# BACHELOR OF VOCATION

## Software Development (to be implemented from July 2017)

| Code | Title of Paper | Credits | | Max. Marks |
|------|----------------|---------|---|------------|
| | | Gen. Education | Skill Component | |
| **Semester –I** | | | | |
| SOF-BV-G101 | Communication Skills | 4 | | 100 |
| SOF-BV-G102 | Introduction to IT | 4 | | 100 |
| SOF-BV-G103 | Basics of Data Communication | 4 | | 100 |
| SOF-BV-S104 | Programming in 'C' Language | | 4 | 100 |
| SOF-BV-S105 | Software Lab – I | | 5 | 100 |
| SOF-BV-S106 | Software Lab – II | | 5 | 100 |
| SOF-BV-S107 | Project– I (Based on MS-Office) | | 4 | 100 |
| **Total** | | **12** | **18** | **700** |
| **Semester-II** | | | | |
| SOF-BV-G201 | Fundamentals of Windows and Server Administration | 4 | | 100 |
| SOF-BV-G202 | Mobile and Wireless Technologies | 4 | | 100 |
| SOF-BV-G203 | Internet & Web Development | 4 | | 100 |
| SOF-BV-S204 | Data and File Structures | | 4 | 100 |
| SOF-BV-S205 | Software Lab – III | | 5 | 100 |
| SOF-BV-S206 | Software Lab – IV | | 5 | 100 |
| SOF-BV-S207 | Project – II | | 4 | 100 |
| **Total** | | **12** | **18** | **700** |
| **Semester-III** | | | | |
| SOF-BV-G301 | Cloud Computing | 4 | | 100 |
| SOF-BV-G302 | Digital Electronics | 4 | | 100 |
| SOF-BV-G303 | Object Oriented Programming with C++ | 4 | | 100 |
| SOF-BV-S304 | Java Programming | | 4 | 100 |
| SOF-BV-S305 | Software Lab – V | | 5 | 100 |
| SOF-BV-S306 | Software Lab – VI | | 5 | 100 |
| SOF-BV-S307 | Training/ Mini Project-III | | 4 | 100 |
| **Total** | | **12** | **18** | **700** |
| **Semester-IV** | | | | |
| SOF-BV-F401 | GFC-Communicative English | 4 | | 100 |
| SOF-BV-G402 | Entrepreneurship Development | 4 | | 100 |
| SOF-BV-G403 | Introduction to RDBMS & SQL | 4 | | 100 |
| SOF-BV-S404 | Net Programming | | 4 | 100 |
| SOF-BV-S405 | Software Lab – VII | | 5 | 100 |

| SOF-BV-S406 | Software Lab – VIII | | | 5 | 100 |
|---|---|---|---|---|---|
| SOF-BV-S407 | Industrial Training/ Mini Project | | | 4 | 100 |
| **Total** | | **12** | | **18** | **700** |
| **Semester-V** | | | | | |
| SOF-BV-F501 | GFC - Environmental Studies | 4 | | | 100 |
| SOF-BV-G502 | Entrepreneurship Development | 4 | | | 100 |
| SOF-BV-G503 | Introduction to RDBMS & SQL | 4 | | | 100 |
| SOF-BV-S504 | Net Programming | | | 4 | 100 |
| SOF-BV-S505 | Software Lab – VII | | | 5 | 100 |
| SOF-BV-S506 | Software Lab – VIII | | | 5 | 100 |
| SOF-BV-S507 | Industrial Training/ Mini Project | | | 4 | 100 |
| **Total** | | **12** | | **18** | **700** |
| **Semester-VI** | | | | | |
| SOF-BV-F601 | GFC- Eastern Himalayan Studies | 4 | | | 100 |
| SOF-BV-G602 | Entrepreneurship Development | 4 | | | 100 |
| SOF-BV-G603 | Introduction to RDBMS & SQL | 4 | | | 100 |
| SOF-BV-S604 | Net Programming | | | 4 | 100 |
| **Total** | | **12** | | **18** | **400** |

## COURSE STRUCTURE

| NSQF Level | Skill Component Credits | General Education Credits | Normal calendar duration | Exit Points / Awards |
|---|---|---|---|---|
| Year 3 | 36 | 24 | Six Semesters | B.Voc. |
| Year 2 | 36 | 24 | Four semesters | Advanced Diploma |
| Year 1 | 36 | 24 | Two semesters | Diploma |
| TOTAL | 108 | 72 | | |

### BVoc-SD-G-101: COMMUNICATION SKILLS

| | | | | |
|---|---|---|---|---|
| **YEAR** | **: 1** | **CREDIT** | **:** | **4** |
| **SEMESTER** | **: 1** | **MAXIMUM MARKS** | **:** | **100** |

### SYLLABUS

#### UNIT I

**Communication:** Meaning, Importance, and Process, Objectives of Communication, Effective Communication, Means/ Media and Types of Communication, Channels of Communication, Barriers to Communication, Voice Training, Importance of Feedback. Interview, Report Writing, Speeches and Presentations, Documentation.

## UNIT II

**Preparation of Extempore speech:** Group Discussion, Debates, Declamation; Stage Confidence. Business Correspondence: Definition, Importance Business letters: Essential features, Parts and Layout, Types: Purchase order letter, Enquiry Letter, Quotation Letter, Acceptance Letter, Refusal Letter, Follow up Letter and Cancellation of order letter.

## UNIT III

**Personality Development:** Types of personality, Dynamics of Personality, Personality Traits, Influences on Personality, Personality Analysis through body language and Individual habits, Physical Aspects of personality, Emotional Stability.

## UNIT IV

**Memory Training:** Mind and mental development, Mental Blocks, Manners and Art of Living.

**Suggested Text Books:**

1. The Written Word, Vandan R.Singh, Oxford University Press, 2006.
, ABE Books, 2
2. Business Communication, M.K. Sehgal, Vandana Khetarpal, ABE Books, 2006.
3. Succeeding through Communication, Subhash Jagota, Excel books, 2009.
4. Business Communication: A Practical Approach, Shruti D. Naik, Dreamtech, 2015.

**BVoc-SD-G-102:   INTRODUCTION TO IT**

| | |
|---|---|
| **YEAR     : 1** | **CREDIT        :        4** |
| **SEMESTER      : 1** | **MAXIMUM MARKS:  100** |

## SYLLABUS
### UNIT I

**Computer characteristics:** Historic Evolution of Computers; Classification of computers: Microcomputer, Minicomputer, mainframes, Supercomputers; Personal computers: Desktop, Laptops, Palmtop, Tablet PC; Hardware & Software; Speed, storage, accuracy, diligence.

### UNIT II

**Hardware**: CPU, Memory, Input devices, output devices. Memory units: RAM (SDRAM, DDR RAM, RDRAM etc. feature wise comparison only); ROM-different types: Flash memory; Auxiliary storage: Magnetic devices, Optical Devices; Floppy, Hard disk, Memory stick, CD, DVD, CD-Writer; Input devices - keyboard, mouse, scanner, speech input devices, digital camera, Touch screen, Joystick, Optical readers, bar code reader; Output devices: Display device, size and resolution; CRT, LCD; Printers: Dot-matrix, Inkjet, Laser; Plotters, Sound cards & speaker.

### UNIT III

**Software**: System software, Application software; concepts of files and folders, Introduction to Operating systems, Different types of operating systems: single user, multitasking, time-sharing multi-user; Booting, POST;

### UNIT IV

**Operating systems:** Windows & Linux; Application software: Generic Features of Word processors, Spread sheets and Presentation software; Computer Viruses & Protection.

**Suggested Text Books:**
1. Fundamentals of Computers, E. Balaguruswamy, McGraw hill, 2014.
2. Information Technology: The Breaking wave, Dennis P Curtain, McGrawhill, 2014.
3. Introduction to Computers, Peter Norton, McGraw Hill, 2010.
4. Fundamentals of Information Technology, Durgesh Pant, Mahesh Kumar Sharma, Laxmi Publication, 2008.

**BVoc-SD-G-103: BASICS OF DATA COMMUNICATION**

YEAR    : 1                              CREDIT              :         4
SEMESTER     : 1                     MAXIMUM MARKS  :      100

## SYLLABUS

### UNIT I

**Data Communications, Data Networking, and the Internet:** Data communication and networking for today's enterprise, communication model, data communications, networks, the Internet.
**Protocol architecture, and Internet based applications**The need for a protocol architecture, the TCP/IP protocol architecture, the OSI model, standardization within a protocol architecture, traditional Internet based applications, multimedia.

