

# PONDICHERRY UNIVERSITY

PONDICHERRY



## BACHELOR OF VOCATIONAL DEGREE

IN

## SOFTWARE DEVELOPMENT

(CHOICE BASED CREDIT System)

### REGULATIONS & SYLLABUS

2022 - 2023 onWARDS

# PONDICHERRY UNIVERSITY

## **B.VOC. (SOFTWARE DEVELOPMENT)**

**FIRST SEMESTER** -- CERTIFICATE IN SOFTWARE DEVELOPMENT

**FIRST YEAR** – DIPLOMA (Vocational) IN SOFTWARE DEVELOPMENT

**SECOND YEAR** – ADVANCED DIPLOMA (Vocational) IN SOFTWARE  
DEVELOPMENT

**THIRD YEAR** – B.Voc. (SOFTWARE DEVELOPMENT)

### **REGULATIONS, CURRICULUM AND SYLLABUS**

(Effective from the academic year 2022 – 2023)

#### **1. Aim of the Course**

The B.Voc. [Software Development] course aims to prepare the students to get employed in IT industries by imparting them the necessary training which is required in the industry. The syllabus has been prepared in consultation with the industry people and their valuable input has largely defined the way the curriculum and the syllabus had been designed. This course provides lateral entry, lateral exit and vertical mobility facilities to the students.

#### **2. Eligibility for Admission**

Candidates for admission to B.Voc. [Software Development] shall be required to have passed Higher Secondary Examination/Senior Secondary /+2/ conducted by any Sstate Board of Examination with Mathematics / Business Mathematics / Computer Science as one of the subjects of study or an examination accepted as equivalent thereto, subject to such conditions as may be prescribed. Therefore, students with Diploma qualifications with the above mentioned subjects of study are also allowed for direct second year (lateral entry).

#### **3. Duration of the Course**

The course shall be of three years duration spread over six semesters. The maximum duration to complete the course shall be as per the UGC guidelines.

#### **4. Medium**

The medium of instruction shall be English.

#### **5. Passing Minimum**

Passing Eligibility and Classification for the award of the Diploma/Advanced Diploma/Degree as existing for BCA or the other B.Sc. Degree courses stipulated by the Pondicherry University regulations.

## 6. Course Structure

Category	Course Name	Number of Papers	Credits per paper	Total credits
MIL	Modern Indian Languages	1	4	4
ENG	English	2	4	8
MATH	Mathematics	1	4	4
SDSC	Software Development Skill Components	12	4/5	57
SDSCP	Software Development Skill Components- Practical	17	2/6/8	50
SDGE	Software Development General Education	13	3/4/5	57
		46	Total	180

**FIRST SEMESTER**

S.No.	Course	Subject Code	Paper Name	Teaching Hours			Total Contact Hours	Credits
				L	T	P		
<b>GENERAL EDUCATION</b>								
1	MIL	BVSDGE01	Modern Indian Languages	4	0	0	4	4
2	ENG	BVSDGE02	English – I	4	0	0	4	4
3	MATH	BVSDGE03	Mathematics for Computer Science	3	1	0	4	4
<b>Skill Components</b>								
4	SDSC-1	BVSDSC04	Information Technology Fundamentals	4	0	0	4	4
5	SDSC-2	BVSDSC05	Programming Concepts in C	3	1	0	4	4
<b>LAB/PRACTICAL</b>								
6	SDSCP-1	BVSDSC06	Office Automation Tools Lab	2	0	4	6	4
7	SDSCP-2	BVSDSC07	Desktop Publishing Tools Lab	2	0	4	6	4
8	SDSCP-3	BVSDSC08	C Programming Lab	0	0	4	4	2
<b>TOTAL</b>				<b>22</b>	<b>2</b>	<b>12</b>	<b>36</b>	<b>30</b>

**Job Profile:** At the end of the first Semester, the student can get employed in Front office jobs /Computer Operator

**SECOND SEMESTER**

S.No.	Course Code	Subject Code	Paper Name	Teaching Hours			Total Contact Hours	Credits
				L	T	P		
<b>GENERAL EDUCATION</b>								
1	ENG	BVSDGE09	English – II	4	0	0	4	4
2	SDGE-1	BVSDGE10	System Administration and Maintenance	3	1	0	4	4
3	SDGE-2	BVSDGE11	Operating System	3	1	0	4	4
<b>Skill Components</b>								
4	SDSC-3	BVSDSC12	Object-Oriented Programming	3	2	0	5	5
5	SDSC-4	BVSDSC13	Fundamentals of Data Structures	3	2	0	5	5
<b>LAB/PRACTICAL</b>								
6	SDSCP-4	BVSDSC14	OOPS Lab	0	0	4	4	2
7	SDSCP-5	BVSDSC15	Data Structures Lab	0	0	4	4	2
8	SDSCP-6	BVSDSC16	Mini Project-1	0	0	8	8	4
<b>TOTAL</b>				<b>16</b>	<b>6</b>	<b>16</b>	<b>38</b>	<b>30</b>

**Job Profile:** At the end of the second Semester, the student can get employed in Front office jobs /system administrator

**THIRD SEMESTER**

S.No.	Course	Subject Code	Paper Name	Teaching Hours			Total Contact Hours	Credits
				L	T	P		
<b>GENERAL EDUCATION</b>								
1	SDGE-3	BVSDGE17	Accounting Tools	3	2	0	5	5
2	SDGE-4	BVSDGE18	Computer Networks	4	0	0	4	4
3	SDGE-5	BVSDGE19	Fundamentals of Algorithms	3	2	0	5	5
<b>Skill Components</b>								
4	SDSC-5	BVSDSC20	Python Programming	3	2	0	5	5
5	SDSC-6	BVSDSC21	Data Base Management System	3	2	0	5	5
<b>LAB/PRACTICAL</b>								
6	SDSCP-7	BVSDSC22	DBMS Lab	0	0	4	4	2
7	SDSCP-8	BVSDSC23	Python Programming Lab	0	0	4	4	2
8	SDSCP-9	BVSDSC24	Accounting Tools Lab	0	0	4	4	2
<b>TOTAL</b>				<b>16</b>	<b>8</b>	<b>12</b>	<b>36</b>	<b>30</b>

**FOURTH SEMESTER**

S.No.	Course	Subject Code	Paper Name	Teaching Hours			Total Contact Hours	Credits
				L	T	P		
<b>GENERAL EDUCATION</b>								
1	SDGE-6	BVSDGE25	Statistics for Machine Learning	3	1	0	4	4
2	SDGE-7	BVSDGE26	Multimedia Tools	3	2	0	5	5
3	SDGE-8	BVSDGE27	Network Security	3	1	0	4	4
<b>Skill Components</b>								
4	SDSC-7	BVSDSC28	.Net Framework	3	2	0	5	5
5	SDSC-8	BVSDSC29	Software Engineering and Project Management	3	1	0	4	4
<b>LAB/PRACTICAL</b>								
6	SDSCP-10	BVSDSC30	.NET Lab	0	0	4	4	2
7	SDSCP-11	BVSDSC31	Multimedia Tools Lab	0	0	4	4	2
8	SDSCP-12	BVSDSC32	Mini Project 2	0	0	8	8	4
<b>TOTAL</b>				<b>15</b>	<b>7</b>	<b>16</b>	<b>38</b>	<b>30</b>

**Job Profile:** At the end of the second year, the student can get employed as a Programmer/ Infrastructure Engineer/Network Engineer

## FIFTH SEMESTER

S.No.	Course	Subject Code	Paper Name	Teaching Hours			Total Contact Hours	Credits
				L	T	P		
<b>GENERAL EDUCATION</b>								
1	SDGE-9	BVSDGE33	Environmental Studies	3	0	0	3	3
2	SDGE-10	BVSDGE34	Organizational Behavior	4	0	0	4	4
		BVSDGE35	Business Communication					
3	SDGE-11	BVSDGE36	Free and Open-Source Software (FOSS)	3	2	0	5	5
<b>Skill Components</b>								
4	SDSC-9	BVSDSC37	Web Technology	3	2	0	5	5
5	SDSC-10	BVSDSC38	Data Mining	3	2	0	5	5
<b>LAB/PRACTICAL</b>								
6	SDSCP-13	BVSDSC39	Web Technology Lab	0	0	6	6	3
7	SDSCP-14	BVSDSC40	FOSS Lab	0	0	6	6	3
8	SDSCP-15	BVSDSC41	Data Mining Lab	0	0	4	4	2
<b>TOTAL</b>				<b>16</b>	<b>6</b>	<b>16</b>	<b>38</b>	<b>30</b>

## SIXTH SEMESTER

S.No.	Course	Subject Code	Paper Name	Teaching Hours			Total Contact Hours	Credits
				L	T	P		
<b>GENERAL EDUCATION</b>								
1	SDGE-12	BVSDGE42	Cloud Computing	3	2	0	5	5
2	SDGE-13	BVSDGE43	Introduction to Data Analytics	3	2	0	5	5
			E-Commerce					
<b>Skill Components</b>								
4	SDSC-11	BVSDSC44	Mobile Application Development	3	2	0	5	5
5	SDSC-12	BVSDSC45	Internet of Things	3	2	0	5	5
		BVSDSC46	Ethical Hacking					
<b>LAB/PRACTICAL</b>								
6	SDSCP-16	BVSDSC47	Mobile Application Development Lab	0	0	4	4	2
7	SDSCP-17	BVSDSC48	Project Work	0	0	16	16	8
<b>TOTAL</b>				<b>12</b>	<b>8</b>	<b>20</b>	<b>40</b>	<b>30</b>

**Job Profile:** At the end of the third year, the student can get employed as a Programmer or Application Developer

**Objectives:**

1. To help students develop listening skills for academic and professional purposes.
2. To help students acquire language skills to speak effectively in English in real-time situations.
3. To enable students to write letters and reports effectively in formal situations.

**Outcomes:**

On completion of the course, student will be able to

1. Communicate effectively in English.
2. Improve listening skills in English
3. Actively participate in group discussion / meetings / interviews and prepare & deliver presentations become more effective individuals through goal/target setting, self-motivation and practicing creative thinking.

**UNIT 1**

**Fundamentals of Language:** Articles and Parts of Speech.

**UNIT 2**

**Process of Writing:** Paragraph Writing, Essay Writing, Writing– issue- writing instructions – checklists-recommendation.

**UNIT 3**

Reading Skills: Reading Comprehension, Description and Narration (Objects, Places and People)  
Strategies: Skimming and Scanning & Note-making.

**UNIT 4**

**Effective Oral Communication [Spoken English]:** 1) Introducing yourself 2) Presentation 3) Group Discussion 4) role play

**UNIT 5**

**Drafting:** Drafting Letters -Personal - to friends and relatives –Official - requesting, inviting chief guest, apologizing.

