

CHOICE BASED CREDIT SYSTEM

Syllabus

For

B. Voc in Information Technology (IT)



Gauhati University

2019

Syllabus for B.Voc in Information Technology (IT)

Programme Template: B.Voc Course (CBCS) in IT

Gauhati University

Semester	CORE COURSE (12 papers, 72 credits)	Ability Enhancement Compulsory Course (AECC) (2 papers, 8 credits)	Skill Enhancement Course(SEC) (4 papers, 16 credits)	Discipline Specific Elective (DSE) (6 papers, 36 credits)
I	INT-VC-1016	ENG-AE-1014		
	INT-VC-1026			
	INT-VC-1036			
II	INT-VC-2016	ENV-AE-2014		
	INT-VC-2026			
	INT-VC-2036			
III	INT-VC-3016		INT-SE-3014	
	INT-VC-3026			
	INT-VC-3036			
IV	INT-VC-4016		INT-SE-4014	
	INT-VC-4026			
	INT-VC-4036			
V			INT-SE-5014	INT-VE-5016
				INT-VE-5026
				INT-VE-5036
VI			INT-SE-6014	INT-VE-6016
				INT-VE-6026
				INT-VE-6036

QP aligned syllabus for B.Voc Information Technology (IT)

Semester	Paper code	Paper name	Qualification Pack (QP)	NSQF Level
1 st	INT-VC-1016	Fundamentals of Computer	Domestic Data Entry Operator SSC/Q2212	4
	INT -VC-1026	Office Automation & Desktop Publishing		
	INT -VC-1036	Introduction to Computer Programming		
2 nd	INT -VC-2016	Introduction to Database Management System	Test Engineer SSC/Q1301 Or Web Developer SSC/Q0503	5
	INT -VC-2026	Computer Application in Printing & Graphics		
	INT -VC-2036	Internet & Web Technology		
3 rd	INT -VC-3016	Data Structure and Algorithm	Master Trainer to Junior Software Developer SSC/Q0509	6
	INT -VC-3026	Software Engineering		
	INT -VC-3036	Object Oriented Programming using C++		
	INT-SE-3014	Basics of Computer & Office Automation		
4 th	INT -VC-4016	Operating System		
	INT -VC-4026	Programming in JAVA		
	INT -VC-4036	Discrete Mathematics		
	INT-SE-4014	E-Commerce Technologies		
5 th	INT-SE-5014	Animation and Media Design	Software Developer SSC/Q0501	7
	INT -VE-5016	Computer Network		
	INT -VE-5026	System Administration Using Linux		
	INT -VE-5036	OJT / Mini Project		
6 th	INT-SE-6014	Information Security and Cyber Laws		
	INT -VE-6016	Android Application Development		
	INT -VE-6026	Database Design & Programming		
	INT -VE-6036	OJT/ Major Project		

Detailed Syllabus

QP: Domestic Data Entry Operator (SSC/Q2212)

NSQF Level: 4

SEMESTER-I

Paper INT-VC-1016: Fundamentals of Computer

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit 1: Computer Architecture and Peripherals

(Marks : 15)

History and Generations of Computer, Classification and Components of Computer & its Interconnections, Computer Memory (Primary and Secondary Memory), Different Storage Units of Computer System, Computer Hardware & Software and its types.

Unit 2: Operating System

(Marks: 15)

Operating System Definition, Different types of Operating System, Different Parts and Processes of Operating System, System Tools.

Unit 3: Network Fundamentals

(Marks: 10)

Computer Network Definition, Architecture and Requirement of Network, Types & Functions of Network and its Applications, Network Devices, Network Media and Internet Basics.

Unit 4: Computer Security

(Marks: 10)

Computer Security Definition, Types of Security Threats, Different Threats Prevention Techniques. Computer Firewall, System Backup and Restore.

Unit 5: Introduction to ICT Hardware

(Marks : 10)

Number System- Binary, Octal, Hexadecimal, ASCII, EBDIC, Gray Codes, Hard Disk Drive: Logical Structure And file system, FAT, NTFS, Hard Disk Tools: Disk Clean Up, Error Checking, De-Fragmentation, Scanning for Virus, Formatting, Formatting, Installing Additional HDD. Cache and Virtual Memory Concept, IP Address.