### UNIT II

**Data transmission:** Analog and digital data transmission, transmission impairments, channel capacity
**Transmission media:**Guided transmission media, wireless transmission, wireless propagation, line-of-sight transmission

### UNIT III

**Signal encoding techniques:** Digital data-digital signals, digital data-analog signals, analog data-digital signals, analog data – analog signals.
**Digital data communication techniques** Asynchronous and synchronous transmission, types of errors, error detection, error correction, line configuration.

### UNIT IV

**Multiplexing:** Frequency division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, Asymmetric digital subscriber line.
**Spread spectrum :**Concept of spread spectrum, frequency hopping spread spectrum, direct sequence spread spectrum, code-division multiple access

**Suggested Text Books:**
1     Data and Computer Communication, W. Stallings, Prentice Hall of India, 2007.
2.    Data Communication and Networking, B. A. Forouzan, McGraw-Hill, 2007.
3.    Computer Networks, A. S. Tanenbaum, Prentice Hall, 2008.
4.    Cryptography and Network Security: Principles and Practice, W. Stallings, PHI, 2008.

**BVoc-SD-S-104: PROGRAMMING IN 'C' LANGUAGE**

YEAR : 1          CREDIT : 4
SEMESTER : 1       MAXIMUM MARKS : 100

## SYLLABUS
### UNIT I

**Overview of C:** History of C, Importance of C, Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant, Structure of a C Program, printf(), scanf() Functions, Operators & Expression: Arithmetic, relational, logical, BVITwise, unary, assignment, shorthand assignment operators, conditional operators and increment and decrement operators, Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.

### UNIT II

**Decision making & branching:** Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement. Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement, Nested loops.

### UNIT III

**Functions:** Standard Mathematical functions, Input/output: Unformatted & formatted I/O function in C, Input functions viz. getch(), getche(), getchar(), gets(), output functions viz., putch(), putchar(), puts(), string manipulation functions. User defined functions: Introduction/Definition, prototype, Local and global variables, passing parameters, recursion.

### UNIT IV

**Arrays, strings and pointers:** Definition, types, initialization, processing an array, passing arrays to functions, Array of Strings. String constant and variables, Declaration and initialization of string, Input/output of string data, Introduction to pointers. Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime.

**Suggested Text Books:**
1. The C Programming Language, Brian W. Kernighan, Dennis Ritchie, 2015.
2. Programming in ANSI C, E. Balagurusamy, TMH, 2008.
3. Let us C, Yashwant Kanetker, BPB, 2016.
4. C: The Complete Reference, Herbert Schildt, McGraw Hill, 2000.

**BVoc-SD-S-105: SOFTWARE LAB- I**

YEAR : 1                                    CREDIT          :          5
SEMESTER      : 1                           MAXIMUM MARKS:  100

**SYLLABUS**
**Practical (Ms-Office)**

1.  Documentation Using MS-Word - Introduction to word processing interface, Toolbars, Menus, Creating & Editing Document, Formatting Document, Finding and replacing text, Format painter, Header and footer, Drop cap, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Previewing and printing document, Advance Features of MS-Word-Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

2.  Electronic Spread Sheet using MS-Excel - Introduction to MS-Excel, Cell, cell address, Creating & Editing Worksheet, Formatting and Essential Operations, Moving and copying data in excel, Header and footer, Formulas and Functions, Charts, Cell referencing, Page setup, Macros, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation, Database Management using Excel-Sorting, Filtering, Validation, What if analysis with Goal Seek, Conditional formatting.

3.  Presentation using MS-PowerPoint: Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

4.  Introduction to MS Access: creating database creating and manipulating tables, forms, queries, reports, modules, importing and exporting of data.

**BVoc-SD-S-106: SOFTWARE LAB- II**

| | | | | |
|---|---|---|---|---|
| **YEAR** | : 1 | **CREDIT** | : | **5** |
| **SEMESTER** | : 1 | **MAXIMUM MARKS:** | | **100** |

## SYLLABUS

This laboratory course will comprise as exercises to supplement what is learnt under paper Students are required to develop the following programs with internal documentation:

1  **Assignments on Data types, Operators, Control Structure (if else, while, for, Do-while), jumping statements in C .**
   a) Write a program to print the size of all the data types supported by C .
   b) Write a program to check whether the given number is a even number or not.
   c) Write a program to accept three numbers and find the largest among them.
   d) Write a program to count the different vowels in a line of text using switch.
   e) Write a program to accept two numbers and perform various arithmetic operations (+, -, *, /) based on the symbol entered.
   f)  Write a program to find factorial of a number.
   g) Write a program to print all prime numbers between any 2 given limits.
   h) Write a program to print all the Armstrong numbers between any 2 given limits.
   i)  Write a program to demonstrate the use of break and continue statements.

2  **Assignment on Arrays(one and two dimensional) and strings (string handling functions)**
   a) Write a program to find largest element in an array.
   b) Write a program to search an element in an array.
   c) Write a program to find sum and average of numbers stored in an array.
   d) Write a program to check whether a string is a Palindrome.
   e) Write a program to perform matrix addition.
   f)  Write a program to perform matrix multiplication.
   g) Write a program to demonstrate string handling functions.

3  **Assignment on Pointers and Array of Pointers**
   a)  Write a function to swap two numbers using pointers.
   b)  Write a program to access an array of integers using pointers.

5  **Assignment on Structures and Unions**
   a)  Write a program to create an employee structure and display the same.
   b)  Write a program to create a student database storing the roll no, name, class etc and sort by name.

**The laboratory experiments are based on paper BVoc-SD-S-104: PROGRAMMING IN 'C' LANGUAGE**

**BVoc-SD-S-107: PROJECT– I (BASED ON MS-OFFICE)**

| | | | | |
|---|---|---|---|---|
| **YEAR** | **: 1** | **CREDIT** | **:** | **4** |
| **SEMESTER** | **: 1** | **MAXIMUM MARKS** | **:** | **100** |

**NOTE : STUDENT HAVE TO SUBMIT PROJECT REPORT ON MS- OFFICE**
**SYLLABUS**

1. **MS-word**: Design, create and modify a range of business documents, Displaying Different Views of a Document, Creating and Saving a Document, Selecting, Modifying, Finding and Replace Text, Align Text Using Tabs, Display Text as List Items. Apply Borders and Shading, Preview a document, and adjust its margins and orientation, Insert & Format a Table, Convert Text to a Table, Check Spelling and Grammar, Use the Thesaurus, Print with default or custom settings, Managing Lists – Sort, Renumber, Customize a List, Apply a Page Border and Colour, Sorting Table Data, Control Cell Layout, Perform Calculations in a Table, Creating Customized Formats with Styles and Themes. Create or Modify a Text Style, Create a Custom List or Table Style. Modifying Pictures & Picture Appearance Settings, Wrap Text around a Picture, Insert and Format Screenshots in a Document, Add WordArt , Use the Mail Merge Feature including Envelopes and Labels.

2. **MS-Excel:** Construct a spreadsheet and populating Cell Data, Formatting Cells - Search Worksheet Data, Changing Fonts, Modify Rows and Columns, Managing Worksheets and Workbooks, Applying Formulas and Functions, Inserting Currency Symbols, Merging cells, Spell Check a Worksheet, Add Borders and Color to Cells, Printing options to output a chart, Modify the Layout of a Paragraph – Tabs, Headers, Footers, Apply Styles & Manage Formatting, Document Templates, Insert contents, page and section breaks, Apply Character Formatting. Clip Art , Symbols, Illustrations, Set Page Breaks, Page Layout Options, Manage Workbook Views, Apply Cell and Range Names, Auto Sum in Cells, Calculate Data Across Worksheets, Sort or Filter Worksheet or Table Data, Create, Modify and Format Charts, Create, modify and format spreadsheets using the full range of the software formatting, features including conditional formatting for example Hide /unhide/freeze rows and columns.

