Tom NerinoDoli smith "JavaScript & AJAX for the web" Pearson Education 2007.