**Reference Books:**

1. David Green, *Contemporary English Grammar Structures and Composition*, Second Edition, Laxmi Publications, 2015.
2. G. Radhakrishna Pillai, K. Rajeevan and P.Bhaskaran Nair, *Written English for You*. First Edition, Emerald, 2008.



**Objectives:**

- Ability to model data sets as mathematical functions and solve.
- Ability to understand and model the structures such as graphs and trees.

**Outcomes:**

- Acquire knowledge regarding the use of Mathematics in Computer Science.
- Acquire knowledge regarding relevant topics such as set Theory, basic logic, graphs and trees.

**UNIT I**

**Symbolic Logic:** Proposition, Logical operators, conjunction, disjunction, negation, conditional and bi-conditional operators, converse, Inverse, Contra Positive, logically equivalent, tautology and contradiction. Normal forms – Disjunctive normal forms and Conjunctive normal forms.

**UNIT II**

**Set Theory:** Sets- set operations, Venn diagram, Properties of sets, number of elements in a set, Power set- Cartesian product, relations & functions, Relations: Equivalence relation, partially and Totally Ordered sets, Functions: Types of Functions, Composition of Functions. Boolean Algebra and its Properties – Karnaugh Map (1, 2, 3 and 4 variables only)

**UNIT III**

**Matrices:** Definition – types of matrices- Singular and Non-Singular matrices, Adjoint of a Matrix, Inverse of a matrix Symmetric and Skew-Symmetric, Hermitian and Skew-Hermitian, Orthogonal and unitary matrices - Rank of a matrix - Solution of Simultaneous Linear equations -Eigen values and Eigen vectors – Cayley’s Hamilton theorem.

**UNIT IV**

**Graph Theory:** Graph – Definition – Applications of Graph – Finite and Infinite Graphs – Incidence and Degree – Isolated Vertex – Pendant Vertex – Null Graph -Isomorphism –Sub graphs – Walks, paths and circuits – Connected Graphs – Disconnected Graphs and components. Euler Graphs –operations on Graphs - Hamiltonian and circuit.

**UNIT V**

**Tree:** Trees and Fundamentals Circuits: Trees - Some properties of Trees – Pendant Vertices in a tree – Distance and Centres in a Tree – Rooted and Binary Trees – On Counting Trees – Spanning Trees – Fundamental Circuits.

## Reference books

1. J. P. Tremblay & R. Manohar, *Discrete Mathematical Structures with Applications to Computer Science*, First Edition, Mc-Graw Hill Education, 2017.
2. T. K. Manicavachagom Pillay, T. Natarajank, S. Ganapathy, *Algebra – Vol. II*, 11<sup>th</sup> Revised edition. 2004, S. Viswanathan Printers & Publishers Pvt. Ltd. Chennai. 2004
3. Narsingh Deo, *Graph Theory with Applications to Engineering & Computer Science*, Dover Publications Inc., New York, 2016.

## **Subject Code: BVSDSC04 INFORMATION TECHNOLOGY FUNDAMENTALS**

**Prerequisite:** Basic knowledge of Computers.

### **Objectives:**

- To learn fundamental of computer

### **Outcomes:**

- Knowledge of modern computers, input and output devices categories.
- To learn how to identify problems and to develop algorithm.
- To learn basic computer network and how to identify problems in software development

### **UNIT I**

**Introduction to Computers** – Generations of Modern Computers – Classification of digital Computer Systems – Anatomy of a Digital Computer. **Number Systems** – Decimal, Binary, Octal, Hexadecimal Conversion from one number system to another, Complements, Binary coded Decimal, Bits, Bytes and Words.

### **UNIT II**

**Input Devices:** Keyboard, Mouse, Track ball, Joystick, Scanner, Digital Camera, MICR, OCR, Barcode Reader, Touch Screen, and Light Pen. **Internal Memory:** Computer Memory System Overview- RAM and ROM- Cache Memory. **Output Devices:** Monitor, Printer, Plotter, Sound Card and Speaker. Memory Units and Auxiliary Storage Devices. **System Modules:** I/O module- Memory module- Process module - DMA.

### **UNIT III**

**Introduction to Programming** – Algorithms, Flowchart, Source Program, Object Program, Compilers, Interpreters, Assemblers, Machine Language, Assembly Language, High Level Language, Types of High-Level Language, Stages of Program Development.

### **UNIT IV**

**Computer Networks**-Overview of Network, Communication Processors, Communication Media, Types of Networks, Network Topologies, Network Protocols, Network Architecture. Introduction to Internet & WWW, E-mail, Intranet.

### **UNIT V**

**Introduction to Software development**- Defining the problem, Program design, Coding, Testing, documenting and maintaining the program

## **Reference Books**

1. Peter Norton's, "Introduction to Computers", Fifth edition, Tata McGraw Hill Publications 2004.
2. Alexis Leon and Mathews Leon, "Introduction to Computers", Leon TECHWorld, 2009.
3. Alexis Leon and Mathews Leon, "Fundamentals of Information Technology", Leon TECHWorld, 2009.

**Subject Code: BVSDSC05**

## **PROGRAMMING CONCEPTS IN C**

**Prerequisite:** Basic knowledge of Computers.

### **Objectives:**

- To learn the concepts of “C” Programming
- To develop software programs using “C” language

### **Outcomes:**

- In-depth understanding of various concepts of C language.
- Skill to write program code in C to solve real world problems and to debug a program

## **UNIT I**

**Introduction** – C character set, Identifiers and keywords. Data type, Declarations, Expressions, statements and symbolic constants, Input-Output: getchar, putchar, scanf, printf, gets, puts, functions, Pre-processor commands, #include, define, preparing and running a complete C program. Operators and expressions: Arithmetic, Unary, Logical, bit-wise, assignments and conditional Operator, Library functions.

## **UNIT II**

**Control statements:** While, do-while, statement, nested loops, if-else, switch, break, continue and go to statements, comma operator. Arrays: Defining and processing. Multidimensional arrays. Strings and operations on strings.

## **UNIT III**

**Functions:** Defining and accessing: Passing arguments, Function prototypes, Recursion. Use of library functions, Storage classes: Automatic, external and static variables.

## **UNIT IV**

**Pointers:** Declarations, Passing to a function. Operations on pointers, pointer and arrays. Array of pointers. Structure: Defining and processing. Passing to a function, Union.

## **UNIT V**

**Data Files:** Open, close, create, process unformatted data files.

## **Reference Books**

1. E.Balagurusamy, “Programming in ANSI C” , 8th Edition Tata McGraw Hill, 2019
2. P. K. Sinha & Priti Sinha, “Computer Fundamentals”, BPB Publications, 2007.
3. Byron S. Gottfried, “Programming with C” , Schaum’s Outline Series, TMH, 4th Edition 2018.

**Prerequisite:** Basic knowledge of Computers.

**Objectives:**

- To practically learn to use Microsoft word, Excel and Power point

**Outcomes:**

- Students will be able to draft official and personal letters using various functions of MSWord.
- Understand, manipulate and represent data with MS-Excel using formula and graphs
- Acquire knowledge to prepare presentation with PowerPoint

**UNIT – I**

**MS-Word** - Working with MS Word - Creating a New Document – Working with Font, Page setup, Paragraph and Page background - Text Editing using various features – Margins, Inserting Page Numbers, Pictures, Files, Word Art, Symbols – Header and footer, Page border, working with Columns, Tabs & Indents - Creation & Working with Tables -Margins & Space management in Document - Mail Merge

**UNIT – II**

**MS-Excel:** Working with MS Excel - concepts of Workbook & Worksheets - Working with Data & Ranges - Different Views of Worksheets - Using different features with Data and Text - Use of Formulas, Calculations & Functions - Cell Formatting including Borders & Shading; Working with Different Chart Types - Printing of Workbook.

**UNIT – III**

**MS-Powepoint:** Creating and Viewing Presentations – Editing a Presentation – Working with Presentation, slide transitions and Special Effects

**Reference Books:**

1. Dinesh Maidasani , Straight to the Point – MS Office 2010, Laxmi Publications, 2010.
2. Sherry Kinkoph Gunter, Master Visually Microsoft Office 2010, WILEY, 2010.

**List of Experiments:**

1. To create a personal letter using MS-WORD
2. To create company letter head using MS-WORD
3. To create a memo using MS-WORD
4. To create a greeting card using MS-WORD
5. To create a cover page of a project report.
6. To create letter using mail merge.
7. To create a spreadsheet for mark statement of students.
8. To create various graphs with respect to students' academic details.
9. To create a slide show regarding our college and department

**Objectives:**

- To practically learn to design using DTP tools

**Outcomes:**

- Student will be able to work with editing tools such as Adobe PageMaker, CorelDraw and Photoshop

**UNIT I**

**Adobe PageMaker:** Creating and opening publications, using tool box, working with palettes, text and graphics, saving and closing publication, ruler guides, creating columns, creating styles. Adding Graphics to your Document, Adding lines, Shapes, changing Shape Line and fill, Creating Drop-Shadow, Boxes, Text wrap, Changing page maker Options: Adjusting Margins, Setting and Adjusting Columns, Setting Unequal Width Columns, Creating headers and Footers, Creating Graphics in page maker, Rotating Text, Skewing and Mirroring objects with Control Palette. Importing Graphics into page maker: Placing, Sizing, aligning Graphics, Cropping Graphics. Introduction to Using layers.

**UNIT II**

**CorelDRAW:** Introduction-Creating A New File - Title Bar-Menu Bar - Work Area - Property Bar - Colour Palette – Toolbox - Status Bar - Drawing Figures: Drawing Toolbox – Selecting, Resizing, Moving an Object - Changing the Shape - Combining Two Objects –Skewing - Welding the Objects – Blending. Media Tool-Rotating an Object – Grouping - Fill Tool Fly Out – Filling - Spray Mode. Text tool - Entering Artistic Text - Entering Paragraph Text-Converting Text-Formatting Text- Changing the Font Size-Arranging Objects-Ordering The Objects-Changing the Font-Bullets-Decorating the Text-Webdings. Image: Bitmap Images-Vector Image-Resizing-Rotating-Skewing-Moving-Cropping-Importing.