3. **MS-PowerPoint**: Salient features of POWER POINT, Starting ,Saving and quitting presentation, various components and elements of PowerPoint Package. Insert Clip Art and Graphs. Adding Multimedia Effects to the slide. Formatting and Editing Presentations. Adding Animation and Transition effects to the presentations.

   o   Project Report          50 Marks
   o   Viva Voce               50 Marks

**BVoc-SD-G-201: FUNDAMENTALS OF WINDOWS AND SERVER ADMINISTRATION**

YEAR     : 1                                   CREDIT     :     4
SEMESTER    : 2                            MAXIMUM MARKS: 100

## SYLLABUS
### UNIT I

**Understanding Windows Programming Basics:** Identify Windows application types, Implement user interface design. Install a Windows Services application.
**Accessing Data in a Windows Forms Application:** Understand data access methods for a Windows Application, Understand databound controls.
**Deploying a Windows Application:** Understand windows application deployment methods, integrating data.

### UNIT II

**Windows 7/8:** Installing, upgrading and migrating to Window 7/8, Deploying Windows 7/8, Configuring disk and device drivers, Configuring, file access and printers on Window 7/8 client.
**Installation** : Installation Server 2008, Drivers, Working with windows 2008 Devices, Troubleshooting Devices & Drivers, Managing system updates.

### UNIT III

**Working With Disk Storage**: Type of Disk Storage, Type of volumes, Implementing fault tolerance, Use disk management tools, Disk Quota, Troubleshooting disk management, Shadow copy**.**

### UNIT IV

**Domain Controller**: Install Active Directory, Manage Active Directory Component, Working with OU Structure, Working with Domain User account, Working with Domain Groups.
**Domain Name Services (DNS)**: Define Name resolution, Install DNS, Configure DNS Client, Manage and Troubleshoot DNS.
**Dynamic Host Configuration Protocol:** Configure DNS Server, Backup and Recovery, Steps for Backup and Recovery.

**Suggested Text Books:**
1. Mastering Window Server 2008, Mark Minasi, John Paul Mueller, Wiley, 2009.
2. MCSA Windows Server 2012 R2 Complete Study Guide: Exams 70-410, 70-411, 70-412, and 70-417, Sybex, 2012.
3. MCTS Windows 7 Configuration Study Guide: Exam 70-680, William Panek, Wiley, 2010.
4. Red Hat Enterprise Linux 7: Desktops and Administration, Richard Petersen, Surfing turtle, 2017.
5. Windows Server 2008 Inside Out, William Stanek, Microsoft press, 2008.

**BVoc-SD-G-202: MOBILE AND WIRELESS TECHNOLOGIES**

**YEAR        : 1**                                                                          **CREDIT        : 4**
**SEMESTER      : 2**                                                        **MAXIMUM MARKS:        100**
**SYLLABUS**
**UNIT I**
**Introduction to mobile communication and computing**: Why mobile communications, Use-cases, applications, Definition of terms: Challenges, history, Wireless Transmission, Wireless networks in comparison to fixed networks, Simple reference model (TCP/IP model), Influence of mobile communication to the layer model. Wireless Transmission–I : Frequencies for communication- Frequencies for mobile communication, Frequencies and regulations, Signals (physical representation of data, function of time and location.

**UNIT II**
**Wireless Telecommunication Systems**: GSM: Overview, Performance characteristics of GSM (w.r.t. analog sys.), GSM: Mobile Services, Architecture of the GSM system, system architecture, GSM - TDMA/FDMA, GSM hierarchy of frames, GSM protocol layers for signaling, Mobile Originated Call, Mobile Originated Call, 4 types of handover, Handover decision, Handover procedure, Data services in GSM, GPRS quality of service, GPRS architecture and interfaces, GPRS protocol architecture. Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), FDMA, TDMA, CDMA.
**UNIT III**
**Wireless LANs** : Mobile Communication Technology according to IEEE (examples), Characteristics of wireless LANs (Advantages and disadvantages), Comparison: infrared vs. radio transmission, Comparison: infrastructure vs. ad-hoc networks, 802.11 - Architecture of an infrastructure network, 802.11 - Architecture of an ad-hoc network, IEEE standard 802.11, 802.11 - Layers and functions, WLAN: IEEE 802.11b, WLAN: IEEE 802.11a, Some more IEEE standards for mobile communications.

**UNIT IV**
**Mobile Network Layer:** Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).  Mobile Transport Layer I: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP. Mobile Transport Layer II: Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.Data processing and mobility.  4G Technology: The basics of 4G, What is 4G, 4G capable phone.

**Suggested Text Books:**
1. Mobile Communications, JochenSchiller, Addison-Wesley, 2004.
2. Handbook of Wireless Networks and Mobile Computing, Stojmenovic and Cacute, Wiley, 2002.
3. Mobile Database System, Vijay Kumar, Wiley publication, 2010.
4. 5G Mobile and Wireless Communications Technology, Afif Osseiran, Jose F. Monserrat, Patrick Marsch, Mischa Dohler, Takehiro Nakamure, Cambridge University press, 2016.

## BVoc-SD-G-203:   INTERNET & WEB DEVELOPMENT

**YEAR      : 1**                                         **CREDIT           :        4**
**SEMESTER        : 2**                                   **MAXIMUM MARKS:  100**

### SYLLABUS
### UNIT I
**Internet:** History of internet, The early years, The global Internet, A global information infrastructure, Review of packet switching and its relevance to the internet, topologies, Routers, Dial-up access, IP address. Transmission Control Protocol (TCP), Domain names, Names and IP address, TCP/IP, Flexibility, Reliability and efficiency.

### UNIT II
**World Wide Web (WWW):** Browsing the World Wide Web (WWW), HTML, Web page design with HTML, Features and importance of HTML. Advanced WEB technologies.

### UNIT III
 **HTML:** General Introduction to Internet and WWW; Text tags; Graphics, Video and Sound Tags; Link and Anchor Tags; Table Tags; Frame Tags; Miscellaneous tags (layers, image maps etc); CSS; DHTML; Example Applications; HTML Forms and Fields.

### UNIT IV
**Javascript**: Basic data types; control structures; standard functions; arrays and objects, event driven programming in Javascript; Example Applications.

**Suggested Text Books:**
1. Advanced Programming in Web Design, V.K. Jain, Cyber Tech Publications, 2008.
2. Internet and Worldwide web programming: How to Program, H M Deitel, P J Deitel, A B Goldberg, Pearson, 2007.
3. Web Technologies: A Computer Science Perspective, Jackson, Pearson Education, 2007.
4. PHP: The Complete Reference, S. Holzner, TMH, 2007.
5. HTML & Web Design, K. Jamsa, Konrad King, TMH, 2002.
6. Servlet Programming, J. Hunter, William Crawford, O'REILY, 2010.
7. Murach's Java Servlets and JSP, J. Murach, Andrea Steelman, Murach's, 2008.
8. Java Servlet & JSP Cookbook, R. Hoekman Jr., Schorr Pub, 2004.

**BVoc-SD-S-204:     DATA AND FILE STRUCTURES**

YEAR   :     1                              CREDIT      :                        4
SEMESTER   : 2                              MAXIMUM MARKS:  100

## SYLLABUS
### UNIT I

**Data Structures Basics**: Structure and Problem Solving, Data Structures, Data Structure Operations, Algorithm: Complexity and Time- Space Tradeoff.

**Linked List**: Linked List and its representation in memory, Traversing a Linked List, Searching a Linked List, Memory Allocation, Insertion into Linked list, Deletion from a Linked list, Types of Linked List.**Stacks and Queues**: Stack, Applications of Stack, Queue.

### UNIT II

**Trees and Binary Trees**: Tree: Definition and Concepts, 3 Binary Tree: Definition and Concepts, Types of Binary Tree, Traversal on Binary Tree, Representation of Binary Tree.

**Binary Search Tree**: Conversion of General Tree to Binary Tree, Sequential and Other Representations of Binary Tree, Concept of Binary Search Tree (BST), Operations on BST.

### UNIT III

**Graphs**: Basic Concepts about Graphs, Matrix Representation of Graphs, List Structures, Other Representations of Graphs, Algorithms for Graph Traversal, Spanning Trees.

**Applications of Graphs**: Topological Sorting, Weighted Shortest Path – Dijkstra's Algorithm, Minimum Spanning Tree (MST), Introduction to NPCompleteness.