LABORATORY

1. The Practical introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like Windows OS, LINUX OS, device drivers. Basic system administration in Linux which includes: Basic Linux commands in bash, Create hard and symbolic links, Text processing, using wildcards In addition hardware and software level troubleshooting process, tips and tricks would be covered.

2. Application Software Installation

3. Installing Standard Software

4. Creating and Configuring Email Account

5. Configuring Web Browser

6. Windows BOOT Process.

Suggested Books-

1. Computer fundamentals, Sinha and Sinha- BPB Publication
2. Glistler, R: PC Hardware A Beginners, Tata McGraw Hills
3. Sudhaka, V, Varanasi &Mrunalini: Computer Education, Neelkamal Publication, Hyderabad.

QP: Domestic Data Entry Operator (SSC/Q2212)

NSQF Level: 4

SEMESTER-I

Paper INT-VC-1026: Office Automation & Desktop Publishing

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit 1:

(Marks:15)

Documentation Using 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 Word-Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

Unit2:

(Marks:15)

Electronic Spread Sheet using Excel - Introduction to 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 Excel-Pivot table & Pivot Chart, Linking and Consolidation, Database Management using Excel-Sorting, Filtering, Validation, What if analysis with Goal Seek, Conditional formatting.

Unit 3:

(Marks:8)

Presentation using 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.,

Unit 4:

(Marks:7)

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

Unit5:

(Marks:7)

Adobe Page Maker Basic concept: Creating and opening publication, using the tool box, working with palettes, text and graphics, starting a publication from the template, saving and closing a publication.

Unit 6:

(Marks:8)

Introduction to Internet: Internet, Growth of internet, Anatomy of internet, History of WWW and basic internet terminologies, Browsers , Electronic mail. Internet Applications: Commerce on the internet , Governance on the internet , Impact of internet on society

LABORATORY

1. Introduction to MS-WORD Feature, File creation, Storing, Modification, Formation, Creation of Table, Splitting and Merging cells, Mail Merge etc.
2. Introduction to MS-EXCEL Feature, File creation, Storing, Modification, Use of Formulas and Functions etc.
3. Introduction to MS-PowerPoint Feature, File creation, Storing, Modification, Insertion of new Slides, Pictures, Tables etc.
4. Application Software Installation
5. Installing Standard Software
6. Creating and Configuring Email Account
7. Configuring Web Browser
8. Windows BOOT Process.

Suggested Readings

1. Microsoft Office – Complete Reference – BPB Publication
2. Learn Microsoft Office – Russell A. Stultz – BPB Publication
3. Courter, G Marquis (1999). Microsoft Office 2000: Professional Edition. BPB.
4. Koers, D (2001). Microsoft Office XP Fast and Easy. PHI.

QP: Domestic Data Entry Operator (SSC/Q2212)

NSQF Level: 4

SEMESTER-I

Paper INT-VC-1036: Introduction to Computer programming

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit 1:

(Marks:10)

Concept of Computing: Algorithm, Flowchart Programming Languages: Machine language, Assembly language, High Level Language Translators : Assembler, Compiler, Interpreter. Algorithm for problem solving.

Unit 2:

(Marks:15)

Elementary data types , variables, constants and identifiers. Integer, character floating point and string constants .variable declarations. Syntax and semantics. Reserved word.Initialization of variable during declarations Constant data types. Expression in C,precedence and associativity of C operators, unary, binary and ternary operators. C arithmetic operators, assignment operators, relational operators, logical operators and bit –wise operators .L-value and R-value.Side effects of operators.Expression statement.

Unit 3:

(Marks:15)

Conditional statements: if, if-else, switch Iterative Statement-white, do-while, for Other Statement – break , continue, goto, return, null Statement, block Statement.

Function: function declaration. Calling a function. Parameters –Call by value, Call by reference and its absence in C. Recursion and how it works.

Unit 4:

(Marks:10)

Arrays and pointers Storage classes : Automatic, External, Static, Register. Scope and lifetime of variables. Arrays and pointers and corresponding operators. Pointer arithmetic. Programs using arrays and pointers like sum, average, minimum, maximum of an array of numbers. Add and delete an element of an array. Merge two sorted arrays. String manipulation programs like addition, subtraction, multiplication and their combinations. Sum of rows, columns, and diagonal elements of a matrix. Transpose of a matrix. Linear search, binary search. Selection sort and bubble sort.

Unit 5:

(Marks:10)

Structures and Files, Structure – declaration and use. Structure member resolution and structure pointer member resolution operators. Standard C library.Files in C—opening, closing, reading and writing of files. Seeking forward and backward.

LABORATORY

Each student should do at least 20 assignments from the following list.

1. Write a program to convert a given temperature value from Fahrenheit scale to centigrade scale and vice versa.
2. Write a program to display ASCII value of a character.
3. Write a program to check whether a number is perfect or not.
4. Write a program to find out the biggest of three numbers using nested if.
 - a) A company insures its drivers if either of the following conditions are satisfied
 - b) Driver is married.
 - c) Driver is an unmarried, Male and above 30 years of age.
 - d) Driver is unmarried, female and above 25 years of age.
5. Write a program to decide if a driver is to be insured using logical operators.
6. Write a program to read a list of positive integers terminated by -1 and display the odd and even numbers separately and also their respective counts.
7. Write a program to read values of n and x and print the value of y using switch case where
 - a) $y=n+x$ when $n=1$
 - b) $y=1+x/n$ when $n=2$
 - c) $y= n+3x$ when $n=3$
 - d) $y=1+nx$ when $n>3$ or $n<1$.
8. Write a program to n values of sales and then calculate the commission on sales amount where the commission is calculated as follows:
 - a) If sales \leq Rs.500, commission is 5%.
 - b) If sales > 500 but ≤ 2000 , commission is Rs 35 plus 10% above Rs 500.
 - c) If sales > 2000 but ≤ 5000 , commission is Rs 185 plus 12% above Rs.2000.
 - d) If sales >5000 ,commission is 12.5%.
9. Write a program to find out minimum, maximum, sum and average of n numbers without using array.
10. Program to find mean and standard deviation (SD) for a set of n numbers without using array.
11. Write a program to find out the roots of a quadratic equation. Use proper testing to find checks for real and complex roots.
12. Write a program to print the digits of a number in words. (eg. if a number 841 is entered through the keyboard your program should print —Eight Four One!.)
13. Write a program to print the PASCAL Triangle up to the n-th row where n is an input to the program.
14. Write a function to return the HCF of two positive integers. Write a main function to read two positive integers and print their HCF and LCM by using the above function.
15. Write a program to convert a decimal number into binary number using function.
16. Write a program to display the result of sine series using function.
17. Write a program to find the sum of the following series
 $1+x-x^3/3!+x^5/5!-x^7/7!+ \dots$ corrected up to the 3 decimal place.
18. Write a program to read n numbers in a sorted array and insert a given element in a particular position
19. Write functions to compute the factorial of a number using both recursive and non-recursive procedure.
20. Write a program to print the values of ncr and npr for given positive integers $n > 0$. Use a function fact(n) to return the factorial of a non-negative integer n.
 $ncr=n!/r!*(n-r)!$ $npr=n!/(n-r)!$

21. Write a program to display the first n Fibonacci numbers using function.
22. Write a program to display the prime numbers within a given range. Write a function to check whether a given integer is prime or not and use it.
23. Write a program to Multiply two matrices using function
24. Write a program to display the upper Triangle and lower Triangle of a given square matrix using function.
25. Write a function to check if a given square matrix is symmetric or not. Write a main function to implement it.
26. Write a program to read a m X n matrix and calculate the Row sum and Column Sum of the matrix
27. Write a function to read in an integer and print the representation of the number using the sign and magnitude representation scheme using 8 bits. The program should check for overflow/under flow conditions. The left most bit is to be used as the sign bit.
28. Write a program to merge two sorted arrays.
29. Write a program to implement selection sort using function.
30. Write a program to count the number of vowels in a string.

Internal Assessment includes

1. Seminar on how to Manage your work to meet requirements
2. Seminar on how to Maintain a healthy, safe and secure working environment
3. Mock interview
4. Report preparation

Suggested Books-

1. R.G.Dromey; How to solve it by Computer; Prentice Hall of India, 1992; (First Edition).
2. Cooper, Mullish; The Spirit of C, Jaico Publishing House; New Delhi, 1987. (Fourth Edition).
3. B. Gottfried; Programming in C; Tata McGraw Hill, New Delhi; (Second Edition).

QP: Test Engineer (SSC/Q1301) / Web Developer (SSC/Q0503)

NSQF Level: 5

SEMESTER-II

Paper - INT-VC-2016: Introduction to Database Management System

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit 1:

(Marks:15)

File Structure: Record storage and primary file organization: memory hierarchies and storage devices, Storage of DataBases, Placing file records on disks: Records and its Types, Files, Fixed length records and variable length records, Record Blocking, allocating file blocks on disks, operation on files.

Issues in Physical Design : Concept of indexes

Unit 2:

(Marks:15)

Overview of Database Management System: Definition of DataBase, Traditional File Approach vs. DBMS approach, Characteristics of the Data Base Approach, DBMS user, Role of a DBA, Advantage of using DBMS, DBMS architecture, Data independence

ANSI/SPARC 3 level architecture.

Unit 3:

(Marks:15)

Relational Models: Fundamental integrity rules: entity integrity, referential integrity, Relational algebra(Select, Project, Cross ,Product , theta join, equi join, natural join, outer join),Set Operation ANSI SQL –92 Standard: DDL, DML, SQL constructs(Select .. From...Where... Group by Having... Order by.....), Insert, Delete, Update, View, Definition and use, nested quires, Constraints considers(NOT NULL , UNIQUE, Check Primary key. Foreign key)

Unit 4:

(Marks:15)

Database Design: Conceptual model, logical model, physical model.ER model as a tool for conceptual design-entities, attributes and relationships, weak and strong entities, conversion of ER model into relational schema. DFD.Normalization: informal design guidelines for relational schemas (overview level), functional dependencies, different types of keys. Normal forms (first, second, third, BCNF). Functional dependency diagram and design of relational database from it.

6. Create the following two tables and insert data into the tables.

Player (Roll no.→Primary Key)

Roll no.	Name
10	Vijay Amrithraj
20	Leander Paes
30	Mahesh Bhupathi
40	SaniaMirza

Match (Match_no→Primary key, Roll no→Foreign key)

Match_no	Roll_no.	Match_Date	Opponent
1	20	10-Jul-2008	Washington
2	30	12-Jan-2008	Sampras
3	20	12-Aug-2008	Borg
4	30	20-Mar-2008	Vijay

- Perform EQUIJOIN operation to retrieve data from both the files.
- Perform OUTERJOIN operation to retrieve the unmatched records.

7. Design an ER diagram for a **BANK** database schema. To consider that each Bank can have multiple branches, and each branch can have multiple Accounts and Loans for customer. Also to specify the non weak& weak entity types, key attributes & key types, relationship types, instances, constraints and participations.

8. Create a table **Student** taking the attributes given below:

Roll_no, Student_name, Address, Date_of_admission, Class Section and Contact_no.

Write appropriate queries to perform the following operations:

- To insert values in the Student table.
- To delete values from Student table
- To list the names of all students which roll_no > 20.
- To search for students who got admitted before 01-01-2006.
- To change the name of the student whose roll number is 10 to Amar.

9. Create tables **Department** and **Employee** with the attributes given bellow.

Employee (EmpNo ,Empname, Address, Dno)

Department (Dno, Dname, Location)

Dno in Employee is a foreign key.

Write appropriate queries to perform the following operations:

- To insert values in the tables.
- To retrieve the names and addresses of all Employees working in the Finance department.
- To print the location where Administration department is located.
- To delete all information regarding a particular employee.

10. Create table **Student** and **Course** taking the attributes given bellow.

Student (Roll_no, Name, Semester, Course_no(Foreign key))

Course (Course_no, Course_name)

Write appropriate queries for the following operations:

- To retrieve names of all students who are admitted to the course BCA.
- To retrieve the names of all students whose course name is BCA and who are in the 3rd semester.
- To display details of all courses in which more than 100 students got admitted.
- For course being offered, display the course name and number of students admitted to the course.

11. Create tables *Employee*, *Department*, *Location*, *Works_on*, and *Project* taking the attributes given below.

Employee (Fname, Lname, Empno, Bdate, Address, Salary, Dnumber)

Department (Dname,Dnumber,Mgrno)

Locations(Dnumber, DLocation)

Works_on(Empno, Pnumber, Hours_per_day)

Project(Pname, Pnumber, Location,Dnumber (Foreign))

Dependent(Empno, Dependent_name, Sex, DOB, Relationship)

Write appropriate queries for the following operations:

- Retrieve the names and addresses of all employees who work in the Finance department.
 - To retrieve the names of all employees who works on all the projects controlled by department number 6
 - For each department, print the name of the department and the name of the manager of the department.
 - Retrieve the location where the Administration department is located.
 - For every project located in Mumbai list the project number, the controlling department and department manger's name and address.
 - Find out how many employees are there in each department.
 - Find the total salary of all employees of the —Research department, as well as the maximum, minimum and average salary in this department
 - Retrieve the name of all employees who have no dependent.
 - Alter the —Employee table by deleting the column Bdate.
 - Retrieve the Fname, Lname of all employees whose salary is higher than average salary.
 - For each department retrieve the department number, the number of employee in the department and their average salary.
 - Retrieve the name of all employees who have two or more dependent
 - Retrieve the details of all employees who works on project number 1,2,3
12. Create Table

Client_master(Client_no, name, address, Bdate)

Product_master(P_number,Description,saleprice,costprice)

Sales_master(Salesmno,Sname,Address,Salamnt,Remarks)

Sales_order(O_no,Client_no,Odate,Delyaddr,Salesmno)

Sales_order_detail(Order_no,Product_no, Qtyorder, product_rate,Qty_dispatched)

Write appropriate queries to perform the following operations:

- List name of all clients having 'a' as the second letter in their names.
 - Retrieve the description and total Qty sold for each product.
 - Find product no. and description of non moving products (i.e product not being sold).
 - For each product being sold, list the product number and the total amount (in Rs.) sold.
 - List all client who stay in 'Bangalore' or 'Mumbai'
 - List the clients who stay in a city whose First letter is 'M'
 - Find the names of clients who had purchased the item 'Trouser'.
 - Find out if 'T-Shirt' has been ordered by any client and if so print the details of the client.
 - List details of all products whose unit price is more than Rs. 5000.00.
 - Calculate the total amount (in Rs.) purchased by each client that has purchased items amounting more than Rs. 20000.
13. Create table

Author(Author_id, Name, City, Country)

Catalog (Book_id, Title, Author1_id, Author2_id, Publisher_id, Category_id, Year, Price)

Publisher(Publisher_id, Name, City, Country)

Order_details(Order_no, Book_id, Quantity)

Category(Category_id, Description)

Order_summary(Order_no,Member_id,Odate,Amount,Ostatus)

Member(Member_id, Name, Address, Contact)

Assume that all books have at most two authors.

Write appropriate queries to perform the following operations:

- a) Retrieve the title, author, and publisher names of all books published in 1999 and 2006.
- b) Retrieve the title of all books whose one author is 'A Tanenbum'.
- c) Get the details of all books whose price is greater than the average price of the books.
- d) Get the names of all the books for which an order has been placed.
- e) Get the names of all authors who have more than ten books in the catalog.
- f) Get the details of the authors whose books are being sold from the book club.
- g) Get the title and price of all books whose price is greater than the maximum of the category average.

Internal Assessment includes

1. Seminar on Writing presentation skill
2. Group discussion
3. Mock interview
4. Report preparation

The interview board will consist of an external expert, the head of the concerned departments and the course coordinator of the course will constitute an expert panel. Students will have to appear before the panel for Mock interview.

Suggested Reading:

1. Introduction to database management system, C.J. Date
2. Fundamentals of data base management system, Elmasri&Navathe
3. An introduction to Database systems; Bipin C. Desai; Galgotia publications.
4. Database Systems - Concept, Design and Applications; S.K.Singh; Pearson Education.

QP: Test Engineer (SSC/Q1301) / