Scheme of Examination
and
Syllabus

for

Master of Vocation

in

Software Development

offered by

University School of Information, Communication and Technology

Guru Gobind Singh Indrapastha University
Sector-16 C, Dwarka, New Delhi - 110 078
www.ipu.ac.in

University School of Information, Communication & Technology
Guru Gobind Singh Indraprastha University, Dwarka, Delhi

Programme: Master of Vocation (Software Development)
First Semester Examination

Paper Code	Paper ID	Paper	L	T	P	Credit
Theory Paper(s)						
MVOCSD-101		Java Programming	3	0	0	3
MVOCSD-103		Database Management Systems	3	0	0	3
MVOCSD-105		Web Technology	3	0	0	3
MVOCSD-107		Data Analytics	3	0	0	3
MVOCSD-109		Enterprise Accounting	3	0	0	3
Practical(s)						
MVOCSD-151		Java Programming Lab	0	0	4	2
MVOCSD-153		DBMS Lab	0	0	4	2
MVOCSD-155		Web Technology Lab	0	0	4	2
MVOCSD-157		Data Analytics and Accounting Lab	0	0	4	2
Total						23

University School of Information, Communication & Technology
Guru Gobind Singh Indraprastha University, Dwarka, Delhi

Programme: Master of Vocation (Software Development)
Second Semester Examination

Paper Code	Paper ID	Paper	L	T	P	Credit
Theory Paper(s)						
MVOCSD-102		Data Analytics using R	3	0	0	3
MVOCSD-104		Web Server & Network Administration	3	0	0	3
MVOCSD-106		Software Development for Mobile	3	0	0	3
MVOCSD-108*		Self-Study-1	3	0	0	3
Elective (Choose Any One)						
MVOCSD-110		Advanced Networking concept	3	0	0	3
MVOCSD-112		Computer Forensics and Investigation	3	0	0	3
MVOCSD-114		Human Resource Management	3	0	0	3
MVOCSD-116		Cyber Physical System	3	0	0	3
Practical(s)						
MVOCSD-152		R Programming Lab	0	0	4	2
MVOCSD-154		Web Server & Network Administration Lab	0	0	4	2
MVOCSD-156		Mobile application development lab	0	0	4	2
MVOCSD-158		Database Administration	0	0	4	2
Total						23

*NUES course:Principal of college shall ensure that student should register in NPTEL/SWAYAM/MOOC course and award marks based on certificate issued by respective institution.

University School of Information, Communication & Technology
Guru Gobind Singh Indraprastha University, Dwarka, Delhi

Programme: Master of Vocation (Software Development)
Third Semester Examination

Paper Code	Paper ID	Paper	L	T	P	Credit
Theory Paper(s)						
MVOCSD-201		Web programming using C# .NET	3	0	0	3
MVOCSD-203*		Self-Study-2	3	0	0	3
Elective (Choose Any two)						
MVOCSD-205		Intellectual Property Right	3	0	0	3
MVOCSD-207		Concept of Entrepreneurship	3	0	0	3
MVOCSD-209		Marketing Management	3	0	0	3
MVOCSD-211		Digital Marketing	3	0	0	3
MVOCSD-213		Python Programming	3	0	0	3
MVOCSD-215		MIS and ERP	3	0	0	3
Practical(s)						
MVOCSD-251		Web Programming using C# .lab	0	0	8	4
MVOCSD-253		Minor Project	0	0	12	6
MVOCSD-255#		Industrial Training	0	0	0	2
Total						24

*NUES course : Principal of college shall ensure that student should register in NPTEL/SWAYAM/MOOC course and award marks based on certificate issued by respective institution.

Training of MVOCSD-255 should be completed during summer vacation after 2nd semester and report should be prepared. Viva-voce of this course shall be conducted in 3rd semester by University Examination Division.

University School of Information, Communication & Technology
Guru Gobind Singh Indraprastha University, Dwarka, Delhi

Programme: Master of Vocation (Software Development)
Fourth Semester Examination

Paper Code	Paper ID	Paper	L	T	P	Credit
Practical(s)						
MVOCSD-252		Major Project	0	0	0	26
MVOCSD-254		Seminar and Progress Report	0	0	0	4
		Total				30

Note:

1. Total number of Credits of the Programme M.Voc=100
2. Each student shall be required to appear for examination in all papers of Course, but for the award of the Degree, a student shall be required to earn a minimum of 94 credits out of 100. Relaxation of 6 credit papers of the course is restricted to only elective papers.
3. M.Voc programme shall be governed as per Ordinance-11 of GGSIPU.
4. The minimum passing marks for all papers of the course shall be 40.

Java Programming

	L	T/P	C
Paper Code: **MVOCSD-101**			
Paper: **Java Programming**	3	0	3

INSTRUCTION TO PAPER SETTERS — **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

UNIT-1:

Introduction to Java Programming: Overview and characteristics of java, Java Virtual Machine; Java programming syntax: Java program structure, types of variables in Java, primitive types in java, control statements, operators; Defining Classes and Object Creation: Defining classes and access modifiers, creating objects, Reading Input from console Using Scanner class, Buffered Reader class; constructors; Arrays: Overview of 1-D, 2-D arrays, Command-Line Argument; Strings: String class, methods; String Buffer: object and class methods; Inheritance: super class, sub class, this and super operator, method overriding, use of static and final keywords; Polymorphism: method overloading, constructor overloading; Abstract class: abstract method and abstract classes, Interfaces: Interface, nested and inner classes, Multiple Inheritance using interface; Packages: package, types of packages, interfaces in a packages, creating sub-package in a package.

UNIT-2:

Exception Handling: Exception Class, built in checked and unchecked exceptions, user defined exceptions, use of try, catch, throw, throws, finally; Multi threaded programming: Overview, comparison with multiprocessing ,Thread class and runnable interface, life cycle, creation of single and multiple threads, deadlock of thread, thread communication, thread priorities, daemon thread, Thread Synchronization; Input/Output Programming: Basics, Streams, Byte and Character Stream, predefined streams, Reading and writing from console and files; Wrapper classes; Collection Framework: Introduction to Collection Framework in Java, Important Collection Interfaces and Their Methods.

UNIT-3:

Applets: Introduction, Life cycle, creation and implementation, Animation in Applet; Layout managers; AWT controls: Button, Label,TextField, TextArea, Choice lists, list, scrollbars, check boxes; Swings: Introduction to JFC, Components and Containers and Layouts, JFrame & JPanel Classes in Java, JLabel, JTextField and JTextAreaclasses, Swing Buttons: JButton, JToggleButton, Check Boxes, Radio Buttons, JScrollPane , JMenu, JMenuBar and JMenuItem, Designing Frames and Adding GUI Components, comparison with AWT controls; Event Handling: Delegation Event Model, Event classes and listeners, Adapter classes, Inner classes.