### UNIT IV

**External Searching Techniques**: External Searching, Introduction to Static Hashing, Dynamic Hashing Techniques.

**Suggested Text Books:**
1. An Introduction to Data Structures with Applications, Jean-Paul Tremblay Paul G. Sorenson, McGraw Hill, 1991.
2. Data Structures, Seymour Lipschutz, TMH, 2006.
3. Expert Data Structures with C, R. B. Patel. Khanna Book Publishing, 2006.
4. Classic Data Structures, D. Samanta, PHI, 2006.

**BVoc-SD-S-205:**       **SOFTWARE LAB-III**

**YEAR       : 1**                                         **CREDIT          :       5**
**SEMESTER     : 2**                                    **MAXIMUM MARKS:  100**

**SYLLABUS**

**The laboratory experiments are based on paper BVoc-SD-G-203: Internet and Web Development**

**BVoc-SD-S-206: SOFTWARE LAB-IV**

YEAR        : 1                                    CREDIT              :        5
SEMESTER      : 2                                MAXIMUM MARKS:  100

**SYLLABUS**

**The laboratory experiments are based on paper BVoc-SD-S-204: DATA AND FILE STRUCTURES**

**BVoc-SD-S-207:   PROJECT – II**

**YEAR      : 1**                                                    **CREDIT          :       4**
**SEMESTER     : 2**                                         **MAXIMUM MARKS:   100**

1. Installation Window 7 and 8, upgrading Windows 7 & 8. Deploying Windows 7/8.
2. Configuring disk and device drivers, Configuring file access, Install printers on Window 7/8 client.
3. Configuring network connectivity and wireless network connections.
4. Install UTP(Straight, Cross, Rollover Cables), IP Addressing with LAN, Subnetting, Implement Wireless Network with LAN.
5. Installation Server 2008, Drivers, Working with windows 2008 Devices, Troubleshooting Devices & Drivers, Managing system updates.
6. Implementing fault tolerance, Use disk management tools, Disk Quota, Troubleshooting disk management, Shadow copy.
7. Install Active Directory, Manage Active Directory Component, Working with OU Structure, Working with Domain User account, Working with Domain Groups, Troubleshooting Active Directory.
8. Configure Auditing, Enable Auditing, Working with Security logs, Install terminal services, Configure terminal services, Working with Remote desktop, Working with telnet, Working with SSH, Manage terminal Services, Network Traffic Monitoring.
9. Install DNS, Configure DNS Client, Manage and Troubleshoot DNS.
10. Configure DNS Server, Working With Super Scope, Configure DHCP Client, Manage and Troubleshoot DHCP Server.
11. Configure VPN , Manage and Troubleshoot on VPN.
12. Implement and Manage Group Policy, Creating GPO‟s, Linking GPO‟s to Active Directory.

   o   Project Report          50 Marks

   o   Viva Voce               50 Marks

**BVoc-SD-G-301: CLOUD COMPUTING**

YEAR      : 2                                                    CREDIT       : 4
SEMESTER      :3                            MAXIMUM MARKS:      100
**SYLLABUS**
**UNIT I**
**Introduction**: Objectives, From collaborative to the Cloud – A short history Client – Server Computing, Peer-to-Peer Computing, Distributed Computing, Collaborative Computing, Cloud Computing, Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services, Industrial Applications.

**UNIT II**
**Business Values, Introduction:** Objectives, Service Modeling, Infrastructure Services, Platform Services, Software Services - Software as service modes- Massively scaled software as a service- Scale of Economy, Management and Administration.

**UNIT III**
**Cloud Service Administration:** Service Level Agreements and Monitoring Support Services- Accounting Services, Resource Management- IT Security- Performance Management- Provisioning- Service Management, Untangling Software Dependencies.

**UNIT IV**
**Migrating to the Cloud:** Introduction- Objectives, Cloud Services for individuals- Available Services - Skytap Solution, Cloud Services Aimed at the mid – market, Enterprise Class Cloud Offerings- MS Exchange - VMotion- VMWare v Center Converter- Hyper – V Live Migration, Migration Applications needed for migration - Moving existing data to cloud- Using the Wave approach.

**Suggested Text Books:**
1.  Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Michael Miller, Que Publications, 2009.
2.  Cloud Computing for Dummies, Judith Hurwitz, Robin Bloor, Marcia Kaufman and Fern Halper; Wiley Publishing Inc., 2010.
3.  Cloud Computing and SOA Convergence in Your Enterprise: A step by step guide, David S. Linthicum, Addison Wesley, 2010.
4.  Cloud Security and Privacy: An enterprise perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy and Shahed Latif, O'rielly, 2010.
5.  Cloud Computing: A Hands-on Approach, Arshdeep Bahga, Vijay Madisetti, Orient Blacksawan, 2014.

## BVoc-SD-G-302: DIGITAL ELECTRONICS

**YEAR  : 2**                                          **CREDIT  : 4**
**SEMESTER  : 3**                                      **MAXIMUM MARKS:  100**

### SYLLABUS
### UNIT I

**Introduction to Digital Systems:** Introduction to Digital electronics ,Digital and Analog Signals and Systems, Binary Digits, Logic Levels, and Digital Waveforms, Logic Systems- Positive and negative, Logic Operations, Combinational and Sequential Logic Functions, Programmable Logic, Fixed-Function Logic Devices.

### UNIT II

**Number Systems and Codes:** Introduction to Number Systems-Types-Decimal, Binary, Octal, Hexadecimal; Conversion from one number system to other; Binary arithmetic operations; Representation of Negative Numbers;1's complement and 2's complement, Complement arithmetic, BCD code, Digital Codes - Excess-3 code, Gray code, Binary to Excess -3 code conversion and vice versa, ASCII code, EBCIDIC code , Error Detection Codes.

### UNIT III

**Logic Gates:** Logical Operators, Logic Gates-Basic Gates, Other gates, Active high and Active low concepts, Universal Gates and realization of other gates using universal gates, Gate Performance Characteristics and Parameters.

### UNIT IV

**Boolean Algebra:** Rules and laws of Boolean algebra, Demorgan's Theorems, Boolean Expressions and Truth Tables, Standard SOP and POS forms; Minterm and Maxterms, Canaonical representation of Boolean expressions, Duality Theorem, Simplification of Boolean Expressions, Minimization Techniques for Boolean Expressions using Karnaugh Map and Quine McCluskey Tabular method.

**Suggested Text Books:**
1. Digital Electronics-An Introduction to Theory and Practice, William H.Gothman, PHI, 2008.
2. Digital Circuits and Logic Design, Morris Manno, PHI, 2010.
3. Digital Fundamentals,Thomas Floyd, Pearson, 2014.
4. Digital Integrated Electronics, Herbert Taub and Donald Schilling, McGraw Hill, 2010.
5. Digital Principles and applications, Albert Paul, Malvino Donald and P. Leach, Tata Mc Graw Hill, 2006.

## BVoc-SD-G-303: OBJECT ORIENTED PROGRAMMING WITH C++

YEAR     : 2                                    CREDIT          :     4
SEMESTER     : 3                            MAXIMUM MARKS:  100

### SYLLABUS
#### UNIT I
**Introduction to C++:** key concepts of Object-Oriented Programming Advantages Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures : - Decision Making and Statements : If .. else ,jump, goto, break, continue, Switch case statements - Loops in C++ : For, While, Do - Functions in C++ - Inline functions – Function Overloading.

#### UNIT II
**Classes and Objects:** Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects –friend functions – Overloading member functions – BVIT fields and classes – Constructor and destructor with static members.

#### UNIT III
**Overloading:** Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.

#### UNIT IV
**Pointers:** Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding , Polymorphism and Virtual Functions. Files – File stream Exception Handling Miscellaneous functions.

**Suggested Text Books:**
1. Object-oriented programming with ANSI and TURBO C++, Ashok N. Kamthane, Pearson , 2003.
2. Object-oriented programming with C++, E. Balagurusamy, TMH, 2006.
3. Programming with C++, John R Hubbard, TMH. 2000.

**BVoc-SD-S-304:**　　　　　　　　　　**JAVA PROGRAMMING**

**YEAR** 　: 2　　　　　　　　　　　　　　　**CREDIT** 　　　　:　　4
**SEMESTER** 　: 3　　　　　　　　　　　　　**MAXIMUM MARKS:** 　　100

**SYLLABUS**
**UNIT I**
**Java Evolution:** History – Features – How Java differs from C and C++ – Java and Internet – Java and www –Web Browsers. Overview of Java: simple Java program– Structure – Java Tokens – Statements – Java Virtual Machine.

**UNIT II**
**Java Constructs:** Constants, Variables, Data Types - Operators and Expressions – Decision Making and Branching: if, if ..else, nested if, switch, ? : Operator - Decision Making and Looping: while, do, for – Jumps in Loops - Labeled Loops – Classes, Objects and Methods.

**UNIT III**
**Programming:** Arrays, Strings and Vectors – Interfaces: Multiple Inheritance – Packages: Putting Classes together – Multithreaded Programming.

**UNIT IV**
**Errors and Exceptions:** Managing Errors and Exceptions – Applet Programming – Graphics Programming. Managing Input / Output Files in Java : Concepts of Streams-Stream.

**Suggested Text Books:**
1. Programming with java – a primer,  E. Balagurusamy, TMH, 2012.
2. The complete reference java 2, Patrick Naughton & Hebert Schildt, McGraw Hill, 2012.
3. The programming with Java, John R. Hubbard, TMH, 2009.

**BVoc-SD-S-305:   SOFTWARE LAB-V**

YEAR      : 2                                    CREDIT            :      5
SEMESTER      : 3                                MAXIMUM MARKS:  100

**SYLLABUS**

The laboratory experiments are based on paper BVoc-SD-G-303:   OBJECT ORIENTED PROGRAMMING USING C++

**BVoc-SD-S-306: SOFTWARE LAB-VI**

YEAR     : 2                                                CREDIT              :     5
SEMESTER      : 3                                           MAXIMUM MARKS:   100

**SYLLABUS**

**The laboratory experiments are based on paper BVoc-SD-S-304:   JAVA PROGRAMMING**

**BVoc-SD-S-307: TRAINING/ MINI PROJECT-III**

| | |
|---|---|
| **YEAR : 2** | **CREDIT : 4** |
| **SEMESTER : 3** | **MAXIMUM MARKS: 100** |

In This course student will have to do training on project. In Last Student have to Submit Project Report of their training to the supervisor.

- o Project Report        50 Marks
- o Viva Voce        50 Marks

## BVoc-SD-G-401:  ENGLISH

YEAR     : 2                        CREDIT       :     4

SEMESTER     : 4                  MAXIMUM MARKS:    100

## SYLLABUS

(The approved syllabus of SU for UG course.)

## BVoc-SD-G-402: ENTREPRENEURSHIP DEVELOPMENT

YEAR        : 2                                    CREDIT            :        4
SEMESTER      : 4                                  MAXIMUM MARKS:  100

## SYLLABUS
### UNIT I

**Concepts of entrepreneur:** Entrepreneur- Definitions-Characteristics ofentrepreneur-Classification of entrepreneur-Entrepreneurial traits- Entrepreneurial functions-role of entrepreneurs in the economic development- Factor effecting entrepreneurial growth-Entrepreneurship - Meaning- definition- Entrepreneur VsIntrapreneur- Women Entrepreneurs-Recent development-Problems- Entrepreneurial Development Programmes- Objectives of EDP-Methods of training- Phases of EDP.

### UNIT II

**Institutional support and incentives to entrepreneurs:** Functions of Department ofIndustries and Commerce (DIC) - Activities of Small Industrial Development Corporation (SIDCO)-Functions of National Small Industries Corporation(NSIC)- Functions of Small Industries Development Bank of India (SIDBI)-Khadi Village Industry Commission (KVIC)-Small Industries Service Institute (SISI)- Functions and services of Kerala Industrial Technical Consultancy Organisation (KITCO)-Activities of Science and Technology Entrepreneurship Development Project (STEDP)- Strategies of National entrepreneurship Development Board(NEDB)-Objectives of National Institute for entrepreneurship and small business development (NIESBUD)- Techno park-Functions of techno park Incentives-Importance- Classification of incentives- Subsidy- Types of Subsidy

### UNIT III

**Micro Small and Medium Enterprises:** Features- Objectives- Importance- Role ofSME in the economic development- MSME Act 2006- Salient features- Credit Guarantee Fund Trust Scheme for MSMEs - Industrial estates-Classification- Benefits-Green channel-Bridge capital- Seed capital assistance-Margin money schemes –Single Window System-Sickness- Causes –Remedies- Registration of SSI

### UNIT IV

**Setting up of Industrial unit**: (Only Basic study) Environment forEntrepreneurship –Criteria for selecting particular project- Generating project ideas-Market and demand analysis-Feasibility study- Scope of technical feasibility- Financial feasibility-Social cost benefit analysis-Government regulations for project clearance- -Import of capital goods- approval of foreign collaboration-Pollution control clearances- Setting up of micro small and medium enterprises-Location decision- Significance.


**Suggested Text Books:**
1. Entrepreneurship and small Business Management, M. B. Shukla, Kitab Mahal Allahabad, 2012.
2. Fundamentals of entrepreneurship, Sangram Keshari Mohanty, PHI, 2011.
3. Fundamentals of Entrepreneurship, H. Nandan, PHI, 2010.
4. Project Management, C.N. Sontakki, Kalyani Publishers, 2012.
5. Innovation and Entrepreneurship, Peter F. Drucker, Harper Business, 2006.
6. Small Business Entrepreneurship, Vasanth Desai, Himalaya Publications, 2010.

## BVoc-SD-G-403: INTRODUCTION TO RDBMS & SQL

**YEAR       : 2**                                    **CREDIT         :     4**
**SEMESTER      : 4**                               **MAXIMUM MARKS:  100**

### SYLLABUS
### UNIT I
**Introduction to database systems:** File Systems Versus a DBMS, View of data, Data abstraction, View levels, Data models, Instances and Schemas, Data Independence, Database languages, Database architecture, Database users, Database administrator, Role of DBA. The Entity Relationship (ER) model Entity sets, Relationship sets, Attributes, Constraints, Mapping Cardinalities, Keys, ER diagrams, Weak entity sets, Strong entity sets. Normalization, need for normalization, functional dependency, Normal forms-First, Second, Third, BCNF, Multi valued functional dependency, Fourth and Fifth Normal forms.

### UNIT II
**Data Definition in SQL:** Data types, Creation, Insertion, Viewing, Updation, Deletion of tables, modifying the structure of the tables, Renaming, Dropping of tables. Data Constraints – I/O constraints, Primary key, foreign key, unique key constraints, ALTER TABLE command.

### UNIT III
**Database Manipulation in SQL:** Computations done on table data - Select command, Logical operators, Range searching, Pattern matching, Grouping data from tables in SQL, GROUP BY, HAVING clauses, Joins – Joining multiple tables, Joining a table to itself. Views - Creation, Renaming the column of a view, destroys view, Granting and revoking permissions: Granting privileges, Object privileges, Revoking privileges.

### UNIT IV
**Program with SQL:** Data types: Using set and select commands, procedural flow, if, if /else, while, goto, global variables, Security - Locks, types of locks, levels of locks. Cursors - Working with cursors, Error Handling, Developing stored procedures, create, alter and drop, passing and returning data to stored procedures, using stored procedures within queries, building user defined functions , creating and calling a scalar function , implementing triggers, creating triggers , multiple trigger interaction.

**Suggested Text Books:**
1. Fundamentals of Database Systems, Elmasri & Navathe, Pearson Education, 2007.
2. Database System Concepts, Abraham Silberschatz, Henry Korth, McGraw Hill, 2006.
3. Introduction to Database Systems, C J Date, Addison Wesley, 2005.
4. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, BPB, 2010.

**BVoc-SD-S-404: .NET PROGRAMMING**

YEAR : 2                                      CREDIT          :    4
SEMESTER    : 4                               MAXIMUM MARKS:  100

## SYLLABUS
### UNIT I

**Basic of the .net framework:** .net architecture, managed code, assemblies, CLR, execution of assemblies code, IL, JIT, .NET framework class library, common type system, common language specification, interoperability with unmanaged code.

### UNIT II

**Introduction to VB.Net and C#:** VB.Net: Net features, Data Types C#: Data Types, Operators, Garbage Collection, Jagged Array, Collection (Array list, Hash table), Indexer(One Dimension) and property, Delegates and events (Multicasting, Multicasting Event), Exception Handling.