**UNIT III**

**Adobe Photoshop:** Image Modifications, Color Modifications, Basic Tools, Selection Tools, Drawing and Coloring Tools, Advanced Tools, Text Tools, Tools Presets, Brush Presets Color and Shapes, Making Selections with Different Tools, Modifying an Existing Selection, Saving and Loading Selections, Working with Layers Layer Options, Layer Effects, Mask Types Modifying Masks, Filters and Effects, Additional Filters



**Reference Books:**

1. “Adobe Pagemaker: A classroom in a book”, Adobe, 2002
2. Gary David Bouton, “CorelDRAW: The official guide”, 12th edition, 2017
3. Andrew Faulkner, “Adobe Photoshop cc: classroom in a book”, Adobe, 2018

**List of Experiments:**

1. Create a simple document using text and shapes in PageMaker
2. Create a simple document using graphics and layering in PageMaker
3. Create a simple document using Objects and Shapes in CorelDRAW
4. Create a simple document using Text and images in CorelDRAW
5. Modifying an existing Image with modifications in colours and shapes using Photoshop
6. Layering, Masking and Filtering effects in image using Photoshop

**List of Experiments:**

1. Check for Prime Number, Armstrong number, Fibonacci
2. Summation of the series: Sin (x) , Cos(x), Exp(x)
3. String Manipulations
  - a. Counting number of vowels, consonants, words, white spaces in a string
  - b. Reversing a string and check for palindrome
  - c. Finding the number of occurrences of a sub string in a given string
  - d. Sub string replacing and removal
4. Recursion
  - a. Factorial
  - b. Reversing a string
  - c. Fibonacci Sequence
  - d. Tower of Hanoi
5. Matrix Manipulations using functions and Case structure
  - a. Addition & Subtraction
  - b. Multiplication
  - c. Transpose
  - d. Check if the given matrix is a Magic square
6. Searching
7. Sorting
8. Structures
9. Pointers
10. Files

**Objectives:**

- To help students develop listening skills for academic and professional purposes.
- To help students acquire language skills to speak effectively in English in real-time situations.
- To enable students to write letters and reports effectively in formal situations.

**Outcome:**

On completion of the course, student will be able to–

- communicate effectively in English and improve listening skills in English
- actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
- become more effective individuals through goal/target setting, self-motivation and practicing creative thinking.

**UNIT I**

**Technical English:** Terminology of Computer Science

**UNIT II**

**Process of Writing:** Report Writing, nature and structure of report, types of report- visit reports, survey reports and reports on events

**UNIT III**

**Creative writing:** Basic writing skills, developing ideas and themes, writing- welcoming, thanks giving, reporting events.

**UNIT IV**

**Developing Conversational Ability:** 1) Meeting People, Exchanging Greetings and Taking Leave  
2) facing interview 3) Introducing People to Others 4) Answering the Telephone and Asking for Someone 5) Dealing with a Wrong Number 6) Taking and Leaving Messages 7) Making Inquiries on the Phone

**UNIT V**

**Drafting:** Writing- email etiquette- job application – cover letter –Resume preparation (via email and hard copy)- analytical essays and issue-based essays.

**Reference Books:**

1. David Green, Contemporary English Grammar Structures and Compositions. Revised Edition, Macmillan India Ltd, 2008
2. G. Radhakrishna Pillai, K. Rajeevan and P.Bhaskaran Nair, Written English for You. Emerald, 2007.

## **Subject Code: BVSDGE10 SYSTEM ADMINISTRATION AND MAINTENANCE**

### **Objectives:**

- To learn Fundamentals of Windows and Administration, SharePoint, operating system maintenance

### **Outcomes:**

- Knowledge of windows fundamentals.
- knowledge of how to install operating system and maintenance and Network system maintenance

### **UNIT I**

**Windows 10: Introduction to windows Fundamentals:** Installing, Upgrading and migrating to windows 10. Configuring Disk and Device Drivers. Configuring File Access and Printers on windows 10 client. Configuring Network connectivity & wireless Network Connections. Securing windows 10 Desktop with UAC, local security policies, EFS, and AppLocker. Optimizing and maintaining windows 10 client computers. Configuring mobile computing and Remote Access in windows 10.

### **UNIT II**

**Server administration fundamentals:** Understanding Server installation, Roles. Understanding Active Directory. Storage & server performance Management and server Maintenance.

### **UNIT III**

**Introduction to Share point fundamentals:** Understanding, Installing and Assigning service applications. Power shell Basics, Using the ULS viewer, FAST search, Backup Restore Disaster Recovery, SharePoint Foundation.

### **UNIT IV**

**Operating System Maintenance:** Linux distributions, Windows versions, PC hardware, BIOS, devices and drivers, system monitoring, kernel configuration and building. Applications installation, configuration, maintenance (service packs, patches, etc.), server services (database, web, network services, etc.), client services.

### **UNIT V**

**Network System Maintenance:** Network configuration, network services (file printing on network, DHCP, DNS, FTP, HTTP, mail, SNMP, telnet)

**Reference Books:**

1. Lindsay Henning, "Microsoft windows fundamentals" student resource manual-6<sup>th</sup> edition,2011.
2. Craig Zacker, "Windows server administration fundamentals" Microsoft official academic course, Wiley publications,2019.
3. Hillier, Scot, Ted Pattison, "Microsoft® SharePoint® 2013 App Development" , first edition, Microsoft press, 2013.

**List of Experiments:**

- 1) Installation of WINDOWS operating system.
- 2) Upgrading and migrating WINDOWS operating system.
- 3) Configuring Disk and Device Drivers and File access and Printers in WINDOWS operating system.
- 4) Configuring Mobile computing and Remote Access in WINDOWS operating system.
- 5) Optimizing security and maintaining the WINDOWS operating system.
- 6) Installation of LINUX operating system.
- 7) Installation of WINDOWS server and maintenance.
- 8) Configure and connect the computers in Local Area Network.

**Objectives:**

- To learn OS management functions.
- To learn Memory management, Processor management, Device Management and I/O Management

**Outcomes:**

- Understand how memory is utilized. Understand CPU scheduling algorithms to manage tasks.
- Knowledge of methods to prevention and recover from a System Deadlock
- Understand the working principles of File System.

**UNIT I**

**Introduction to Operating System:** What is an operating system? History of operating system, Computer hardware & Software, Different operating systems, Various System Software associated with Operating Systems, Shell and Kernel, Systems Calls .

**UNIT II**

**Process & Threads:** Processes, PCB, Process States, Threads & TCB, difference and Similarities in Threads and Process. Inter-process communication, CPU scheduling, IPC problems.

**UNIT III**

**Process Synchronization & deadlocks:** Critical Section Problems & Semaphores, Classical Problems of process Synchronization, Introduction to deadlocks, Deadlock detection and recovery, Deadlock avoidance, Deadlock prevention, issues

**UNIT IV**

**Memory Management:** Address Spaces and Address Translation, Swapping & memory allocation, Paging & Segmentation, Virtual Memory & Demand Paging, Page Replacement Algorithm, Thrashing

**UNIT V**

**File Management & Disk Management:** File Systems: Files, directories, file system & Directories implementation, file-system management and optimization, File Allocation Methods, MS-DOS file system, UNIX V7 file system. Disk Structure, Disk Scheduling Algorithm (FCFS, RAID, Network Operating System, Real Time Operating System, Distributed Operating System.

## **Reference Books**

1. Stuart E. Madnick and John Donovan “Operating System”, TMH, Reprint 2008.
2. William Stallings, “Operating Systems Internals and Design Principles”, 4<sup>th</sup> edition, PHI India, 2005.
3. H.M. Deitel, “Operating Systems”, 2<sup>nd</sup> edition, Addison-Wesley.



**Prerequisite:** Basic knowledge of programming

**Objectives:**

- To learn the basic concepts of OOP
- To learn Java programs, concepts of Swing and Applets

**Outcomes:**

- Skill to write Java application programs using OOP principles and proper program structuring.
- Ability to create packages and interfaces.
- Ability to implement error handling techniques using exception handling.
- To create real time java applications.

## **UNIT I**

**INTRODUCTION TO OOP AND JAVA FUNDAMENTALS:** Object Oriented Programming – Abstraction – objects and classes – Encapsulation- Inheritance – Polymorphism- OOP in Java – Characteristics of Java – The Java Environment – Java Source File Structure – Compilation. Fundamental Programming Structures in Java – Defining classes in Java – constructors, methods - access specifiers – static members -Comments, Data Types, Variables, Operators, Control Flow, Arrays, Packages – Javadoc comments.

## **UNIT II**

**INHERITANCE AND INTERFACES:** Inheritance – Super classes- sub classes –Protected members – constructors in sub classes- the Object class – abstract classes and methods- final methods and classes – Interfaces – defining an interface, implementing interface, differences between classes and interfaces and extending interfaces – Object cloning -inner classes, Array Lists – Strings

## **UNIT III**

**EXCEPTION HANDLING AND I/O:** Exceptions – exception hierarchy – throwing and catching exceptions – built-in exceptions, creating own exceptions, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files

## UNIT IV

**MULTITHREADING AND GENERIC PROGRAMMING:** Differences between multithreading and multitasking, thread life cycle, creating threads, synchronizing threads, Inter-thread communication, daemon threads, thread groups. Generic Programming – Generic classes – generic methods – Bounded Types – Restrictions and Limitations.

## UNIT V

**EVENT DRIVEN PROGRAMMING:** Graphics programming – Frame – Components – working with 2D shapes – Using color, fonts, and images – Basics of event handling – event handlers – adapter classes – actions – mouse events – AWT event hierarchy – Introduction to Swing – layout management – Swing Components – Text Fields, Text Areas – Buttons- Check Boxes – Radio Buttons – Lists- choices- Scrollbars – Windows –Menus – Dialog Boxes.

### Reference Books:

- 1 Herbert Schildt, —Java The complete reference, 8th Edition, McGraw Hill Education, 2011.
- 2 Cay S. Horstmann, Gary cornell, —Core Java Volume –I Fundamentals, 9th Edition, Prentice Hall, 2013.
- 3 Paul Deitel, Harvey Deitel, —Java SE 8 for programmers, 3rd Edition, Pearson, 2015.
- 4 Steven Holzner, —Java 2 Black book, Dreamtech press, 2011.
- 5 Timothy Budd, —Understanding Object-oriented programming with Javal, Updated Edition, Pearson Education, 2000.

## **Subject Code: BVSDSC13 FUNDAMENTALS OF DATA STRUCTURES**

**Pre-requisite:** Knowledge of any programming language

**Objectives:**

- To acquaint students with data structures used for programming and manipulation of data.
- To make students to understand the basics of algorithms.

**Outcomes:**

- Skill to analyze data and to determine appropriate data structure. Knowledge of various data structures and their implementations.
- Ability to implement algorithms to perform various operations on data structures.

### **UNIT I**

**Introduction to Data Structure:** Types of Data Structures - Linear & Non-Linear Data Structures. Linear Data Structure - Arrays: Representation of arrays, Applications of arrays. Searching: Linear search and Binary Search.

### **UNIT II**

**Stacks:** Representation, Operations on stack, Implementation of stack using array, Application – Evaluation of Expression.

### **UNIT III**

**Queues:** Representation, Operations on Queues, Implementation of queues using array. List representations: implementing the list operations, doubly linked list representation. Polynomial-representations.