UNIT-4:

Networking Basics: Socket (datagram and TCP/IP based client and server socket), factory methods, InetAddress JDBC: JDBC Architecture, JDBC Drivers, Connecting to the Database; Java Servlets: Introduction, HTTP Servlet Basics, Servlet Lifecycle, Retrieving Information,

Sending HTML Information, Session Tracking, Database Connectivity; Java Server Pages: JSP Overview, JSP life cycle, Creating a JSP Page, JSP Scripting Element, Implicit objects, JSP Sessions, Cookies, Generating Dynamic Content, Using Custom Tag Libraries and the JSP Standard Tag Library; Introduction to Java Beans: Overview.

TEXT BOOKS:

T[1]. Patrick Naughton and Herbert Schildt, "Java-2 The Complete Reference", TMH.
T[2]. Y. Daniel Liang, "Introduction to Java Programming, Comprehensive Version, 7/e" Pearson.
T[3]. Jason Hunter, "Java Servlet Programming" O'Reilly
T[4]. Hans Bergsten, "Java Server Pages", 3 rd Ed. O'reilly

REFERENCE BOOK:

R[1]. Krishnamoorthy R, Prabhu S,"Internet and Java Programming", New Age Intl.
R[2]. David Flanagan, Jim Farley, William Crawford and Kris Magnusson, "Java Enterprise in a Nutshell", O'Reilly.
R[3]. Programming With Java – John R. Hubbard, 2nd Edition, TMH.

Database Management Systems

Paper Code: **MVOCSD-103**

Paper: **Database Management Systems**

L	T/P	C
3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

Objective: This course will introduce the basics as well as the advance concepts of Database Management Systems, using SQL and PL/SQL. By the end of this course the students will be able to: Create and update database, Write simple and advanced PL/SQL code blocks and will have the knowledge of advanced features such as cursors and triggers.

Unit – I:

Introduction to Databases: Introduction, Traditional File-Based Systems, Database Users and their Roles, Advantages and Disadvantages of DBMS, Three-Level ANSI-SPARC Architecture, Database Languages, Data Models.

Entity–Relationship Modeling: Entity Types, Relationship Types, Attributes, Keys, Strong and Weak Entity Types, Attributes on Relationships, Structural Constraints, Specialization/Generalization, Aggregation.

Unit – II: [T1, T2][No. of Hrs. 10]

Relational Algebra - Selection and projection set operations - renaming - Joins - Division - Examples of Algebra overviews - Relational calculus – SQL - Basic SQL Query -Nested queries - correlated and uncorrelated queries - Comparison Operators - Aggregative Operators - NULL values - Comparison using Null values - Logical connectivity's - AND, OR and NOT - Impact on SQL Constructs - Outer Joins – PLSQL programming – cursors, procedures, functions, triggers

UNIT-III: [T2, T4] [No. of Hrs. 14]

Functional–Dependencies (FD): Anomalies, Rules of FD, Partial Functional Dependency, Transitive Functional Dependency, Multi Valued Dependency, Join Dependency. Normalization: The Purpose of Normalization, Data Redundancy and Update Anomalies, The Process of Normalization,1NF, 2NF, 3NF, BCNF,4NF and 5NF,Concept of Denormalization .

[T1, T2, T3][No. of Hrs. 10]

UNIT-IV:

Transaction Management: Transaction and Schedule ,ACID properties, Concurrency Control– The Need for Concurrency Control, Serializability and Recoverability, Locking Methods, Deadlock, Time Stamping Methods, Multi-version Timestamp Ordering. Database Recovery– The Need for Recovery, Overview of Storage and Indexing: File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes, Security: Database Security–Threats, Views, Backup and Recovery.

[T2, T3][No. of Hrs. 10]

TEXT BOOK(S):

[T1] Date C J, "An Introduction to Database System", Pearson Educations
[T2] Korth, Silbertz,Sudarshan, "Fundamental of Database System", McGraw Hill
[T3] Elmasri, Navathe, "Fundamentals of Database Systems", Pearson Educations
[T4] Bayross, Ivan "Sql/ Pl/SQL", BPB

REFERENCE BOOK(S):

[R1] Peter rob, Carlos Coronel, "Database Systems – Design, Implementation, and Management", 9th Edition, Thomson Learning, 2009
[R2] Atul Kahate, "Introduction to Database Manage ment System", Pearson Educations

Web Technology

Paper Code: **MVOCSD-105**	L	T/P	C
Paper: **Web Technology**	3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

Prerequisites: Knowledge of HTML and JavaScript is required. Familiarity with CSS and the My-SQL is recommended.

Objectives: To develop the skill & knowledge of dynamic Web pages development. Students will understand how they can function either as an entrepreneur or can take up jobs in the multimedia and Web site development and other information technology sectors.

Outcome: This course will improve IT skills in the area of dynamic web development and also students will have basic and advance knowledge of dynamic PHP/MySQL and then able to make dynamic websites and PHP based apps.

Unit-1:

Introduction to HTML: HTML, Client and Server, Basic Tags, CSS, Table and Forms,

Introduction to Java Script: JavaScript Overview, JavaScript Syntax, Type of JavaScript, Embedding Script In HTML File, Variable.

Introduction to PHP: History, Benefits of Using PHP MYSQL, Web Browser, Web server, Types of Server, Installation and Configuration files, Cookies, Sessions, $_GET and $_POST method.

Unit-2:

Development Concept: How PHP Script Work, PHP Syntax, Write your First PHP Program, Embed PHP In HTML & HTML In PHP, PHP Data Type, Variable In PHP, Contents In PHP, Operator In PHP. Control Structure: If Statement, If.....Else Statement, If...If Else Statement, Nested If Statement, Switch Statement. Looping Structure: For Loop, While Loop, Do...While Loop, For each Loop

Function: What is function, Syntax, User Defined Function, System Defined Function, Parameterized Function, Parameterized Function, Date & Time Function, Hash Function, mail Function.

Unit-3:

Introduction to MYSQL: What is Database, Understanding an RDBMS, Understanding Tables, Record & Fields, Sub query, join.