### UNIT III

**ADO.Net & Object Oriented Concepts (Using VB.Net or C#):** Basic window control, Architecture of ADO.Net, Comparison with ADO, .Net Data provider, Data Adapter, Data Set, Data Row, Data Column, Data Relation, command, Data Reader, Data Grid Constructor, Destructor, Abstraction, interface, polymorphism (Over loading and over ridding)

### UNIT IV

**ASP.Net :** Anatomy of ASP.NET Page, Server Controls : label, dropdown list box, validation controls, list box, text box, radio button, check box, State Management: session, caching, Authentication (window,.Net Passport, Forms Based), Authorization, web services, Advance Grid Manipulation.


**Suggested Text Books:**
1. Applied .Net Framework Programming, In MS VB.Net, Jeffrey Richter, Francesco Balena, TMH 2009.
2. Complete Reference C#, Herbert Schildt, TMH Publication, 2010.
3. Microsoft Visual Basic.NET step by step, Michael Halvorsan, PHI, 2009.
4. Microsoft ASP.Net With C#.Net step by step, G. Andew Duthie, PHI, 2008.
5. .NET 4.5 Programming 6-in-1, Black Book, Kogent Learning Solutions Inc., Dreamtech, 2013.

**BVoc-SD-S-405:  SOFTWARE LAB-VII**


YEAR      : 2                                    CREDIT              :      5
SEMESTER      : 4                          MAXIMUM MARKS:  100

## SYLLABUS

**The  laboratory  experiments  are  based  on  paper  BVoc-SD-G-403:**
**INTRODUCTION TO RDBMS & SQL**

**BVoc-SD-S-406:   SOFTWARE LAB-VIII**

YEAR      : 2                                    CREDIT               :      5
SEMESTER      : 4                          MAXIMUM MARKS:  100

## SYLLABUS

**The laboratory experiments are based on paper BVoc-SD-S-404:   .NET PROGRAMMING**

## BVoc-SD-S-407: INDUSTRIAL TRAINING/ MINI PROJECT

**YEAR        : 2**                                                                  **CREDIT              :      4**
**SEMESTER        : 4**                                                        **MAXIMUM MARKS:  100**

In This course student will have to do Industrial training on live project for 3 Months. The Industry should be ISO certified. In Last Student have to Submit Project Report of their training to the supervisor.

- o  Project Report          50 Marks
- o  Viva Voce              50 Marks

## BVoc-SD-G-501:  DISCRETE MATHEMATICS

**YEAR     : 3**                                    **CREDIT          :     4**
**SEMESTER      : 5**                          **MAXIMUM MARKS:  100**

## SYLLABUS

### UNIT I

**Set theory**:  (Basic definitions), union, intersection, complement, difference of sets, DeMorgan's Laws, Subsets, power sets, Equal vs. equivalent sets, Cartesian products

### UNIT II

**Relations and Functions:** Relations and functions, Symmetry, transitivity, reflexivity, Equivalence classes, Congruence, Functions, domain, range, co-domain of functions, One-to-one, onto function, inverse of a function.

### UNIT III

**Permutations and Combinations:** Permutations, Combinations, Binomial Theorem, Pascal's Triangle, Towers of Hanoi, Recurrence Relations, Graphs and Trees.

### UNIT IV

**Groups:** Definitions, Examples, Properties, Semigroups, Monoids, Sub Groups, Normal SubGroup, Homomorphism

**Suggested Text Books:**

1. Discrete Mathematical Structures, Tremblay and Manohar, Tata McGraw Hill, 2007.
2. Discrete Mathematics, Semyour Lipschutz, Varsha PatilIInd, Schaum"s Series, TMH, 2009.
3. Discrete Mathematical Structures, Kolman, Busby and Ross,  PHI, 2009.
4. Elements of Discrete Structures, C. L. Liu, 2002.
5. Discrete Mathematics and its application, K. H. Rosen,  MacGraw Hill, 2010.
6. Fundamental Approach to Discrete Mathematics, D. P. Acharjaya, Sreekumar, New Age, 2008.

**BVoc-SD-G-502:**        **ENVIRONMENTAL STUDIES**

**YEAR**    : 3                  **CREDIT**          :     4
**SEMESTER**    : 5                **MAXIMUM MARKS: 100**

## SYLLABUS
### UNIT I

**Environment and Ecosystem:** Environment: Introduction, importance and components of Environment; Scope and importance of environmental studies
Ecosystems: Concept, structure and Function of an ecosystem; Energy flow, Ecological succession, Food chains, Food webs, Ecological pyramids, Ecological Niche and Keystone Species.

### UNIT II

**Natural Resources and Conservation :** Introduction and classification of Natural Resources
(a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people
(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, interlinking of rivers, dams-benefits and problems. rain water harvesting, watershed management.
(c) Energy resources: Growing energy needs, renewable, non-renewable and alternate energy resources.
(d) Land resources: Land as a resource, land degradation, human induced landslides, soil erosion and desertification. water logging and salinity
Biodiversity: Introduction, issues and concerns

### UNIT III

**Environmental Issues and Management :** Introduction to Environmental Pollution
Causes, effects and control measures of: (a) Air pollution (b) Water pollution, (c) Soil pollution (d) solid waste, (e) Noise pollution (f) Nuclear hazards
Sustainable development: concept and issues
Environmental ethics: Issues and possible solutions.
Environmental Issues relating to Climate change, global warming, acid rain, ozone layer depletion

### UNIT IV

**Human and Environment :** Population-Environment Relationship; Environment and human health; Role of Information Technology in environmental management and human health.

**Suggested Text Books:**
1. Text Book of Environmental Studies, Bharucha Erach, University Press (India), 2005.
2. The Biodiversity of India, Bharucha Erach, Mapin Publishing Pvt. Ltd, 2003.
3. Environmental Science, S. C. India Santra, New Central Agency Pvt Ltd., 2005.
4. Perspectives in Environmental Studies, Kaushik, Anubha & Kaushik, New Age International (P) Ltd. Publisher, 2006.
5. Environmental Geography, Singh Savindra, Prayag Pustak Bhawan, 2003.

# BVoc-SD-G-503: ADVANCE COMPUTER NETWORKS

**YEAR** : 3                  **CREDIT** : 4
**SEMESTER** : 5                **MAXIMUM MARKS: 100**

## SYLLABUS
### UNIT I

**Introduction to communications and Networking :** Introduction – Fundamental concepts - Data communications – Protocols- standards - Standards organizations - Signal propagations- Analog and Digital signals- Bandwidth of a signal and a medium - Fourier analysis and the concept of bandwidth of a signal - The data transmission rate and the bandwidth. Information encoding: Introduction – Representing different symbols- Minimizing errors- Multimedia – Multimedia and Data compression.

### UNIT II

**Analog and digital transmission methods:** Introduction - Analog signal, Analog transmission - Digital signal, Digital transmission - Digital signal , Analog transmission - Baud rate and BVITs per second - Analog signal, Digital (Storage and) transmission - Nyquist Theorem. Modes of data transmission and Multiplexing: Introduction – Parallel and Serial communication - Asynchronous, Synchronous and Isochronous communication - Simplex, Half-duplex and Fullduplex communication – Multiplexing - Types of Multiplexing - FDM versus TDM. Transmission Errors: Detection and correction: Introduction – Error classification – Types of Errors – Error detection.

### UNIT III

**Transmission media:** Introduction - Guided media - Unguided media - Shannon capacity. Network topologies, switching and routing algorithms: Introduction - Mesh topology - Star topology - Tree topology - Ring topology - Bus topology - Hybrid topology - Switching basics Circuit switching – Packet switching - Message switching - Router and Routing – Factors affecting routing algorithms - Routing algorithm -Approaches to routing.

### UNIT IV

**Networking protocols and OSI model:** Introduction – Protocols in computer communications - The OSI model - OSI layer functions. Integrated services digital networking (ISDN): Introduction – Background of ISDN - ISDN architecture – ISDN interfaces - Functional grouping – Reference points - ISDN protocol architecture - Broadband ISDN (B-ISDN) of ATM – Packet size – Virtual circuits in ATM – ATM cells – Switching – ATM layers – Miscellaneous Topics, Network protocols; IP, IPv4, IPv6, UPD, TCP,HTTP, SHTTP, FTP, POP, SMTP, etc.

**Suggested Text Books:**
1. Data and Computer Communication, W. Stallings, Prentice Hall of India, 2007.
2. Data Communication and Networking, B. A. Forouzan, McGraw-Hill, 2007.
3. Computer Networks, Prentice Hall, A. S. Tanenbaum, 2008.
4. Internetworking with TCP/IP, D. Comer, Prentice Hall of India, 2006.
5. TCP/IP Illustrated: The Protocol, W. Richard Stevens, Addison-Wesley, 2011.
6. Cryptography and Network Security: Principles and Practice, W. Stallings, PHI, 2008.

7. A course in number theory and cryptography, N. Koblitz, Springer, 2008.
8. Secure Coding in C and C++, R. C. Seacord, Addison-Wesley, 2005.
9. Network Security with OpenSSL, J. Viega, M. Messier, P. Chandra, O'Reilly, 2009.
10. Secure Programming Cookbook for C and C++: Recipes for Cryptography, Authentication, Input Validation & More, J. Viega, M. Messier, O'Reilly, 2009.

**BVoc-SD-S-504: PHP PROGRAMMING**

**YEAR    : 3**                    **CREDIT        :    4**
**SEMESTER   : 5**                  **MAXIMUM MARKS: 100**

## SYLLABUS
### UNITI

**Introduction:** Introducing PHP – Basic development Concepts – Creating first PHP Scripts – Using Variable and Operators – Storing Data in variable – Understanding Data types – Setting and Checking variables Data types – Using Constants – Manipulating Variables with Operators.

### UNITII

**Controlling Program Flow:** Writing Simple Conditional Statements - Writing More Complex Conditional Statements – Repeating Action with Loops – Working with String and Numeric Functions.

### UNITIII

**Working with Arrays:** Storing Data in Arrays – Processing Arrays with Loops and Iterations – Using Arrays with Forms - Working with Array Functions – Working with Dates and Times.

### UNITIV

**Using Functions and Classes:** Creating User-Defined Functions - Creating Classes – Using Advanced OOP Concepts. Working with Files and Directories: Reading Files-Writing Files-Processing Directories. Working with Database and SQL : Introducing Database and SQL- Using MySQL-Adding and modifying Data-Handling Errors – Using SQLite Extension and PDO Extension. Introduction XML— Simple XML and DOM Extension.

**Suggested Text Books:**
1. Mastering VB Scriptǁ, Christopher J. Goddard, Mark White, Galgotia publications, 2011..
2. PHP: The Complete Reference, Steven Holzner, McGraw Hill, 2007.
3. PHP and MySQL Web Development, Luke Welling, Laura Thomson, Pearson, 2016.
4. Learning PHP, MySQL & JavaScript with j Query, CSS & HTML5, Robin Nixon, Shroff Publishers & Distributers Private Limited , 2015.

## BVoc-SD-S-505:  SOFTWARE LAB-IX

**YEAR      : 3**                                      **CREDIT            :      5**
**SEMESTER    : 5**                                    **MAXIMUM MARKS:  100**

**SYLLABUS**

**The laboratory experiments are based on paper BVoc-SD-G-503: ADVANCE COMPUTER NETWORKS**

# BVoc-SD-S-506:   SOFTWARE LAB-X

**YEAR      : 3**                                              **CREDIT            :      5**
**SEMESTER        : 5**                                     **MAXIMUM MARKS:  100**

**SYLLABUS**

**The laboratory experiments are based on paper BVoc-SD-S-504:   PHP PROGRAMMING**

## BVoc-SD-S-507: INDUSTRIAL TRAINING/ MINI PROJECT

**YEAR** : 3 **CREDIT** : 4
**SEMESTER** : 5 **MAXIMUM MARKS:** 100

In This course student will have to do Industrial training on live project for 3 Months. The Industry should be ISO certified. In Last Student have to Submit Project Report of their training to the supervisor.

- o Project Report 50 Marks
- o Viva Voce 50 Marks

**BVoc-SD-G-601: EHS**

YEAR      : 3                                      CREDIT              :      4
SEMESTER    : 6                                  MAXIMUM MARKS:  100

## SYLLABUS
### UNIT I
**Geography and Environment:** Geography and Environment of the Eastern Himalaya [Darjeeling, Sikkim, Bhutan, Arunachal Pradesh] Delineation of the Eastern Himalaya as a region Physiography; Climate; Drainage; Biodiversity and overview of Natural Resources

### UNIT II
**Historical background:** History of Sikkim and Darjeeling since 17th century; Spatial relations (Trade and Religious linkages) of Sikkim with its neighbours-Tibet, Bhutan and Nepal.

### UNIT III
**Society, Economy and Politics:** Society and Culture in Darjeeling-Sikkim; Economy and Livelihood in Darjeeling - Sikkim with emphasis on Agriculture, Industry and Tourism; Social and Political dimensions of Sikkim-Darjeeling Himalaya

### UNIT IV
**Critical Environmental Issues:** Development Bottlenecks: Potentials, Prospects and Implications with special reference to Hydro-resources, Communication and Industrial Development. Natural Hazards and Disaster Management, Degradation of Bio-Resources, Climate Change

**Suggested Text Books:**
1. Land and people of the Himalaya, S. C. Bose, Indian Publications, 1968.
2. The Himalayan Kingdoms, P. P. Karan, W. M. Jenkins, W.M, Princeton, 1963.
3. Enchanted Frontiers: Sikkim, Bhutan and India's North-Eastern Borderland, N. Rustumji, Oxford University Press, 1971.
4. The Eastern Himalayas: Environment and Economy, R. L. Sarkar and Mahendra P Lama, Atma Ram, 1986.
5. Among the Himalayas, L. A. Waddell, Mittal Publication, 1979.

# BVoc-SD-G-602: SOFTWARE ENGINEERING

**YEAR** : 3                  **CREDIT** : 4
**SEMESTER** : 6              **MAXIMUM MARKS: 100**

## SYLLABUS
### UNIT I

**Introduction:** Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models.

**Software Requirements Analysis & Specifications:** Requirement engineering, requirement elicitation techniques like FAST, QFD, requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS .

### UNIT II

**Software Project Management Concepts:** The Management spectrum, The People The Problem, The Process, The Project. **Software Project Planning:** Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management.

### UNIT III

**Software Design:** Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics, **Software Implementation**: Relationship between design and implementation, Implementation issues and programming support environment, Coding the procedural design, Good coding style.

### UNIT IV

**Software Testing:** Testing Process, Design of Test Cases, Types of Testing, Functional Testing, Structural Testing, Test Activities, Unit Testing, Integration Testing and System Testing, Debugging Activities. **Software Maintenance:** Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.


**Suggested Text Books:**
1. Software Engineering Concepts, Richard Fairley, TMH, 1997.
2. Software Engineering For Internet Applications, Eve Anderson, Philip Greenspun, Andrew Grumet, PHI, 2006.
3. Software Quality Engineering, Jeff Tian, Wiley India , 2006.

**BVoc-SD-G-603: CYBER SECURITY**

**YEAR     : 3**                                **CREDIT     :     4**
**SEMESTER     : 6**                        **MAXIMUM MARKS: 100**

**SYLLABUS**
**UNIT I**
**Introduction to Cyber Security:** Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.

**Cyber Security Vulnerabilities and Cyber Security Safeguards:** Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.

**UNIT II**
**Securing Web Application, Services and Servers:** Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges. Intrusion Detection and Prevention Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection.

**Cryptography and Network Security:** Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Protocols: - security at the Application Layer-PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

**UNIT III**
**Cyberspace and the Law :** Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.

**UNIT IV**
**Cyber Forensics:** Introduction to Cyber Forensics, Handling Preliminary Investigations, Controlling an Investigation, Conducting disk-based analysis, Investigating Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time.


**Suggested Text Books:**
1. Computer and Information Technology Handbook, John R.Vacca, Elsevier, 2013.
2. Cyber Law and Cyber Security in developing and emerging Economics, Zeinab Karake Shalboub, Lubna Al Qusinie, EE, 2010.
3. Cyber Security, Edward Amoroso, Silicon Press, 2006.

4. Cyber Space and Cyber Security, George k. Kostopoulos, CRC, 2008.
5. Cyber Forensics: A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes, Albert J. Marcella, Jr. and Doug Menendez, CBS Publishers & Distributors Pvt. Ltd., 2010.

## BVoc-SD-S-604:   MAJOR PROJECT & VIVA

YEAR       : 3                                    CREDIT              :        18
SEMESTER        : 6                               MAXIMUM MARKS:   100

### SYLLABUS

**Project Work & Viva-Voce**
*The aim of the Project work is to acquire industrial knowledge on the implementation of the software development concepts. Each student should carry out individually one Project Work and it may be a work using the software tools/ languages that they have learned.*
**GUIDELINES**
- Group Size – Maximum 3
- No. of records – No. of group members + 1 (Department copy) Certificate should include the names of all members
- The minimal phases for the project are: Project search, finalization and allocation, Investigation of system requirements, Data and Process Modeling, System Design, Program design, Program coding and unit testing, System integration, System implementation and acceptance testing.

**Planning the Project:** The Major Project is an involved Exercise which has to be plannedwell in advance. The topic should be chosen in Semester 4 itself and the case study of Course CS1302 should as far as possible, be based on the project topic, though on Exceptional cases, for valid reasons, the project guide may waive this condition. Related reading, training and discussions should start from semester 5 itself.

**Selection of project work:** Project work could be of 3 types:
**Developing solution for a real-life problem:** In this case, a requirement for developing acomputer based solution already Exists and the different stages of system development life cycle is to be implemented successfully. Examples are Accounting Software Package for a particular organization, Computerization of administrative functions of an organization, Web Based Commerce, etc. The scope for creativity and Exploration in such projects is limited, but if done meticulously, valuable Experience in the industrial context can be gained.
**Innovative Product development:** These are projects where a clear-cut requirement fordeveloping a computer based solution may not be existing, but a possible utility for the same is conceived by the proposer. An Example is a Malayalam Language Editor with Spell Checker, Computer Music Software for Indian Music, Heat Engines Simulation Software for eLearning, Digital Water Marking Software,
**Research level project:** These are projects which involve research and development andmay not be as structured and clear cut as in the above case. Examples are Malayalam Character Recognition, Neural Net Based Speech Recognizer, Biometric Systems, Machine Translation System etc. These projects provide more challenging opportunities to students, but at EX level is a difficult choice. If any student identifies proper support in terms of guidance, technology and references from External organizations and also the supervisors are convinced of the ability of the student(s) to take up the project, it shall be permitted. The

methodology and reporting of such projects could be markedly different from type (a) and is left to the proposer/external supervisor of the projects.

**Selection of Team:** To meet the stated objectives, it is imperative that Major Project isdone through a team effort. Though it would be ideal to select the team members at random (drawing lots) and this should be strongly recommended, due to practical considerations, students may also be given the choice of forming themselves into teams with 3 to 5 members (teams less than 3 members may be permitted in Exceptional cases, for valid reasons). A gender mix should also be strongly suggested. A team leader shall be elected through drawing lots. Teams shall maintain team meeting minutes and ensure that every team member has tasks assigned in writing. Team meeting minutes shall form a part of the Project Report. Even if students are doing projects as groups, each one must independently take up different modules of the work and must submit the reports also independently (though, in such cases, some common materials is permissible). Evaluation will also be done independently.

**Selection of Tools:** No restrictions shall be placed on the students in the choice ofplatforms/tools/languages to be utilized for their project work, though open source is strongly recommended, wherever possible. No value shall be placed on the use of tools in the evaluation of the project.

**Selection of Organisation& Guide:** No restrictions shall be placed on the students in thechoice of organization where project work may be done, in terms of locality, type (public/private) etc. It is the duty of the Head of Institute/Principal of College to ensure that the Aim, Objectives and full project guidelines are communicated to the external organization. The guide should ideally be a post-graduate with minimum 2 years of work experience.

Students may also choose to do project in the college/institute (or partially in the college/institute and partially in an external organization), especially product-based work, but in such cases the supervisors must ensure that (i) industry practices are followed (ii) thestudents undertake a planned visit to an IT industry with international operations to make up for the loss of experience and (iii) the services of an external guide with industry experience is obtained.

**Project Management:** Head of Institute/Principal of College should publish a list ofstudents, projects topics, internal guide and external organization (if any) and teams agreed, before the end of semester 5. Changes in this list may be permitted for valid reasons and shall be considered favorably by Head of Institute/Principal of College any time before commencement of the project. Any request for change after commencement should considered by a committee of 3 teachers and their recommendation shall be accepted by Head of Institute/Principal of College.

**Gantt-chart :**of proposed activities and a draft statement of project deliverables (which maysubsequently be altered if justified) should be prepared before the commencement of the project. The actual completion of each phase should be noted on the chart in the course of the project work. Students should submit a fortnightly report of progress which could be indication of percentage of completion marked on the orginal Gantt-chart, with any notes attached. Students should ideally keep a daily activity log sheet. Team meetings should be documented in the format given at the end. Changes in the submitted documents are possible, as project development is essentially an evolutionary process. The project guide must ensure that changes are necessary due to the knowledge gained in succeeding phases of the project. The date of completion of a phase should be brought forward if the

changes made are deemed to be errors and not due to additional knowledge gained from a succeeding phase.

 **Documentation:** The following are the major guidelines: The final outer dimensions of the report shall be 21 cm X 30 cm. The colour of the flap cover shall be light green. Only hard binding should be done, with title of the thesis displayed on the spine in 20 point, Bold, Times New Roman, as in example below.

• The text of the report should be set in 12 pt, Times New Roman, Single Spaced.

• Headings should be set as follows: CHAPTER HEADINGS 20 pt, Times New Roman, Bold, All Caps and Centered.

The Gantt chart, fortnightly progress reports, and team meeting minutes mentioned in section 3.5 should appear as appendix to the project report. Regarding the body of the report, as an indicative Example, the following is given (though students should not attempt to fit every kind of project report into this format):

– Organizational overview (of the client organization, where applicable)
– Description of the present system
– Limitations of the present system
– The Proposed system- Its advantages and features
– Context diagram of the proposed system.
– Top level DFD of the proposed system with at least one additional level of Expansion
– Structure Chart of the System
– System flowchart
– Menu Tree
– Program List
– Files or tables (for DBMS projects) list. Class names to be entered for each file in OO systems.
– List of fields or attributes (for DBMS projects) in each file or table.
– Program – File table that shows the files/tables used by each program and the files are read, written to, updated, queried or reports were produced from them.
– Reports List with column headings and summary information for each report.
– System Coding and variable/file/table naming conventions
– System controls and standards
– Screen layouts for each data entry screen.
– Report formats for each report.

Program documentation is suggested on the following lines:

– Program id
– Program level run chart
– Program function Explanation
– Data entry screen (reproduced from system documentation).
– Report layout (reproduced from system documentations)
– Program level pseudo code or flowchart.
– Decision tables, decision trees, with English Explanation where necessary.
– Program listing
– Test data
– Test results.

Methodology:
Wherever applicable, object oriented approach should be used for software development. The project report should generally contain details of the following

steps *(though students shouldnot attempt to fit every kind of project into this format):*
Analysis
– Study of existing systems and its drawbacks (general)
– Understanding the functionalities of the system (detailed)
– Preparation of requirement
– Conduct of Feasibility study
– Identification of relevant Objects
– Abstraction of each object (attributed and methods)
– Relationship between objects
Design
– Design of each subsystems
– Design of each classes
– Design of communications between objects
– Design of Algorithms for problem solving
– User interface Design
– Any other steps if necessary
Coding and Impletion
Testing
Security, Backup and Recovery Mechanisms
On line help and User Manuals
Upgradability Possibilities

**3.9 Project IPR &Utilization:** The intellectual property rights in all project work done bythe students shall vest with the University of Kerala, except in cases where some external organizations seek undertaking from students to concede IPR in all work done in their organization or under their guidance. Where possible, students should attempt to obtain at least a joint IPR for the University. In cases where project works are of public utility, students shall be asked to publish their work including source code and documentation, in so far as their rights are clear.

Evaluation of Project

| 1 | Mid Term Evaluation | 50 marks |
|---|---|---|
| 2 | Documentation | 100 marks |
| 3 | Content & Methodology | 50 marks |
| 4 | Viva Voce | 100 marks |

The marks to be scaled to 100.