### **UNIT IV**

**Non-Linear Data Structures:** Trees: Basic terminology, Binary tree, Representation, Traversal, Binary search tree.

### **UNIT V**

**Graph:** Definition and Terminology – Representation, Traversal – Depth First and Breadth First traversal techniques.

### **Reference Books**

1. Ellis Horowitz, Sartaj Sahni and Anderson, “Fundamentals of Data Structure in C”, University Press, 2nd edition, 2008.
2. T.H.Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein. “ Introduction to Algorithms, PHI, 3rd edition, 2010.

**Subject Code: BVSDSC14 OBJECT ORIENTED PROGRAMMING LAB**

**List of Experiments:**

1. Sample programs on conditional statements and loop controls
2. Demonstrate class, object and methods with various access modifiers
3. Sample program on static variables and static methods
4. Sample program on passing and returning object as argument
5. Demonstrate constructors overloading
6. Demonstrate types of inheritance
7. Abstract classes and methods
8. Program on Packages and Interfaces
9. Demonstration of threads using Thread class and Runnable Interface
10. Sample programs on file handling operations

**List of Experiments:**

1. Write a program to demonstrate insertion, deletion, search and displaying of an element in an array,
2. Write a program to demonstrate sorting algorithm. (using any one of these techniques: bubble, Insertion, selection)
3. Write a program to demonstrate operations performed on stack.
4. Program to convert infix expression to postfix and infix to postfix.
5. Write a program to demonstrate operations on queue.
6. Write a program to demonstrate operations on singly link list.
7. Write a program to implement Stack as Linked List.
8. Write a program to implement operations on double link list.
9. Write a program to demonstrate creation, traversing and searching in Binary Search Tree.
10. Write a program to traverse a graph using DFS with an adjacency matrix.
11. Write a program to traverse a graph using BFS with an adjacency matrix.

**Subject Code : BVSDSC16**

**MINI PROJECT-1**

Internship for the Students for a period of 2 weeks in Software Development or any other IT/ITES organization to get hands-on experience of the software development life cycle and the various processes involved in the development, testing and operation of software systems. Student must submit a report on their internship work from the organization based on which university viva voce will be conducted. Inhouse project can also be done with similar mode of evaluation

**Objectives:**

- To learn about basics entries in Tally
- To work with Tally Accounting Software for maintaining accounts

**Outcomes:**

- Student will be able to computerize the accounts maintained in the ledger
- Acquire knowledge about how to use the package for accounts application for a company

**UNIT I**

**Accounting Software Packages:** Overview - Tally, Wings, Busy, Spreadsheet, MS-Excel as Accounting tool, Function wizard, Auditing Tool in MS Excel - Selective Applications for Accounts.

**UNIT II**

**Problems of Accounting Software:** Security Problems - Power problems - Data integrity problems -Computer virus problems of system adoptions.

**UNIT III**

**Fundamentals of Tally. ERP 9:** Introduction to Tally: Introduction, Terminology in Tally; Difference between Manual Accounting and Accounting Packages, Features and advantages of Tally Creation of a company, Gateway of Tally, Key board shortcuts in Tally, Accounts Information, Groups, pre-defined Groups, Creation of New Groups, Creation of sub-Group. Journal, Ledgers, Ledger Creation – Single and multiple Ledgers, Displaying & altering Ledgers, Stock Ledger, Ledgers and their Group Allocation, Trial Balance.

**UNIT IV**

**Vouchers:** –Types of vouchers – recording of vouchers – entry of payment voucher, Receipt voucher, sales voucher, purchase voucher, Journal Voucher, Contra Voucher, Debit & Credit Note. Creating New Voucher types, customizing the Existing voucher types, Alternation of Voucher, Deletion of Voucher.

## **UNIT V**

**Generating Reports:** Final Accounts: Customizing the final accounts – Trading, Profit and Loss Account, Balance Sheet. Generating the Reports from Tally, Trial Balance, Account Books, Sales, Purchase, Journal Registers, Statement of Accounts, Day Book, Practice Exercises.

### **Reference Books:**

1. Tally 9 In Simple Steps, Kogent Learning Inc solutions, John Wiley & Sons, 2008.
2. Tally.ERP 9 Made Simple: Basic Financial Accounting (Asok K Nadhani),2012



**Subject Code: BVSDGE18**

**COMPUTER NETWORKS**

**Pre-requisite:** Basic Knowledge of Computers

**Objectives:**

- To educate the functions of various OSI layers

**Outcomes:**

- Knowledge of OSI Layers in Computer Network.
- Ability to identify transmission media, types and topologies of network. Familiarization with the techniques of error detection and congestion control

**UNIT I**

Introduction –Uses of Networks, Network hardware, Network Software, Network Reference Models, Example Networks.

**UNIT II**

Physical Layer: Transmission Media: Guided, Wireless and Communication satellites – Multiplexing and Switching.

**UNIT III**

Data Link Layer: data link Layer Design issues, Error Detection and correction, Simplex Stop-and-wait protocol, Sliding window protocols

**UNIT IV**

Network Layer –Design issues, Routing Algorithms: Optimality Principle, Shortest path algorithm, flooding, link state routing, Hierarchical routing, Broadcast, Multicast. Congestion Control Algorithms.

**UNIT V**

Transport Layer – Elements of Transport Protocols, Internet Transport protocols: UDP, TCP  
Application Layer – Domain Name System –Electronic Mail

**Reference Books**

1. A.S Tanenbaum, David J. Wetherall, “Computer Networks”, Prentice Hall,5th edition, 2011
2. Behouuz A. Forouzan, “Data Communication & Networking “, McGraw-Hill, 4th Edition

**Objectives:**

- To analyze performance of algorithms.
- To understand algorithm design methods impacts the performance of programs.

**Outcomes:**

- Knowledge of algorithms and design techniques
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound

**UNIT 1**

**Introduction to Algorithms:** Definition of Algorithm, Algorithm design techniques, Algorithm Analysis, Performance analysis – space complexity, Performance analysis- time complexity, Best, Worst, And average case complexity

**UNIT II**

**Divide and Conquer method:** Divide and Conquer General method, Binary search, Finding the maximum and minimum, Merge sort, Quick sort. Performance measurement of quick sort, Selection, Strassen's matrix multiplication.

**UNIT III**

**Greedy Algorithm:** General Characteristics of greedy algorithms, Knapsack problem, Minimum Spanning trees, Kruskal's algorithm, Prim's algorithm.

**UNIT IV**

**Dynamic programming:** Dynamic programming- the general method, Multistage graphs, All-pairs shortest path, Single source shortest path, 0/1 Knapsack problem, Traveling Sales person problem.

**UNIT V**

**Basic traversals, Search techniques & Backtracking:** Basic traversals, Search techniques – BFS and traversal, DFS and traversal, Bi-connected components and DFS, Backtracking General method, 8-queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

## Reference Books

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekharan, Computer algorithms/C++, Second 2007
2. Anan Levitin- Introduction to design and analysis of algorithms, Third Edition, Addison Wesley, Low price edition 2007
3. Richard Neapolitan & Kumar Naimipour, Foundation of Algorithms using C++ Pseudocode, Third edition, Jones and Bartlett Publishers.

**Subject Code: BVSDSC20**

## **PYTHON PROGRAMMING**

**Prerequisite:** Knowledge of any programming language

**Objectives:**

- To learn basic python concept.
- To develop simple Python programs and code reusing with functions

**Outcomes:**

- Skill to write codes in Python to solve mathematical or real world problems.
- Ability to isolate and fix common errors in Python programs.

### **UNIT 1**

Introduction to Python - The IDLE Python Development Environment - The Python Standard Library - Literals - Numeric Literals - String Literals - Control Characters - String Formatting - Implicit and Explicit Line Joining Variables and Identifiers - Variable Assignment and Keyboard Input- Identifier-Keywords and Other Predefined Identifiers in Python – Operators - Various Operators - Relational Operators-Membership Operators – Boolean Operators - Expression and Data Types -Operator Precedence and Boolean Expressions - Operator Associativity - Mixed-Type Expression

### **UNIT II**

Control Structure -Selection Control- If Statement - Indentation in Python - Multi-Way Selection - Iterative Control - While Statement - Input Error Checking - Infinite loops - Definite vs. Indefinite Loops

### **UNIT III**

List Structures - Common List Operations - List Traversal - Lists (Sequences) in Python- Python List Type - Tuples- Sequences- Nested Lists Iterating Over Lists (Sequences) in Python - For Loops - The Built-in range Function - Iterating Over List Elements vs. List Index Values-While Loops and Lists (Sequences) - Dictionaries and sets

### **UNIT IV**

Defining Functions - Calling Value-Returning Functions - Calling Non-Value-Returning Functions - Parameter Passing - Keyword Arguments in Python Default Arguments in Python - Variable Scope - Recursive functions - Exception Handling -The Propagation of Raised Exceptions - Catching and Handling Exceptions -Exception Handling and User Input

### **UNIT V**

String Processing - String Traversal - String-Applicable Sequence Operations -String Methods - Using Text Files - Opening Text Files - Reading Text Files - Writing Text Files

## Reference Books

1. Charles Dierbach, Introduction to Computer Science using Python , Wiley First Edition (2015), ISBN-10: 81265560132015
2. Zed A.Shaw, Learn Python the Hard Way Paperback, Pearson Education, Third Edition edition (2017), ISBN-10: 9332582106
3. Paul Barry, Head First Python, O' Reilly Publishers, First Edition, 2010, ISBN:1449382673

**Subject Code: BVSDSC21    DATABASE MANAGEMENT SYSTEM**

**Prerequisite:** Knowledge of data structures and file-handling

**Objectives:**

- To learn the fundamental concepts of Database management systems.
- To learn SQL commands to manage data and PL/SQL.

**Outcomes:**

- Understand data modeling and database development process. Construct and normalize conceptual data models.
- Implement a relational database into a database management system. Become proficient in using database query language.

**UNIT I**

Introduction to Database System – Objectives – Entities and Attributes – Data Models.

**UNIT II**

Database Management Systems – Tree Structures – Plex Structures – Data Description Languages. Relational Databases – Third Normal Form – Canonical Data structures – Varieties of data independences.

**UNIT III**

Basic SQL reports and commands – Datatypes and notations – String functions – Date functions – Unions – Joins – DDL – DML – DCL.

**UNIT IV**

PL/SQL: Approach and Advantages – PL/SQL Blocks – Variables – Manipulating Data – Triggers – Procedures, Functions and Packages – Exception handling.

**UNIT V**

Definition of NOSQL, History of NOSQL and Different NOSQL products, Exploring MongoDB Java/Ruby/Python, Interfacing and Interacting with NOSQL

**References Books**

1. Henry F. Korth Abraham Silberschatz, “Database System Concepts”, Fourth Edition, McGraw Hill International, Editions 2002.
2. James Martin, “Computer Database Organization”, 2nd edition, PHI, 2001.
3. Kevin Loney, George Koch, “Oracle 8i The Complete Reference”, 10th Edition.

**List of Experiments:**

1. Draw E-R diagram and convert entities and relationships to relation table for a given scenario. a. Two assignments shall be carried out i.e., consider two different scenarios (e.g., bank, college)
2. Write relational algebra queries for a given set of relations.
3. Perform the following: a. Viewing all databases, creating a Database, viewing all Tables in a Database, Creating Tables (With and Without Constraints), Inserting/Updating/Deleting Records in a Table, Saving (Commit) and Undoing (rollback)
4. Perform the following: a. Altering a Table, Dropping/Truncating/Renaming Tables, backing up/ Restoring a Database.
5. For a given set of relation schemes, create tables and perform the following Simple Queries, Simple Queries with Aggregate functions, Queries with Aggregate functions (group by and having clause), Queries involving- Date Functions, String Functions, Math Functions Join Queries- Inner Join, Outer Join Subqueries- With IN clause, With EXISTS clause
6. For a given set of relation tables perform the following a. Creating Views (with and without check option), Dropping views, Selecting from a view
7. Write a PL/SQL program using FOR loop to insert ten rows into a given table.
8. Given the table EMPLOYEE (EmpNo, Name, Salary, Designation, DeptID) write a cursor to select the five highest paid employees from the table.
9. Illustrate how you can embed PL/SQL in a high-level host language such as C/Java And demonstrates how a banking debit transaction might be done.
10. Given an integer i, write a PL/SQL procedure to insert the tuple (i, 'xxx') into a given relation

**Subject Code: BVSDSC23**

**PYTHON PROGRAMMING LAB**

**List of Experiments:**

1. Create simple programs using arithmetic Boolean and logical operators
2. Develop program using control flow statements
3. Develop program using looping statements
4. Use list, tuple, strings in developing small programs
5. Write a program to read and write files, create and delete directories
6. Write a program with exception handling
7. Write a program using string handling and regular expressions



**Subject Code: BVSDSC24**

**ACCOUNTING TOOLS LAB**

**List of Experiments:**

1. Creation of a company and ledger.
2. Preparation of Trial Balance
3. Creation of voucher entries
4. Preparation of cash book
5. Preparation of Bank reconciliation statement
6. Preparation of Trading, Profit and Loss Account and Trial Balance without adjustments.
7. Preparation of Trading, Profit and Loss Account and Trial Balance with adjustments.
8. Ratio Analysis
9. Preparation of budget
10. Fund Flow Analysis
11. Cash Flow Analysis
12. Stock valuation

**Subject Code: BVSDGE25      STATISTICS FOR MACHINE LEARNING**

**Objectives:**

- To learn the basics of statistics concepts
- To learn solving correlation and regression problems

**Outcomes:**

- Ability to understand and represent data
- Ability to analyze and interpret data.

**UNIT I**

Introduction - scope and limitations of statistical methods - classification of data - Tabulation of data - Diagrammatic and Graphical representation of data.

**UNIT II**

Measures of Central Tendency: Arithmetic mean, median, mode, geometric mean and Harmonic mean and their properties. Graphical determination of percentiles and quartiles.

**UNIT III**

Measures of dispersion and Skewness: Range, Quartile deviation, mean deviation, Standard Deviation, co-efficient of variation. Measures of Skewness Karl Pearson's, Bowley's, Kelly's and co-efficient of Skewness and kurtosis based on moments.

**UNIT IV**

Correlation - Karl Pearson - Spearman's rank correlation - Regression Analysis: Simple Regression Equations – Time Series Analysis – Index Number – Curve Fitting.

**UNIT V**

Machine Learning Introduction: Definition –Uses of Machine learning - Languages of Machine Learning – Machine Learning life cycle - Defining the process – Data Processing. Case Studies on Real time data analysis.

**Reference Books**

1. S.C. Gupta & V.K. Kapoor, "Fundamental of Mathematical Statistics", Sultan Chand, 2002.
2. Dr. S.P. Gupta , "Statistical Methods", Sultan Chand & Sons, 2014
3. Jason Bell, "Machine Learning Hands-On for Developers and Technical Professionals", Wiley publications, 2015

**Subject Code: BVSDGE26**

## **MULTIMEDIA TOOLS**

. **Prerequisite:** Familiarity with computers

### **Objectives:**

- Understanding the key principles of animation and its applications.

### **Outcomes:**

- Acquire knowledge of how to create animation using photoshop.
- Acquire knowledge of how to create story board, work with files create movies and publish

## **UNIT I**

Definition - Classification – applications of multimedia – Multimedia Hardware and Software.

**Graphics:** coloring - digital imaging fundamentals - development and editing - file formats- scanning and digital photography

## **UNIT II**

**Audio:** Digital medium - Digital audio technology - sound cards - recording - editing - MP3- MIDI fundamentals - Working with MIDI – audio file formats. **Text:** 2D and 3D Text- Compression formats.

## **UNIT III**

**Animation:** Computer animation fundamentals - Kinematics - morphing -animation s/w tools and techniques. **Video:** How video works - digital video fundamentals - digital video production and editing techniques - file formats.

## **UNIT IV**

**Image Editing Software:** Introduction to Photoshop- Basic Tools for Image Editing- Fill and Stroke with Transformation- Creating various 2D Scenes with Photoshop Tools-Working and Retouching with Images- Typography Basics- Layers and Multi-colors technique-Masking and Filters.

## **UNIT V**

**Animation Software:** Introduction to Flash- The Flash Toolbox- Create and Edit Symbols- Working with Shapes- Use the Timeline- Use different Motion Presets- Add and Manage Tweens- Create and design Banner ads, Short Animations.

### **Reference Books**

1. Multimedia Magic – 2nd Edition Paperback – 1 January 2005
2. Multimedia: Making It Work, Sixth Edition Paperback – 1 January 2004

**Subject Code: BVSDGE27**

## **NETWORK SECURITY**

**Prerequisite:** Knowledge of computer networks.

**Objectives:**

- To learn Computer Network Vulnerabilities
- To learn how to deal with Network Security Challenges and counter measures

**Outcomes:**

- familiarization with the benefits and issues regarding Network Security
- Ability to understand the threat and deal with vulnerabilities

### **UNIT I**

Computer Network Fundamentals - Introduction - Computer Network Models- Computer Network Types - Data Communication Media Technology - Network Topology -Network Connectivity and Protocol - Network Services.

### **UNIT II**

Understanding Network Security - Defining Network Security - Security Services - Security Standards - Elements of Security.

### **UNIT III**

Security threats to Computer Networks: Sources of security threats, Threat motives, Security threat management. Computer Network Vulnerabilities - Sources of Vulnerabilities- Vulnerability Assessment.

### **UNIT IV**

Dealing with Network Security Challenges - Access Rights - Access Control Systems – Authorization - Types of Authorization Systems – Authorization principles, Authorisation granularity.

### **UNIT V**

Authentication - Multiple Factors and Effectiveness of Authentication - Authentication Elements Types of Authentication - Authentication Methods Developing an Authentication Policy. Introduction to firewalls - Types of Firewalls.

### **Reference Books**

1. Kizza& Joseph Migga, “Computer Network Security”, Springer,2005.
2. William Stallings, “Cryptography & Network Security”, Pearson Education, 4th edition, 2010.

**Subject Code: BVSDSC28**

**.NET FRAMEWORK**

**Pre-Requisite:** Knowledge of any object-oriented programming language

**Objectives:**

- Understand the foundations of CLR execution.
- Familiarize the object-oriented aspects of C#.
- Design and develop applications on .NET

**Outcomes:**

- Understand programming in C# and able to write code for real life problems.
- Ability to connect to a database and create small projects.

### **Unit I**

Introduction to the .NET Platform – Common Language Runtime (CLR) – The Common Type Specification (CTS) – The Common Language Specifications (CLS) – Assemblies – .NET Base Classes – CLR Debugger.

### **Unit II**

Introduction to C# – Data Type – Operators – Flow Control and Iteration – Arrays and Strings – Basics of C# Classes – Boxing and Unboxing – Reflection – Interoperability – The Preprocessors – Attributes – Name Spaces.

### **Unit III**

Object-Oriented Programming in C# – Encapsulation, Inheritance, and Polymorphism – Exception Handling – Garbage Collection – Input and Output (Directories, Files and Streams).

### **Unit IV**

Implementing the Interfaces – Introduction to .NET Collections (including Custom Collections) – Custom Indexers, Delegates and Events – Multithreading and Synchronization – Type Reflection and Attributes – Programming the Windows Registry.

### **Unit V**

GDI+ Graphics Tutorial (including Fonts, Brushes, Images, and using .NET Resources) – COM, COM+ and .NET Interoperability – ADO.NET for Database Programming with Datasets and Object Model. Windows Applications: Winforms – Winforms Namespace – Creating Winforms Applications in VS.NET – Developing Windows Applications.

### **Reference Books**

1. Robert J. Oberg, “Introduction to C# using .NET”, PHI, 2002.
2. Andrew Troelsen, “C# and .NET Platform”, Apress, 1st edition, 2001.
3. Ben Albahari, Peter Drayton and Brad Merrill, “C# Essentials”, SPD, 2001.
4. “Microsoft C# Language Specifications”, WP Publishers and Distributors Pvt. Ltd., 2001

**Subject Code: BVSDSC29 SOFTWARE ENGINEERING AND PROJECT MANAGEMENT**

**Pre-Requisite:** Basic knowledge of programming

**Objectives:**

- To gain knowledge about software development life cycle models, software design, implementation, and testing of software.
- To gain overall knowledge of how software is developed

**Outcomes:**

- Ability to analyze existing system to gather requirements for proposed system.
- Acquire knowledge of the Project management process and need for such a management strategy.
- Understand how to be a stakeholder in a project and know the responsibilities

**UNIT I**

Introduction to Software Engineering – evolving role of software – defining software engineering – changing nature of software – software myths – terminologies – role of software development – software life cycle models – build & fix model – waterfall model – incremental model – evolutionary model – unified model – selection of a life cycle model.

**UNIT II**

Software Design: Fundamental Design Concepts - Modules and Modularization Criteria -Design Notations –Design Techniques -Detailed Design Considerations -Real-Time and Distributed System Design -Test Plans -Milestones, walkthroughs, and Inspections.

**UNIT III**

Software testing – strategic approach to software testing – terminologies – functional testing – structural testing – levels of testing – validation testing – the art of debugging – testing tools

**UNIT IV**

The Work Breakdown Structure and Project Estimation - The Project Schedule and Budget - Managing Project Risk Project Communication, Tracking and Reporting.

**UNIT V**

IT Project Quality Management-Managing Organizational Change, Resistance and Conflict – Project Implementation, Closure and Evaluation.

## **Reference Book**

1. Roger S. Pressman, “Software Engineering: A Practitioner’s Approach”, McGraw Hill, 7th edition, 2010.
2. R. Fairley, “Software Engineering Concepts”, Tata McGraw Hill Edition -1997.
3. Jack T.Marchewka, “Information Technology and Project Management”, John Wiley & sons P.Ltd, 2003.



**Subject Code: BVSDSC30**

**.NET LAB**

**List of Experiments:**

1. Building simple applications.
2. Working with controls.
3. Application with multiple forms.
4. Application with dialogs
5. Application with Menus
6. Develop any TWO case studies listed below:
  - i) Students marksheet processing
  - ii) Electricity bill processing
  - iii) Bank Transaction
  - iv) Payroll processing
  - v) Gas booking and delivery
  - vi) Library information system.

**List of Experiments:**

- 1) Convert a color photo to black and white photo and vice versa with crop and retouch tools in Photoshop.
- 2) Design Passport Size Photos on a Max Size Paper using appropriate tools in Photoshop.
- 3) Create various 2D Scenes by using appropriate tools in Photoshop.
- 4) Create Visiting Card by using appropriate tools in Photoshop.
- 5) Retouch with Images by using Filters and appropriate tools in Photoshop.
- 6) Create Greeting Card by using Typography and Blending options in Photoshop.
- 7) Create Advertisement banner with Multicolor using appropriate tools in Photoshop.
- 8) Create a Logo by using appropriate tools in Corel Draw.
- 9) Create and design short animation by using appropriate tools in Flash.

**Subject Code: BVSDSC32**

**MINI PROJECT 2**

Mini Project must be done by individual Students for a period of 3 weeks in Software Development or any other organization to get hands on experience of the software development life cycle and the various processes involved in the development, testing and operation of software systems. Inhouse projects are also acceptable and each student must submit a mini project report at the end of the semester. The students shall defend their dissertation during viva-voce examinations.

**Objectives:**

- To create environmental awareness and devise eco-friendly strategies to protect our rich biodiversity.
- To expose the environmental degradation and find out solution for the same.

**Outcomes:**

- The students will know the environment and will be aware of the need for protecting the environment degradation and tackling all environmental issues.
- Emphasizes the study of the environment, teaches everyone particularly the youth about the basic scientific and social issues with respect to environmental problems.

**UNIT I**

**INTRODUCTION OF ENVIRONMENTAL STUDIES** • Multidisciplinary nature of Environmental Studies • Scope and importance, Concept of Sustainability Development.

**UNIT II**

**ECOSYSTEM:** What is an Ecosystem Structure and Function of Ecosystem: Energy Flow in an Ecosystem: Food Chain, Food Webs and Ecological Succession. Case Studies of the Following Ecosystems: Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem Aquatic Ecosystem (ponds, Streams, lakes, Rivers, Oceans, Estuaries)

**UNIT III**

**NATURAL RESOURCES: RENEWABLE AND NON-RENEWABLE RESOURCES:** Land Resources and Land use Change: Land Degradation, Soil Erosion and Desertification. Deforestation: Causes and Impacts due to Mining, Dam Building on Environment, Forests, Biodiversity and Tribal Populations. } Water: Use and Over-Exploitation of Surface and Ground Water, Floods, Droughts, Conflicts over Water (International & Inter-State). } Energy Resources: Renewable and Non-Renewable Energy Sources, Use of Alternate Energy Sources, Growing Energy Needs, Case studies.

**UNIT IV**

**BIODIVERSITY AND CONSERVATION:** Levels of Biological Diversity: Genetic, Species and Ecosystem Diversity; Biogeographic Zones of India; Biodiversity Patterns and Global Biodiversity Hot Spots. ∞ India as a Mega-Biodiversity Nation; Endangered and Endemic Species of India. Threats to Biodiversity: Habitat loss, Poaching of Wildlife, Man-Wildlife Conflicts, Biological

Invasions; Conservation of Biodiversity: In-situ and Ex-situ Conservation of Biodiversity. Ecosystem and Biodiversity Services: Ecological, Economic, Social, Ethical, Aesthetic and Informational Value.

#### **UNIT V**

**ENVIRONMENTAL POLLUTION:** Environmental Pollution; Types, Causes, Effects and Controls: Air, Water, Soil and Noise Pollution. Nuclear Hazards and Human Health Risks. Solid Waste Management: Control Measure of Urban and Industrial Waste. Pollution Case Studies.

#### **UNIT VI**

**ENVIRONMENTAL POLICIES & PRACTICES:** Climate Change, Global Warming, Ozone Layer Depletion, Acid Rain and Impacts on Human Communities and Agriculture. Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and Control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International Agreements; Montreal and Kyoto Protocols and Convention on Biological Diversity (CBD). Nature Reserves, Tribal Populations and Rights, and Human Wildlife Conflicts in India Context.

#### **UNIT VII**

##### **HUMAN COMMUNITIES AND THE ENVIRONMENT**

Human Population Growth: Impacts on Environment, Human Health and Welfare.

Resettlement and Rehabilitation of Project Affected Persons; Case Studies. Disaster Management: Floods, Earthquake, Cyclones and Landslides. Environmental Movements: Chipko, Silent Valley, Bishnois of Rajasthan. Environmental Ethics: Role of Indian and other Religions and Cultures in Environmental Conservation. Environmental Communication and Public Awareness, Case Studies (e.g., CNG Vehicles in Delhi).

#### **UNIT VIII**

**FIELD WORK:** Visit to an Area to Document Environment Assets: River/ Forest / Flora/ Fauna, etc. } Visit to a Local Polluted Site-Urban/ Rural/ Industrial / Agricultural. Study of Common Plants, Insects, Birds and Basic Principle of Identification. Study of Simple Ecosystems-Pond, River, Delhi Ridge, etc.

#### **Reference Books:**

1. Erach Bharucha. 2004, Environmental studies for undergraduate courses. University Grants Commission and Bharati Vidyapeeth Institute of Environment Education and Research, Pune.
2. Singh, J.S, Singh S.P. and Gupta, S.R. 2014. Ecology, Environmental science and conservation. S.Chand Publishing, New Delhi.
3. Sodhi, N.S., Gibson, L & Raven, P.H. 2013, conservation Biology :Voices from the Tropics. John Willy & sons.

**Objectives:**

- The objective of this course is to help students understand the conceptual framework of organisational behaviour.

**Course outcomes:**

- To analyse the behaviour of individuals and groups in organisations in terms of organisational behaviour theories, models and concepts
- To apply organizational behaviour concepts, models and theories to real life management situations through case analysis
- To enable the student to explore various dimensions of Human Resource Management and will find new career opportunities in the same

**UNIT I**

Organisation Behaviour – Concept – Nature – Significance – Disciplines Challenges - Role – Models - Human Behaviour Approach – Organizational systems and Environment.

**UNIT II**

Individual Behaviour – Concept of Behaviour- Process of Behaviour - Personality- Concept – Measurement - Perception – Concept – Process – Application - Learning – Concept – Theories – Attitudes & Value - Concept – Theories – Types of values.

**UNIT III**

Group Behaviour – Group Norms – Group Formation – Group Cohesiveness – Group Dynamics – Interpersonal Relationships – Transactional Analysis.

**UNIT IV**

Organizational Dynamics – Organizational Design – Organisational Climate - Organisational Change – Resistance to Change, Management to Change, Organisational Culture.

**UNIT V**

Organisational Conflicts – Source, Pattern, Levels, and Type of Conflict – Resolution of Conflict – Organizational change and Development – Organisational Effectiveness.

**Reference Books:**

1. Stephen P. Robins, Organisational Behavior, PHI Learning / Pearson Education, 11th edition, 2008.
2. Schermerhorn, Hunt and Osborn, Organisational behavior, John Wiley, 9th Edition, 2008.
3. Udai Pareek, Understanding Organisational Behaviour, 2nd Edition, Oxford Higher Education, 2004.
4. Mc Shane & Von Glinov, Organisational Behaviour, 4th Edition, Tata Mc Graw Hill, 2007.

**Subject Code: BVSDGE35      BUSINESS COMMUNICATION**

**Pre-requisite:** Basic knowledge in English.

**Objectives:**

- To understand and learn to communicate effectively
- Learn to write business reports and letters

**Outcomes:**

- Understand the importance of communication and able to communicate business deals verbally and non-verbally
- Acquire knowledge to write efficient business reports and equip to appear for interviews

**UNIT I**

The fact and meaning of communication: the need for communication, the communication process, interpersonal communication, business communication, characteristics of business communication, many meaning of communication; direct communication, non-direct of written communication, non-method of communication, non-verbal communication, visual communication, audio-visual communication, Tele-communication.

**UNIT II**

Objectives of communication process, types of communication-internal and external communication, formal and informal channels, the grapevine, internal communication networks, downward communication, upward communication, horizontal communication, barriers to communication and how to handle them.

**UNIT III**

Public relations advertising- concepts and types, interviews: types and techniques, meetings, committees, conference and communication problems.

**UNIT IV**

Business reports, memoranda and representation, business correspondence: theory principles of business correspondence, parts of a letter, forms / formats of letters.

**UNIT V**

Business correspondence in practice- applications, reference, testimonials, appointments, confirmation, promotion, termination, resignation enquiries and replies, orders and acknowledgements, circulars, public speaking, precise writing.

## **Reference Books**

1. Rajendra Pal & J.S. Korlahalli, “Essentials of Business Communications”, Sultan Chand & Sons, 2009
2. M.K. Sehgal, Vandana Khetarpal, “Business Communication”, Excel books, 2008



**Subject Code: BVSDGE36 FREE AND OPEN-SOURCE SOFTWARE (FOSS)**

**Pre-requisite:** Knowledge of Operating system

**Objectives:**

- Basic understanding of programming and information technology

**Outcomes**

- To acquire the basic knowledge about Free and Open-Source Software (FOSS)
- To acquire skills on adapting Open-source software

**UNIT I**

Introduction to FOSS - Types of Software - Types of Software licenses - Free software vs open-source software - Advantages of FOSS over proprietary software - Features of FOSS.

**UNIT II**

Open Source office tools – Introduction – Basic features - Libre office: Write – Calc – Impress.

**UNIT III**

Open Source operating system – Introduction – Choices – Getting started with GNU Linux – Basic commands – A case study with BOSS (Bharat Operating System Solutions) Linux.

**UNIT IV**

Open-Source Programming – Building open-source desktop and web application - A Case study with Python – Version Control Systems: Introduction to Git.

**UNIT V**

Open-Source Audio tools – Getting started with Audacity – Open-source Video Editing tools – A case study with Open Shot.

**References**

1. Understanding Open Source and Free Software Licensing by Andrew M. St. Laurent, Released August 2004, Publisher(s): O'Reilly Media, Inc.
2. Libreoffice : <https://documentation.libreoffice.org/en/english-documentation/>
3. Openshot <https://www.openshot.org/features/>
4. BOSSLinux: [https://downloads.bosslinux.in/isoimages/usermanual/BOSS\\_Manual.pdf](https://downloads.bosslinux.in/isoimages/usermanual/BOSS_Manual.pdf)
5. Audacity : <https://www.audacityteam.org/help/documentation/>
6. Git : <https://git-scm.com/docs>

**Subject Code: BVSDSC37**

## **WEB TECHNOLOGY**

**Pre-requisite:** Knowledge of Operating system, computer network, DBMS, and Java language.

### **Objectives:**

- To gain knowledge about the working mechanism of Internet.
- To design interactive web pages using Style sheets, Java-script and ASP.

### **Outcomes:**

- Understand the various steps in designing Creative and dynamic website.
- Ability to write HTML, JavaScript, CSS and ASP.

### **UNIT I**

Introduction to Internet – Resources of internet – H/W & S/W requirements of Internet – Domain Naming system – Registering our Domain name – URL – Protocol – Server name – Port – Relative URLs – Overview of web browsers – ISDN Dialup or Leased Line Connection – Internet Service Providers – Internet Services – Protocols concepts – Internet Client and Internet Server – Introduction to WWW, HTTP, TCP/IP, FTP, SMTP, POP3 (Brief Treatment).

### **UNIT II**

Introduction to HTML – Elementary tags in HTML – List in HTML – Displaying Text in Lists – Using Ordered List – Using Unordered Lists – Directory Lists – Definition Lists – Combining List Types – Graphics and Image Formats – Graphics and HTML document – Image and hyperlink anchors – Image maps – Tables – Frames – Forms – Background Graphics and Color.

### **UNIT III**

Introduction to Style Sheets – Setting the default style sheet language – Inline style information – External Style sheets – Cascading Style sheets.

### **UNIT IV**

Introduction to Java Script – Declaring variables – Using Mathematical operators and functions – Using Conditional statement. Creating Functions – Event Handling – Communicating with server.

### **UNIT V**

Introduction to PHP – brief history – installing PHP – Language basics – Lexical structure – data types – variables – expressions and Operators – flow-control statements – various methods of code inclusion – Responding to clients.

## **Reference Books**

1. Elisabeth Freeman and Eric Freeman, “Head First HTML with CSS and XHTML” Head First, O’ Reilly, 2005.
2. Lynn Beighley, Michael Morrison, Head First PHP & MySQL: A Brain-Friendly Guide, O’ Reilly 2011.

**Objectives:**

- To understand the concepts of Data Mining.
- To learn about Classification, prediction and cluster analysis techniques.

**Outcomes:**

- Acquire knowledge to compare and contrast OLAP and data mining as techniques for extracting knowledge from a data warehouse.
- Implement data mining techniques like clustering, association rule and decision tree etc on the real data set.

**UNIT I**

**Data Mining Introduction:** Introduction to Data Mining, Need of Mine Data, Evolution of Data Mining, Data Mining Tasks, Classification, Clustering, Association Mining, Challenges of Data Mining

**UNIT II**

**Pre-processing:** Data, Attribute Values, Measurement of Length, Types and Properties of Attributes & data, Data Preprocessing

**UNIT III**

**Data Exploration:** Data Exploration Techniques, Summary Statistics, Frequency and Mode, Percentiles, Mean and Median, Visualization, Histograms, Box Plots

**UNIT IV**

**Classification and Association:** OLAP, OLAP Operations, Data Mining Classification, Decision Trees, Naive Bayes, Data Mining Association Analysis, Association Rule Mining, Frequent Item set Generation, FP-growth Tree Algorithm, Cluster Analysis

**UNIT V**

**Data Mining Tools:** Real-world data mining tasks on preprocessing, classification, clustering and association using WEKA/ RapidMiner.

**Reference Books**

1. Jiawei Han, Micheline Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Publishers, Third Edition, 2011
2. Tan, Steinbach, Kumar:” Introduction to Data Mining”, Pearson Addison Wesley, 2006
3. David Hand, Heikki Mannila & Padhraic Smyth “Principles of Data Mining”, PHP Publication, 2001

**List of Experiments:**

1. Develop and demonstrate the usage of inline, internal and external style sheet using CSS
2. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next in the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).
3. Write JavaScript to validate the following fields of the Registration page.
  - a. First Name (Name should contains alphabets and the length should not be less than 6 characters).
  - b. Password (Password should not be less than 6 characters length).
  - c. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
  - d. Mobile Number (Phone number should contain 10 digits only).
  - e. Last Name and Address (should not be Empty).
4. Develop and demonstrate PHP Script for the following problems:
  - a. Write a PHP Script to find out the Sum of the Individual Digits.
  - b. Write a PHP Script to check whether the given number is Palindrome or not
5. Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:
  - a. Input: Click on Display Date button using onclick () function Output: Display date in the textbox
  - b. Input: A number n obtained using prompt Output: Factorial of n number using alert
  - c. Input: A number n obtained using prompt Output: A multiplication table of numbers from 1 to 10 of n using alert
  - d) Input: A number n obtained using prompt and add another number using confirm Output: Sum of the entire n numbers using alert
6. Design the following static web pages required for an online book store web site.
  - a) HOME PAGE: The static home page must contain three frames.
  - b) LOGIN PAGE
  - c) CATALOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in a table.
  - d) REGISTRATION PAGE

**Subject Code: BVSDSC40**

**FOSS LAB**

**List of Experiments:**

1. Build a brochure for your college using Libreoffice
2. Create a presentation about your department using Libreoffice
3. Install and remove software in BOSS Linux
4. Build a desktop application using various components of Python
5. Build a web application using various components of Python
6. Record and edit an audio using Audacity
7. Build your video resume using Openshot

**Subject Code: BVSDSC41**

**DATA MINING LAB**

**List of Experiments:**

1. Build Dataset and Explore WEKA

2 Perform data preprocessing tasks and demonstrate performing association rule mining on data sets

3 Demonstrate performing classification on data sets

4. Demonstrate performing clustering on data sets

5. Demonstrate performing Regression on data sets

Task 1: Credit Risk Assessment. Sample Programs using German Credit Data

Task 2: Sample Programs using Hospital Management System

**Subject Code: BVSDGE42**

## **CLOUD COMPUTING**

Prerequisite: Knowledge of operating system, distributed system & services computing.

### **Objectives:**

- To impart the principles and paradigm of Cloud Computing
- To understand the Service Model with reference to Cloud Computing
- To comprehend the Cloud Computing architecture and implementation
- To realize the role of Virtualization Technologies

### **UNIT I**

Computing Paradigms - Cloud Computing Fundamentals - Motivation for Cloud Computing - Defining Cloud Computing - Principles of Cloud computing - Cloud Ecosystem - Requirements for Cloud Services - Cloud Application - Benefits and Drawbacks - Cloud Computing Architecture and Management Cloud Architecture - Anatomy of the Cloud- Network Connectivity in Cloud Computing - Applications on the Cloud- Managing the Cloud - Migrating Application to Cloud

### **UNIT II**

Cloud Deployment Models – Introduction - Private Cloud - Public Cloud- Hybrid Cloud- Cloud Service Models- Infrastructure as a Service- Platform as a Service Software as a Service.

### **UNIT III**

Technological Drivers for Cloud Computing - SOA and Cloud – Virtualization Multicore Technology - Memory and Storage Technologies - Networking Technologies - Web 2.0 - Web 3.0 - Software Process Models for Cloud Programming Models - Operating System - Application Environment.

### **UNIT IV**

Virtualization - Approaches to Virtualization- Hypervisors - From Virtualization to Cloud Computing- Programming Models for Cloud Computing.

### **UNIT V**

Software Development in Cloud Introduction - Different Perspectives on SaaS Development - New Challenges - Cloud-Aware Software Development Using PaaS Technology.

### **Reference Book:**

1. K. Chandrasekaran, “Essentials of Cloud Computing “, CRC Press, Taylor & Francis Group, 2015.



**List of Experiments:**

1. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows10
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs.
3. Install Google App Engine. Create hello world app and other simple web applications using python/java
4. Find a procedure to transfer the files from one virtual machine to another virtual machine.
5. Install Hadoop single node cluster and run simple applications like wordcount.

## **Subject Code: BVSDGE43 INTRODUCTION TO DATA ANALYTICS**

Prerequisite: Knowledge of DBMS and data mining

### **Objectives:**

- To learn relevant parts of statistics, computer science, and machine learning that are crucial to data science.
- To learn science from a pragmatic, practice-oriented viewpoint.

### **Outcome:**

- Ability to use R programming in statistical and machine learning, include concrete code examples, and explore partnering with and presenting to non-specialists.

### **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.

### **UNIT II**

Modeling Methods - Choosing and evaluating models – mapping problems to machine learning, Linear Regression, Unsupervised learning-Clustering techniques-types- K-Means algorithm

### **UNIT III**

Supervised learning-Naïve Bayes –logistic regression – Decision trees-Neural networks.

### **UNIT IV**

Introduction to R - Language: 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 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, Anand Rajaraman, 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.

**Subject Code: BVSDGE44**

**E-BUSINESS**

Pre-requisite: Basic knowledge of Information Technology

**Objectives:**

- This course introduces students to various aspects and models fore-business.
- At the end of the course, students should have an understanding of the impacts which e-business is having on society, markets and commerce.

**Outcomes:**

- Understand the various E-Business solutions available today such as E-Commerce and its mechanisms
- Acquire knowledge from e-governance to e-learning

**UNIT I**

Introduction to e-Business and e-Commerce- Define the e-Commerce and e-Business - Define Ecommerce

Types of EC transactions - Define e-Business Models - Internet Marketing and e-Tailing - Elements of e-Business Models- Explain the benefits and limitations of e-Commerce.

**UNIT II**

E-Marketplaces: Structures, Mechanisms, Economics, and Impacts- Define e-Marketplace and Describe their Functions- Explain e-Marketplace types and their features - Describe the various types of auctions and list their characteristics - Discuss the benefits, limitations and impacts of auctions - E-Commerce in the wireless environment - Competition in the DE and impact on industry

**UNIT III**

e-Business Applications, e-Procurement and e-Payment Systems - Integration and e-Business suits - ERP, eSCM, CRM - e-Procurement definition, processes, methods and benefits - e-Payment - Discuss the categories and users of smart cards - Describe payment methods in B2B EC.

**UNIT IV**

The Impact of e-Business on Different Fields and Industries - e-Tourism - Employment and Job Market Online - Online Real Estate - Online Publishing and e-Books - Banking and Personal Finance Online - On-Demand Delivery Systems and E-Grocers - Online Delivery of Digital Products, Entertainment, and Media

## **UNIT V**

e-Learning and Online Education- Define electronic learning-Discuss the benefits and drawbacks of e-Learning. The e-Learning Industry- Discuss e-Content development and tools-Describe the major technologies used in e-Learning- Discuss the different approaches for e-Learning delivery- How e-Learning can be evaluated. Future Trends-e-Government- Definition of e-Governments- Implementation-E-Government Services- Challenges and Opportunities- E-Government Benefit.

### **Reference Books**

1. Electronic Commerce: A Managerial Perspective, Turban, E. et al., Prentice Hall 2008.
2. Electronic Business and Electronic Commerce Management, 2nd edition, Dave Chaffey.

**Subject Code: BVSDSC45 MOBILE APPLICATION DEVELOPMENT**

**Prerequisite: Basic Understanding of Programming Concepts.**

**Objectives:**

- To introduce students to the Mobile application development ecosystem.
- To impart mobile application development skills.

**Outcomes:**

- Understand the anatomy of Android app and develop small application
- Understand to use multimedia handling in android application

**Unit I**

Introduction to Mobile Apps - Mobility Panorama - Various Mobile Platforms - Different Approaches to Mobile Development.

**Unit II**

Comparison of Various Mobile app development platforms - Overview of Android App Development Scenario - Mobile App development challenges.

**Unit III**

Android App Development - Setting up the development environment - Building the Hello World Android App - Anatomy of Android Apps - Logical Components.

**Unit IV**

Android Activities - UI Resources and Elements - Activity interaction - Fragments - Services - App Data Persistence.

**Unit V**

Multimedia Handling in Android Applications: Audio, Video and Images, Capture and Storage - Graphics and Animation - Location Services - Sensor handling in Android apps - App markets and publishing apps.

**Reference Books**

1. *Composing Mobile Apps: Learn, Explore and Apply using Android*, by Anubhav Pradhan and Anil V Deshpande, Wiley Publications, 2014, ISBN: 978-81-265-4660-2.
2. <https://developer.android.com/training/basics/firstapp/index.html>
3. <https://developers.google.com/training/android/#for-new-programmers>

**Subject Code: BVSDSC46**

## **INTERNET OF THINGS**

**Pre-Requisite:** Knowledge in Wireless and mobile communication Technologies.

**Objectives:**

- Vision and Introduction to IoT.
- Understand IoT Market perspective and state of the art – IoT Architecture.

**Outcomes:**

- Understand the machine-to-machine communication technology in both technical and market perspective
- Acquire knowledge about how they are applied to various business scenarios

### **UNIT I**

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, Differing Characteristics: Comparison between M2M and IoT.

### **UNIT II**

M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.

### **UNIT III**

An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, Standards.

### **UNIT IV**

M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management: Introduction, Managing M2M Data, Considerations.

### **UNIT V**

Business processes in IoT: Introduction, IoT Integration with enterprise system, Distributed business process in IoT - Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management,

## Reference Books:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014.
2. Hakima Chaouchi, — “The Internet of Things Connecting Objects to the Web” ISBN : 978-1- 84821-140-7, Wiley Publications
3. 2. Olivier Hersent, David Boswarthick, and Omar Elloumi, — “The Internet of Things: Key Applications and Protocols”, Wiley Publications
4. Vijay Madisetti and Arshdeep Bahga, — “Internet of Things (A Hands-on-Approach)”, 1st Edition, VPT, 2014.
5. 4. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.
6. 5. Keysight Technologies, “The Internet of Things: Enabling Technologies and Solutions for Design and Test”, Application Note, 2016.

**Pre-requisite:** Knowledge of Networks

**Objectives:**

- Understanding need for Ethical Hacking
- Understanding the procedure for hacking and malware attacks

**Outcomes:**

- Acquire knowledge of ethical hacking, need and procedure.
- Understand various malwares and hacking methodologies.

**UNIT I**

Introduction to Ethical Hacking: Defining hacker, Ethical Hacking, Understanding the Need to Hack Your Own Systems, Understanding the Dangers Your Systems Face, Nontechnical attacks Network-infrastructure attacks, Operating system attacks, Application and other specialized attacks, Obeying the Ethical hacking Commandments, working ethically Respecting privacy Not crashing your systems, The Ethical hacking Process: Formulating your plan, selecting tools Executing the plan, Evaluating results.

**UNIT II**

Cracking the Hacker Mindset: Determining who you're up against, who hacks, why hackers hack. Planning and Performing Attacks, Maintaining Anonymity, Developing Your Ethical Hacking Plan, Getting Your Plan Approved, Establishing Your Goals, Determining What Systems to Hack, Creating Testing Standards: Timing, Specific tests, Blind versus knowledge assessments, Location, reacting to major exploits that you find, Silly assumptions, Selecting Tools.

**UNIT III**

Hacking Methodology: Setting the Stage, Seeing What Others See, gathering public information, Mapping the network, Scanning Systems, Hosts, Modems and open ports, Determining What's Running on Open Ports, Assessing Vulnerabilities, Penetrating the System

**UNIT IV**

Putting Ethical Hacking in Motion: Social Engineering, Why Hackers Use Social Engineering, Understanding the Implications, Performing Social-Engineering Attacks: Fishing for information, building trust, exploiting the relationship. Social-Engineering Countermeasures: Policies, awareness.



## **UNIT V**

Implications of Malware Attacks, Types of Malware: Trojan horses, Viruses, Worms, Rootkits, Spyware, Built-in programming interfaces, Logic bombs Security tools, How Malware Propagates: Automation, E-mail, Hacker backdoors, Testing: Vulnerable malware ports, Manual assessment, Antivirus software testing, Network scanning, Behavioral-analysis tools, Malware Countermeasures: General system administration, E-mails, Files.

### **Reference Books**

1. Rafay Baloch, "Ethical Hacking and Penetration Testing Guide", CRC Press, 2014.
1. Kevin Beaver, "Ethical Hacking for Dummies", Sixth Edition, Wiley, 2018.
2. Jon Erickson , "Hacking: The Art of Exploitation", Second Edition, Rogunix, 2007.

**Subject Code: BVSDSC48 MOBILE APPLICATION LAB**

**List of Experiments:**

1. Design and develop a mobile app to compute Body Mass Index.
2. Design and develop a mobile app for an event registration form.
3. Design and develop a mobile app for storage and retrieval of data.
4. Design and develop a mobile app with multimedia components.
5. Design and develop a mobile app to utilize various sensors.
6. Design and develop a mobile app to utilize location services.

A group project with 3 or 4 members in a group in any organization. This would enable the student to face and overcome the real-time problems and challenges in implementing a project. In-house projects can also be considered.

**Objective**

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

**Outcomes**

The course outcome is the ability of the student to apply Software Development Cycle to develop a software module. The student will be able to use the techniques, skills and modern software engineering tools necessary for software development. Develop a software product along with its complete documentation.

The project is of 16 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implement the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides. The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The students shall defend their dissertation during viva-voce examinations.

**MODERN INDIAN LANGUAGE PAPER (HINDI)**

**LHIN 111- सामान्य हिंदी**

पाठ्य विषय  
कहानी संकलन  
कथा-मंजरी -- सं. रामदरशमिश्र, वाणी प्रकाशन, 21-ए, दरियागंज, नई दिल्ली-110002

केवल निम्नलिखित कहानियों और कहानीकारों पर ही व्याख्यात्मक/ आलोचनात्मक एवं लघुत्तरी पूछे जायेंगे।

1. कफन – प्रेमचंद
2. आकाशदीप – जयशंकर प्रसाद
3. परदा – यशपाल
4. अपरिचित – मोहन राकेश
5. वापसी – उषा प्रियंवदा
6. सितंबर की एक शाम – निर्मल वर्मा
7. चीफ की दावत – भीष्म साहनी
8. चेहरे - चित्रामुद्गल

**हिंदी व्याकरण**

लिंग, वचन, वाच्य, काल और पारिभाषिक शब्दावली का अनुवाद(अंग्रेजी से हिंदी)

(पारिभाषिक शब्दावली निर्धारित है)

पत्राचार - औपचारिक और अनौपचारिक पत्र

**अंक विभाजन**

1. एक अंक वाले प्रश्न कहानी संकलन से- दस में से दस 1x10=10 अंक
2. पांच अंक वाले प्रश्न कहानी संकलन से- चार में से दो 2x5= 10 अंक
3. पन्द्रह अंक वाले प्रश्न कहानी संकलन से दो में से एक 1x15=15 अंक
4. व्याकरण
  1. पत्राचार -- दो में से एक 1x15=15 अंक
  2. लिंग बदलकर वाक्य लिखिए 1x5=5 अंक
  3. वचन बदलकर वाक्य लिखिए 1x5=5 अंक
  4. वाच्य बदलिए 1x5=5 अंक
  5. काल बदलिए 1x5=5 अंक
  6. पारिभाषिक शब्दावली का अनुवाद (अंग्रेजी से हिंदी) 1x5=5 अंक  
( पारिभाषिक शब्द निर्धारित हैं)

अध्ययन के लिए सहायक पुस्तकें

- सामान्य हिंदी, डॉ. विजयपाल सिंह, हिंदी प्रचार संस्थान, वारणासी
- व्यावहारिक हिंदी, डॉ. महेन्द्र मित्तल, शबरी संस्थान, दिल्ली
- प्रेमचंद और उनका युग, रामविलास शर्मा, राजकमल प्रकाशन, दिल्ली
- कहानी: स्वरूप और संवेदना , राजेन्द्र यादव, वाणी प्रकाशन, नई दिल्ली
- अभिनव हिंदी व्याकरण, डॉ. वेदप्रकाश शास्त्री, सन्मार्ग प्रकाशन, दिल्ली

## Modern Indian Languages (Tamil)

Subject Code: BVSDGE01

பயன் பாடலுத் தமிழ்.

நாக்கம் :

- மமொழியையும் அறிமுகப்படுத்துதல், வளர்த்தல். இலக்கிதையதும் பயன்பாக்கத் திறயை

பயன் :

- சமகால ழலில் தமிழ்ச் சூர்து வவயலவாண் ப்பியபைப் சூ சூரந மபறுதல்.

ஊகைங் கள், தரவு தைச்சு.

அலகு 1.

அறிமுக நியல : தமிழ் மமொழி வரலாறு, இலக்கிை வரலாறு, வரலாறு, பண் பைஇலைகத் தமிழ் வரலாறு, இணும் பிற...

அலகு 2

இலக்கிைக் கையரகள்: இலக்கிைங் களில் வமலாண் யம: வணிகவமலாண் யம, நீ ரவமலாண் யம, நிதி வமலாண் யம, ழல் வமலாண் யம, இணும் சூற்றுசூறிவிைல் தமிழ், தமிழ்க் பிற. கணிை அறிமுகம் ,

அலகு 3

வப க் கயல: ம் எழுத்து, , குழு உயரலாைல், கள சச வபசச வமயபைப் வபசச ஆண்வு,

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மமொழிமபைரத்தல்.

அலகு 5.

வயரவிைல்: கைவரூணயகைக் கைடு

யர கண்டயர, பண்டகக் கண்டயர, யர, ஊகக் கண்டயர,  
வயரவில்; விலகக் கண்டயர, ஆண்டக் கண்டயர.  
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