Working with MYSQL Admin: Working with PHP My Admin, Types Data Type, Creating Database & Tables, Dropping Database & Tables, Adding Fields, Selecting Table, Altering Fields Properties

MySQL Function in PHP: Database Connections, Managing Database Connections, Performing Queries, Closing Connection

SQL Queries : Create Database & Table, Drop Database & Table, Insert Record, Select Record, Deleting Record, Modifying Record, WHERE Clause, Using Operators, Sorting Records, Eliminating Duplicates, Grouping Records, Having Clause, Joining Tables, Sub queries, Using Table And Column Aliases

Unit-4:

PHP with MVC Architecture, OOPS Concepts, File System and the Server, String Manipulation, Regular Expression, PHP Sessions and Cookies, PHP File Handling, Files and Directory Access, Introduction to ZEND framework.

TEXTBOOKS:

T[1] . Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPB Publication
T[2] . Ullman, "PHP for the Web: Visual QuickStart Guide", Pearson Education
T[3] . Web Technologies: A Computer Science Perspective, Jackson, Pearson Education India, 2007

REFERENCE BOOKS:

R[1]. Achyut Godbole,Atul Kahate, "Web Technologies", McGraw-Hill Education, Third Edition.
R[2]. Uttam K Roy, "Web Technologies", Oxford University Press, 2012.
R[3]. Chris Bates, "Web Programming", Wiley
R[4]. Web Engineering by Gertel Keppel, Birgit Proll, Siegfried Reich, Werner R., John Wiley.

Data Analytics

Paper Code: **MVOCSD-107**	L	T/P	C
Paper: **Data Analytics**	3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

Objectives: The Student should be made to be exposed to big data and learn the different ways of Data Analysis, be familiar with data streams, learn the mining and clustering and be familiar with the visualization.

Outcome: The student should be made to apply the statistical analysis methods. Compare and contrast various soft computing frameworks. Design distributed file systems. Apply Stream data model and Use Visualisation techniques.

UNIT 1:

STATISTICS: Sampling Techniques - Data classification, Tabulation, Frequency and Graphic reporesentation - 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, Moments & Kurtosis.

UNIT 2:

DATA DEFINITIONS AND ANALYSIS TECHNIQUES: Elements, Variables, and Data categorization, Levels of Measurement, Data management and indexing, Descriptive Statistics: Measures of central tendency, Measures of location of dispersions

BASIC ANALYSIS TECHNIQUES: Statistical hypothesis generation and testing, Chi-Square test, t-Test, Analysis of variance, Correlation analysis, Maximum likelihood test.

DATA ANALYSIS TECHNIQUES: Regression analysis, Classification techniques, Clustering, Association rules analysis.

UNIT 3:

INTRODUCTION TO BIG DATA: Introduction to Big Data Platform, Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications, Challenges of conventional systems – Web data – Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting – Modern data analytic tools, Stastical concepts: Sampling distributions, resampling, statistical inference, prediction error.

UNIT 4:

DATA ANALYSIS : Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynamics – Rule induction – Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods.

TEXT BOOKS:

T[1]. Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.
T[2]. Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.

T[3]. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
T[4]. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets,Cambridge University Press, 2012.

REFERENCES:

R[1]. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analystics, John Wiley & sons, 2012.
R[2]. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O" Reilly, 2011.
R[3]. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008

Enterprise Accounting

Paper Code: **MVOCSD-109**	L	T/P	C
Paper: **Enterprise Accounting**	3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

UNIT-I

Overview: Accounting concepts, conventions and principles; Accounting Equation, International Accounting principles and standards; Matching of Indian Accounting Standards with International Accounting Standards.

Mechanics of Accounting: Double entry system of accounting, journalizing of transactions; preparation of final accounts, Trading Account, Manufacturing Accounts, Profit & Loss Account, Profit & Loss Appropriation account and Balance Sheet.

UNIT-II

Analysis of financial statement: Ratio Analysis- solvency ratios, profitability ratios, activity ratios, liquidity ratios, market capitalization ratios ; Common Size Statement ; Comparative Balance Sheet and Trend Analysis of manufacturing, service & banking organizations.

UNIT-III

Funds Flow Statement: Meaning, Concept of Gross and Net Working Capital, Preparation of Schedule of Changes in Working Capital, Preparation of Funds Flow Statement and its analysis ; Cash Flow Statement: Various cash and non-cash transactions, flow of cash, preparation of Cash Flow Statement and its analysis.

UNIT-IV

Costing: Nature, Importance And Basic Principles. Budget And Budgetary Control: Nature And Scope, Importance Method Of Finalization, and Master Budget, Functional Budgets.

Marginal Costing: Nature, Scope, Importance, Construction Of Break Even Chart, Limitations And Uses Of Break Even Chart, Practical Applications Of Marginal Costing.

Text Book(s):

[T1] Maheshwari S.N &Maheshwari S K – A text book of Accounting for Management
[T2] Mukherjee - Financial Accounting for Management
[T3] Narayanswami - Financial Accounting: A Managerial Perspective

Reference Book(s):

[R1] Ashish K. Bhattacharya- Essentials of Financial Accounting (PHI, New Delhi)
[R2] Khan & Jain, "Management Accounting", Tata McGraw Hill Publication
[R3] Chowdhary Anil - Fundamentals of Accounting and Financial Analysis (Pearson Education, 1st Edition)

Java Programming Lab

Paper Code: **MVOCSD-151**	L	T/P	C
Paper: **Java Programming Lab**	0	4	2

Note: - The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 15 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.

List of Experiments:

1. Program to create classes and use of different types of functions.
2. Program to show different access level in java.
3. Programming using constructor.
4. Programs using function overloading.
5. Programs using IO streams.
6. Programs to use some of String Buffer class methods.
7. Programs using inheritance.
8. Programs on Abstract methods.
9. Programming using interfaces.
10. Programming creating packages and their use.
11. Programs using exception handling mechanism.
12. Program to illustrate functioning of multiple threads.
13. Programs to create and use the Applet.
14. Programs on AWT to create Forms or GUI.
15. Programs on swing to create Forms or GUI.
16. Program to implement dynamic Login Form using Servlets.
17. Program to implement dynamic Web Page using JSP.
18. Design and implement a simple shopping cart example with session tracking API.

DBMS Lab

Paper Code: **MVOCSD-153**
Paper: **DBMS Lab**

L	T/P	C
0	4	2

Note: *- The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 10 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Design a Database and create required tables. For e.g. Bank, University Database
2. Write a SQL statement for implementing DDL commands along with constraints: Create, ALTER, DROP and TRUNCATE.
3. Write a SQL statement for implementing DML commands :Insert, UPDATE, DELETE
4. Write SQL statement for performing various search queries using Aggregate, Relational, logical and string functions etc.
5. Perform Transaction Control Language commands: Commit, Save point, Rollback, Grant and Revoke
6. Perform the practical on different types of JOIN.
7. Perform the practical based on the locks on database Row level locks, Table level locks, Shared lock, Exclusive lock
8. Create views and test it on a database.
9. Implement PL/SQL programmes using control structures
10. Implement PL/SQL programmes using Cursors
11. Implement PL/SQL programmes using exception handling.
12. Implement database triggers.

Web Technology Lab

	L	T/P	C
Paper Code: **MVOCSD-155**	0	4	2
Paper: **Web Technology Lab**			

Note: - The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 20 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.

List of Experiments:

1. Create a simple HTML Form covering major form elements.
2. Write down a simple PHP program that displays a welcome message.
3. Write down a PHP program to find average number from all the given number using constant and variable.
4. Display or print the details of students in tabular format using associative and multidimensional array in sorted form.
5. Write a program to calculate electricity bill using control structure.
6. Write a program using loop structure to select a date using drop down listbox.
7. Write a PHP program using different variable functions.
8. Write PHP script for testing string function.
9. Write PHP script for testing math and date functions.
10. Write PHP script for testing array function.
11. Write PHP script for testing file function.
12. Write a program for creating form using buttons, textboxes and other form elements using $_POST method to retrieve data.
13. Write a program for creating form using buttons, textboxes and other form elements using $_GET method to retrieve data.
14. Write PHP script to passing hidden information to the form processing script hidden form controls.
15. Write a PHP script to passing variable between pages using URL query string.
16. Write a PHP script to pass the variable using session.
17. Write a PHP script to pass the variable using cookie.
18. Write a PHP script for error handling using custom created error message.
19. Write a PHP script for exception handling.
20. Allowing the user to upload their own images.
21. Write a PHP script to connect PHP with mysql database.
22. Write a PHP script to retrieve data contains in mysql database.
23. Write a program for joining and referencing table concept.
24. Connect to the database from your website.
25. Programs to manipulate the table

Data Analytics and Accounting Lab

Paper Code: MVOCSD-157	L	T/P	C
Paper: **Data Analytics and Accounting Lab**	0	4	2

Note: *- The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. (i)Perform setting up and Installing Hadoop in its two operating modes:
   - Pseudo distributed,
   - Fully distributed.

   (ii) Use web based tools to monitor your Hadoop setup.
2. (i) Implement the following file management tasks in Hadoop:
   - Adding files and directories
   - Retrieving files
   - Deleting files

   (ii) Benchmark and stress test an Apache Hadoop cluster
3. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
   - Find the number of occurrence of each word appearing in the input file(s)
   - Performing a MapReduce Job for word search count (look for specific keywords in a file)
4. Stop word elimination problem:

Input:
- A large textual file containing one sentence per line
- A small file containing a set of stop words (One stop word per line)

Output:
- A textual file containing the same sentences of the large input file without the words appearing in the small file.

5. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented. Data available at: https://github.com/tomwhite/hadoopbook/tree/master/input/ncdc/all.
   - Find average, max and min temperature for each year in NCDC data set?
   - Filter the readings of a set based on value of the measurement, Output the line of input files associated with a temperature value greater than 30.0 and store it in a separate file.

6. Purchases.txt Dataset
   - Instead of breaking the sales down by store, give us a sales breakdown by product category across all of our stores
     - What is the value of total sales for the following categories?

        - Toys
        - Consumer Electronics
- Find the monetary value for the highest individual sale for each separate store
    - What are the values for the following stores?
        - Reno
        - Toledo
        - Chandler
- Find the total sales value across all the stores, and the total number of sales.

7. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.
8. Write a Pig Latin scripts for finding TF-IDF value for book dataset (A corpus of eBooks available at: Project Gutenberg)
9. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes.
10. Install, Deploy & configure Apache Spark Cluster. Run apache spark applications using Scala.
11. Data analytics using Apache Spark on Amazon food dataset, find all the pairs of items frequently reviewed together.
- Write a single Spark application that:
    - Transposes the original Amazon food dataset, obtaining a PairRDD of the type:
    - Counts the frequencies of all the pairs of products reviewed together;
    - Writes on the output folder all the pairs of products that appear more than once and their frequencies. The pairs of products must be sorted by frequency.

Data Analytics Using R

Paper Code: **MVOCSD-102**
Paper: **Data Analytics using R**

L	T/P	C
3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

Objectives: Almost every company and organization collects data about their operations to better understand how to make internal improvements. As the amount of data collected increases, it is more difficult to analyze this data manually. Therefore, Data Mining is applicable to every department in any IT company.

Outcome: Students will learn how to analyze large data sets and identify patterns that will improve any company's and organization decision-making process. After completing the course, they will be able to: - Capture, categorize, simplify, normalize and prepare data to be processed which are applicable to most business and management problems. - Learn R programing language.

UNIT 1:

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.

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 – statistical models in R - manipulating objects – data distribution.

UNIT 2:

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.

UNIT 3:

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

UNIT 4:

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

TEXT BOOKS:

T[5] . Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.

T[6] . Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.
T[7] . Mark Gardener, "Beginning R - The Statistical Pr ogramming Language", John Wiley & Sons, Inc., 2012.
T[8] . The Elements of Statistical Learning, Data Mining, Inference, and Prediction (2nd Edn.), Trevor Hastie Robert Tibshirani Jerome Friedman, Springer, 2014

REFERENCES:

R[4]. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.
R[5]. Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, "Practical Data Science Cookbook", Packt Publishing Ltd., 2014.
R[6]. Nathan Yau, "Visualize This: The FlowingData Guide to Design, Visualization, and Statistics", Wiley, 2011.
R[7]. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
R[8]. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008

Web Server & Network Administration

Paper Code: **MVOCSD-104**	L	T/P	C
Paper: **Web Server & Network Administration**	3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

Prerequisites: The Students are expected to have studies courses like Data Communication and Networking and Advance Computer Network where they have study of Basic Networking Concepts, TCP/IP Protocol Suite, Switching and Routing Basics. Basics of Windows and Linux Operating System.

Unit-1:

Revision of Networking Basics, Routing and Switching Basics. DNS Services, DHCP Services, Email Server, IMAP, POP, SMTP Protocols, Telnet, SSH Services, Firewall and Security. Configuration of Routing Protocols, Access Control through Routers, Universal Threat Management. Bridging and Load Balancing in Network. Remote Booting, Network Booting and Thin Clients.

(10 Hours)

Unit-2:

Linux Operating System, Linux Administration and Web Services, Linux Server as Domain Controller, LDAP Services, Email Services, RADIUS Services. Network Configuration. User Management and Administration. Firewall and Access Control. Remote Administration. Proxy Server and proxy Services

(10 Hours)

Unit-3:

Windows Server Operating System, Windows Server as Domain Server, Active Directory Services, Email Services in Windows Server. RADIUS Services on Windows Server. Network Configuration of Windows Server. User Management and Administration on Windows Server with Domain Services. Remote Administration, Proxy Services. (10 Hours)

Unit-4:

Web Server, Web Server Architecture for Web Servers like Apache and IIS, Administration and Management of Web Server. Configuration of Domain Services on Web Server. User management and Authentication, Management of Multiple Web sites on Web servers. Management of Email Services, monitor and analyze the web server environment. (10 Hours)

TEXTBOOKS:

1. Jeffrey C.Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education.
2. Wireless Network Administration A Beginner's Guide , Wale Soyinka, Mc Graw Hill Publication.

REFERENCE BOOKS:

1. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education.
2. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education.
3. The Practice of system & Network Administration 2nd edition by Thomas Limoncelli.
4. High Performance Tcp/Ip Networking : Concepts, Issues, And Solutions Hassan, Mahbub, Jain, Raj, PHI Publications.

Software Development for Mobile

Paper Code: **MVOCSD-106**	L	T/P	C
Paper: **Software Development for Mobile**	3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

UNIT- I:

The Basics: Hello World: Intro to Android, Why develop apps for Android?, Flavors of Android operating systems, Challenges of developing for Android (multiple OS, need backwards compatibility, need to consider performance and offline capability), Concept: Create Your First Android App, Layouts, Views and Resources, Scrolling Views, Resources to Help You Learn, Activities and Intents, The Activity Lifecycle and Managing State, Starting Activities with Implicit Intents, Testing and Debugging, and Backwards Compatibility.

UNIT-II:

User Interface: User Input Controls, Menus, Screen Navigation, Themes and Styles,Adapt layouts for multiple devices and orientations, Accessibility: Why accessibility matters, accessibility considerations: Color blindness, poor vision, poor hearing, physical limitations, Accessibility guidelines, testing for accessibility, Screen readers, making your app more accessible: Color and Contrast, button size --> Material Design guidelines, considerate layouts and navigation, Localization: How to prep your app for localization, LTR and RTL (eg Arabic) text, Testing the User Interface: Automated testing of UIs, User testing your UI with real users, Using the Espresso and UI Automator frameworks for testing UIs.

UNIT-III:

Background Tasks: Connect to the Internet, AsyncTaskLoade, Broadcast Receivers: What is a Broadcast Receiver and a Broadcast Intent? , Broadcast Receiver Security and Lifecycle, Services: What is a service? Long running task without a UI, Difference between Activity and Service , Start and stop services, Lifecycle methods, Foreground services, Intent Service class, App priority (critical, high, low), How to create a new Service, Notifications: What is a Notification? , Notification Design Guidelines, Triggering, Scheduling, and Optimizing Background Tasks, Transferring Data Efficiently: Less data, less often! Cell radio life cycle, Job Scheduler. Why to use Job Scheduler instead of SyncManager/SyncAdapter, Difference between alarms and job schedulers.

UNIT-IV:

Data -- Saving, Retrieving, And Loading -Storing Data in your app, Store data using SQLite database, Using Content Resolvers to access data, Content Providers, Using Loaders to Load and Display Data: Using loaders to asynchronously load data into an activity or fragment, Benefits of Loaders -- why use them? , Loader states (started, stopped, reset) , LoaderManager , Methods & callbacks to implement in Loaders: loadInBackground(), deliverResult() onStart/StopLoading(), onReset/Cancelled()),Registering listeners , Using Cursor Loader with Content Providers, Polish

and Publish: Permissions, Libraries, Widgets, Publishing your App, Making and publishing APKs: Guidelines for publishing in Google Play , Make and sign the APK, Beta test your app , Publish your app to Google Play

TEXTBOOKS:

1. Mobile Communications Engineering, William C. Y. Lee, Mc Graw Hill Publication.
2. Fundamentals Of Mobile Computing, Pattnaik, Prasant Kumar , Mall, Rajib, PHI Publications.
3. Hands-On Mobile App Testing: A Guide for MobileTesters and Anyone Involved in the Mobile App, Knott, Pearson Education.

REFERENCE BOOKS:

1. Mobile Application Security, Himanshu Dwivedi, Chris Clark, David Thiel, Mc Graw Hill Publication.
2. Next Gen Mobile Communication Rishi Kappal, Milind Pande, Mc Graw Hill Publication.
3. Simple and Usable Web, Mobile, and Interaction Design, 2nd Edition, Colborne, Pearson Education.

Advanced Networking Concept

Paper Code: MVOCSD-110	L	T/P	C
Paper: Advanced Networking Concept	3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

UNIT-I

Overview: Network classification (PAN, LAN, MAN, WAN), Overview of OSI Model, TCP/IP model, Layers and their functions, Comparison of OSI and TCP/IP. Networking Devices: Hubs, Switches, Routers, Bridges, Repeaters, Gateways and Modem. Network Topologies.

Addressing in TCP/IP: ARP, RARP, ICMPv4 Messages, IPv4 vs IPv6, Classful addressing, Classless addressing, subnetting, supernetting, Special Addresses

UNIT-II

Transport Layer: Transport Layer services, TCP, UDP, SMTP, TCP Segment Format, TCP Connection and scenarios, Flow control in TCP, Congestion Control, and TCP Timers

Application Layer: DHCP, DNS, FTP, Remote Login: TELNET, Electronic Mail: Different Scenarios, UA, MTA, SMTP, POP and IMAP

UNIT-III

Wireless Sensor Networks: Fundamentals of WLANs, IEEE 802.11 Architecture, protocols, performance and open issues. Overview and basics of WSN, Applications of Wireless Sensor Networks, Architecture of WSNs, Hardware components, Energy consumption of sensor nodes, Physical Layer and Transceiver design considerations in WSNs, Fundamentals of (wireless) MAC protocol, Routing protocols: Data Dissemination and Gathering, Routing Challenges and Design Issues in WSN

UNIT-IV

Introduction to Mobile Adhoc Network: Mobile Ad Hoc Networks, Technologies for Ad Hoc Network, Issues in Ad hoc wireless Networks, Routing Protocols for Adhoc Networks, Ad Hoc network applications, MAC Protocols for Ad Hoc Wireless Networks Issues, design goals and classification of MAC protocol, MACA and MACAW, Routing Protocols for Ad hoc wireless networks: Issues and classifications of routing protocols, AODV, DSR, DSDV,

TEXT BOOK(S):

[T1] B. A Forouzan., "TCP/IP Protocol Suite", Tata McGraw Hill
[T2] P. Nicopolitidis, "Wireless Networks", John Wiley
[T3] Ad HOC Wireless Networks: Architectures & Protocols , By C Siva Ram Murty & BS Manoj 2nd Ed, Pearson Education

REFERENCE BOOK(S):

[R1] B. A Forouzan., "Data Communications & Networking", Tata McGraw Hill

[R2] Tananbaum A.S., "Computer Networks", PHI
[R3] Yi Bang Lin and ImrichChlamtech , "Wireless and Mobile Network Architecture", Wiley.

Computer Forensics and Investigation

Paper Code: MVOCSD-112

Paper: **Computer Forensics and Investigation**

L	T/P	C
3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

UNIT-I

Computer Forensics Terminology and Requirements: computer forensic, traditional problems in computer investigation, disk structure and digital evidence, developing computer forensic science capabilities, minimum housing, hardware and software requirements; Understanding **Computer Investigations:** preparing computer investigations, taking a systematic approach, understanding data recovery workstations and software, conducting an investigation: gathering the evidence, completing the case.

UNIT-II

Computer Forensics Evidence and Capture: data recovery defined, data back-up and recovery, the role of back-up in data recovery, the data-recovery solution; Evidence Collection and Data Seizure: why collect evidence?, collection options, obstacles, types of evidence, the rules of evidence, volatile evidence, general procedure, collection and archiving, methods of collection, artifacts, collection steps, controlling contamination: the chain of custody; Duplication and Preservation of Digital Evidence: preserving the digital crime scene, computer evidence processing steps, legal aspects of collecting and preserving computer forensic evidence; Computer Image Verification and Authentication: special needs of evidential authentication, practical consideration, practical implementation.

UNIT-III

Processing Crime and Incident Response: Identifying digital evidences, collecting evidence, processing law enforcement crime scenes, preparing for a search, seizing and storing digital evidences, digital hashing, reviewing a case; Computer Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions; Windows and DOS systems based Investigations: file systems, examining file systems, disk encryption, windows registry, startup tasks; Linux boot processes and file systems; Network Forensics: overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project; Steganography.

UNIT-IV

Email Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools; Cell Phone and Mobile Devices: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices. ; Computer Forensics Tools: evaluating computer forensic tool needs, Computer

Forensics Software Tools: Command-Line Forensics Tools, UNIX/Linux Forensics Tools. Other GUI Forensics Tools, computer forensics hardware tools: Forensic Workstations, Using a Write-Blocker, Recommendations for a Forensic Workstation, validating and testing forensics software: Using National Institute of Standards and Technology (NIST) Tools, Using Validation Protocols.

TEXT BOOK(S):

[T1] Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.

[T2] Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

[T3] Computer Forensic and Cyber Crime, 3rd Edition by Marjie T. BritzB

REFERENCE BOOK(S):

[R1] Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media.

[R2] Digital Evidence and Computer Crime, 2nd Edition , Eoghan Casey , academic Press File System Forensic Analysis by Brian Carrier , addition Wesley

[R3] Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media

Human Resource Management

Paper Code: **MVOCSD-114**
Paper: **Human Resource Management**

L	T/P	C
3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

UNIT-I

Introduction to HRM : Definition, Nature and Scope of HRM, Evolution of HRM, Challenges of HRM, HR Profession and HR Department, Global perspective of HRM.
Human Resource Planning: HR, Demand and Supply forecasting, Factors Affecting HRP, Job analysis and Job Design.

UNIT-II

Recruitment and Selection : Recruitment Process, Sources and Methods of Recruitment, Evaluation of methods of recruitment. Steps in selection.
Training and Development: Need and Importance of Training and Development, Training Need Analysis and techniques, Design Training Programme, Types of training, Training evaluation, Executive Development, Concept of Career Development.

UNIT-III

Wages and salary Management : Job Evaluation, Wage Determination, Types of Wages, Salary Structure, Fringe benefits, Executive Compensation.
Performance Appraisal: Need and Importance of Performance Appraisal, Performance Appraisal Process, Methods of Performance Appraisal.

UNIT-IV

Employee Relations Management: Overview of Employee Relations Management, Importance of Relations Management, Employee Relation Management Tool, Issues in Employee Relation Management.

Text Book(s):

[T1] Gary Dessler, Biju Varkey - Human Resource Management, Pearson Publication, 12th Edition
[T2] V.S.P. Rao, Human Resource Management
[T3] K. Ashwathappa, Human Resource Management

Reference Book(s):

[R1] Seema Sanghi, Human Resource Management, Macmilan Publication, 2011
[R2] Decenzo, Robbins, Human Resource Management, John Wiley & Sons Inc, Sixth Edition

[R3] Edwin Flippo, Personal Management

Cyber Physical System

Paper Code: **MVOCSD-116**	L	T/P	C
Paper: **Cyber Physical System**	3	0	3

INSTRUCTION TO PAPER SETTERS **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

***Prerequisites, Objectives and Learning Outcomes**: This subject pre*sumes that the student should have a prior exposure to basic computer programming, differentiation, and mathematical reasoning. The main objective of this paper is to achieve an understanding of the design and analysis of cyber physical systems - computational systems that are integrated with physical processes. After the completion of course, students can develop robots that operate near humans safely, develop computer control systems for cars, aircraft or drones.

UNIT-I

Cyber-Physical Systems: Introduction , Cyber-Physical Systems (CPS) in the real world, CPS Design Challenges; Model-Based Design and Design Methodologies; Simulation, Validation, Verification, and Synthesis; Platform-Based Design and Contract-Based Design.

CPS Hardware platforms - Processors, Sensors, Actuators ,CPS Network - WirelessHart, CAN, Automotive Ethernet , CPS Software stack - RTOS ,Scheduling Real Time control tasks.

UNIT-II

Concurrent Models of Computation: Finite State Machines; Synchronous/Reactive Model. Process Networks; Dataflow; Petri Nets. Timed Models; Discrete-Events (DE) Model. Continuous-Time Model; Acausal Model; Mixed Models; Hybrid Systems.

From features to software components, Mapping software components to ECUs , CPS Performance **CPS implementation :** Analysis - effect of scheduling, bus latency, sense and actuation faults on control performance, network congestion , Control, Bus and Network Scheduling using Truetime.

UNIT-III

Industrial control systems and SCADA; Confidentiality, Integrity, and Availability; Attack space; Power systems models; Bad Data Detection algorithms; Denial of service attack; Zero dynamics attack; Covert attack; Replay attack; Bias injection attack; Risk analysis (threat identification, likelihood assessment, impact assessment); Risk treatment (prevention, detection, mitigation); Model-Based Fault Diagnosis.

Design Space Exploration and Synthesis: Cyber-Physical Systems Architectures; Mapping and Synthesis; Architecture Exploration; Optimization-Based and Simulation-Based Techniques for Mapping and Synthesis, Verification and Synthesis of Controllers; Algorithmic Synthesis Techniques; Optimization-Based Controller Design.

UNIT-IV

CPS Security and Privacy: Attack models, Secure Task mapping and Partitioning, State estimation for attack detection, Network Tomography, Security challenges, Lightweight cryptography implementation for security and privacy in CPS. Cyber physical vulnerabilities of wireless sensor networks in smart cities: Solution Approaches.

CPS Case studies: Automotive : SW controllers for ABS, ACC, Lane Departure Warning, Suspension Control, Healthcare : Artificial Pancreas/Infusion Pump/Pacemaker, Green Buildings : automated lighting, AC control.

TEXT BOOK(S):

[T1] Andr´e Platzer. Logical Foundations of Cyber-Physical Systems. Springer, 2018.

[T2] Eric D. Knapp and Joel Thomas Langill ,Industrial Network Security, Second Edition: Securing Critical Infrastructure Networks for Smart Grid, SCADA, and Other Industrial Control Systems (2nd Edition)

[T3] Eric D. Knapp and Raj Samani ,Applied Cyber Security and the Smart Grid: Implementing Security Controls into the Modern Power Infrastructure (1st Edition)

[T4] Houbing Song, Glenn A. Fink, Sabina Jeschke ,Security and Privacy in Cyber-Physical Systems: Foundations, Principles, and Applications,John Wiey and Sons 2017,First Edition

REFERENCE BOOK(S):

[R1] Raj Rajkumar, Dionisio de Niz, Mark Klein ,Cyber-Physical Systems, Pearson Education 2017

[R2] Houbing Song, Danda B. Rawat, Sabina Jeschke, Christian Brecher ,Cyber-Physical Systems: Foundations, Principles and Applications, Elseiver 2017

R Programming Lab

Paper Code: **MVOCSD-152**	L	T/P	C
Paper: **R Programming Lab**	0	4	2

Note: - The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.

List of Experiments:

1. Introduction to R: Defining and Downloading R.
2. Identifying Types of Variables: Levels of Measurement
3. Univariate Statistics
    - Producing Frequency Distributions
    - Charts
4. Introduction to Probability: Recoding Variables
5. The Normal Curve: Creating a Histogram in R
6. Measures of Central Tendency and Dispersion
7. Standard Deviations, Standard Scores and the Normal Distribution
8. Hypothesis Testing: Testing the Significance of the Difference Between Two Means
9. Hypothesis testing: One- and Two-tailed Tests
10. Bivariate Statistics for Nominal Data
11. Bivariate Statistics for Ordinal Data
12. Bivariate Statistics for Interval/Ratio Data
13. OLS Regression - Modelling Continuous Outcomes

Web Server & Network Administration Lab

Paper Code: **MVOCSD-154**	L	T/P	C
Paper: **Web Server & Network Administration Lab**	0	4	2

Note: *- The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 12 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Installation and Setting up of Computers on Network
2. Installation and Configuration of Computer on Network for REMOTE (Network) Boot.
3. Configuring Managed Switched with VLAN
4. Configuring Routing Protocols on Routers
5. Installation and Configuration of Web Server IIS
6. Installation and Configuration of Web Server Apache
7. Set up Multiple Websites on a Single Web Server
8. Installation and Setting of Linux Server.
9. Install and Configure LDAP Services on Linux Server
10. Installation and Setting of Windows Server.
11. Install and Configure Active Directory Services on Linux Server
12. Installation and Configuration of RADIUS Server
13. Install and Configure Email Server

Mobile Application Development Lab

Paper Code: **MVOCSD-156**	L	T/P	C
Paper: **Mobile Application Development Lab**	0	4	2

Note: - *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 15 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Install Android Studio, Hello World, Logging.
2. Make Your First Interactive UI, Working with Text View Elements
3. Learning Resources, Create and Start Activities, Lifecycle and State Callbacks
4. Start Activities with Implicit Intents, Using the Debugger, Testing your code
5. Use support library, Use Keyboards, Input Controls, Alerts, and Pickers
6. Use an Options Menu and Radio Buttons
7. Create a Recycler View, Theme, Custom Styles, Drawables
8. Add a FAB and Cards
9. Put yourself in the Users shoes
10. Implement Localized Strings
11. Use Espresso to test your UI
12. Create an AsyncTask
13. Google APIs Explorer, JSON, Books API
14. Use AsyncTaskLoader, BroadcastReceiver, Notifications, Alarm Manager
15. Job Scheduler, Firebase Job Dispatcher, Get and Save User Preferences
16. Save user data in a database, Querying and Searching a Database,
17. Implement a Content Provider, Use a ContentResolver to query your data, Implement a Loader,
18. Beta testing your app

Database Administration Lab

Paper Code: **MVOCSD-158**
Paper: **Database Administration Lab**

L	T/P	C
0	4	2

Note: - The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 16 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.

List of Experiments:

Practical 1 :

Create following two tables including integrity constraints using SQL commands:

Table Name : Employee

Field Name	Data Type	Field Size	Constraints
Employee ID	Number	8	Primary key
Employee Name	Text	20	Not Null
Street	Text	15	
City	Text	3	'Del', 'Bom', 'Cal'

Table Name : Works

Field Name	Data Type	Field Size	Constraints
Employee ID	Number	8	Primary key, Foreign Key
Company Name	Text	20	Primary Key
Salary	Number	10,2	>10000 AND <25000

Now, perform the following operations using SQL commands :

(i) List all employees names working in 'FBC'.

(ii) Find the number of employees earning a salary greater than average salary of all employees.

Practical 2 :

Create following tables :

- Student(StudentID, Student_name, age)
- Registered(StudentID, CourseID, dt_of_Join)

Add the following constraints to the table using alter command:

(i) Primary Key and respective foreign key for all tables.

(ii) age>20 and age<60

List the student id and name of each student along with the total number of courses that the student is registered for.

Practical 3 :

Create following two tables including integrity constraints using SQL commands :

Table Name : Part

Field Name	Data Type	Field Size	Constraints
Part ID	Text	8	Primary key
Name	Text	20	Not Null

Table Name : Subpart

Field Name	Data Type	Field Size	Constraints
Part ID	Text	8	Primary key, Foreign Key
Sub Part ID	Text	20	Primary Key
Count	Number	5	>=0 AND <100
Cost	Number	10,2	Default 0

Now, perform the following operations using SQL commands :

(i) List the name of all the subparts whose part-id is "P-100".

(iii)Find the total cost of part "P-100" including subparts.

Practical 4 :

Create following two tables including integrity constraints using SQL commands :

Table Name : Student

Field Name	Data Type	Field Size	Constraints
Roll No	Number	8	Primary key
Name	Text	20	Not Null
Address	Text	50	

Table Name : Enrollment

Field Name	Data Type	Field Size	Constraints
Roll No	Number	8	Primary key, Foreign Key
Course	Text	20	Primary Key
Grade	Text	1	'A','B','C','D','E'

Now, perform the following operations using SQL commands :

(i) List all the students enrolled for 'BBA' and have grade 'A'.

(ii) Find the number of students enrolled in each course.

Practical 5 :

Create following tables :

- Employee(empno, name, office,age)
- Books(isbn, title, author, publisher)
- Loan(empno, isbn, date)

Add the following constraints to the table using alter command:

(iii) Primary Key and respective foreign key for all tables.

(iv) age>20 and age<60

List the names of employees having any book published by 'TMH".

Practical 6 :

Create following two tables including integrity constraints using SQL commands :

Table Name : Student

Field Name	Data Type	Field Size	Constraints
CSTID	Number	4	Primary key
CSTNAME	Text	25	Not Null
CSTCITY	Text	3	Must be- UDP,MNG,BNG,PJM,MAR
CSTDEP	Number	8,2	

Perform the following operations using SQL commands :

(i) Provide constraint names while creating table.

(ii) Drop the check constraint on CSTCITY.

(iii)Create a new constraint chkdep to check that the deposit is within the range 1500 to 30000.

Practical 7 :

Consider EMP table and create a new table based on the EMP table. Add the necessary constraints to the new table and perform the following using SQL commands :

(i) List employee number, employee name, total salary (i.e. salary+commission).
(Note : Manipulate the NULL values accordingly)

(ii) Display the name, job and salary of allemployees whose job is CLERK or ANALYST and their salary is not equal to 1000, 3000 or 5000.

(iii) Display the name, salary and commission for all employees whose commission amount is greater than their salary increased by 10%.

Practical 8 :

Create following two tables including integrity constraints using SQL commands :

Table Name : Student

Field Name	Data Type	Field Size	Constraints
Roll No	Number	8	Primary key
Name	Text	20	Not Null
Address	Text	50	

Table Name : Enrollment

Field Name	Data Type	Field Size	Constraints
Roll No	Number	8	Primary key, Foreign Key
Course	Text	20	Primary Key
Grade	Text	1	'A','B','C','D','E'

Now, perform the following operations using SQL commands :

(i) List all the students who have the same grade as that of 'SUNIL'.
(ii) List all the students who have enrolled in maximum number of courses.

Practical 9 :

Consider EMP table and perform the following using SQL commands :

(i) Add a new column called total sal to the table.
(ii) Update the total sal column with sal+commission.
(iii) Find the employees having salary greater than average salary of the employees working in dept 10.
(iv) List employee name and yearly salary and arrange the output on the basis of yearly salary in descending order.
(v) Retrieve the names of departments in ascending order and their employees in descending order.

Practical 10 :

Consider EMP table and perform the following operations using SQL commands :

(i) Select the name, job, salary and department number of all employees except MANAGER from department number 5.
(ii) List all departments in which more than 2 employees are working.
(iii) Find the employee earning the second highest salary.
(iv) List all the employees whose salary is greater than yearly commission.

Practical 11 (PL/SQL code Block)

1. Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 3 to 7.Store the radius and the corresponding values of calculated area in an empty table named Areas.
2. Write a PL/SQL Block of code for inverting a number 5639 to 9365.
3. Write a PL/SQL Block of code that will merge the data available in the newly created table NEW_BRANCHES with the data available in the table BRANCH_MSTR .if data in the first table already exist in the second table then that data should be skipped.
4. Write a PL/SQL block to display whether the given number is Odd or Even.

Practical 12 (PL/SQL code Block)

1. Write a PL/SQL block to display BPIBS 10 times using for loop
2. Write a PL/SQL Block to print the sum of numbers from 1 to 50.
3. Write a PL/SQL block to find the salary of a given employee and raise his salary by 20%.

Practical 13 (PL/SQL code Block)

1. Write a PL/SQL block to calculate the average salary from table 'Emp' and print increase the salary if the average salary is less that 10,000.
2. Write a PL/SQL block to print the deptno from the employee table using the case statement if the deptname is 'Technical' then deptno is 1, if the deptname is 'HR' then the deptno is 2 else deptno is 3.
3. Write a PL/SQL block to display the detail about given employee from EMP table.

Practical 14 (PL/SQL Procedures)

1. Create a procedure on table employee to display the details of employee whose salary will be provided during execution.
2. Write a PL/SQL procedure to print the following output.

```
* * *
  * *
    *
```

Practical 15 (PL/SQL Functions)

1. Create a function that accepts the programmer_id and checks if the programmer_id exits in the table PROGRAMMER. If the programmer_id exits, display a message valid client and if the programmer_id does not exit, then display an appropriate error message.
2. Write a function on programmer table to calculate number of female programmers.
3. Write a function on programmer table to return total number of programmers having knowledge of specified language.
4. Write a function on programmer table to return age of specified person.
5. Write a function on studies table to return course fee of a specified course.

6. Write a function on studies and programmer table to return number of months required to overcome the course fee he/she has studied.

Practical 16 (PL/SQL Triggers)

1. Write a database trigger to check that date_of_joining is not empty. Also check that the date_of_joining should be greater than date_of_birth field in EMPLOYEE table.
2. Write a database trigger on EMPLOYEE table to check that first letter of the emp_id is 'E'.
3. Create a trigger on EMPLOYEE table for deletion where the whole table is displayed whenever a delete operation is performed.
4. Create trigger on EMPLOYEE table on update or insert of emp_name to convert emp_name into capital letter

Practical 17 (PL/SQL Cursors)

1. Write a PL/SQL block using cursor to update salary of a given programmer by 25%.
2. Create a cursor emp_cur,fetch record from emp table and check whether sal>10000 then update Grade = 'A' else if sal = > 5000 and sal <= 10000 then update Grade = 'B'
3. Write a PL/SQL block with cursor ,showing the use of SQL%FOUND attribute
4. Write a PL/SQL block with cursor ,showing the use of SQL% ROWCOUNT attribute
5. Write a PL/SQL block with cursor ,showing the use of SQL% ISOPEN attribute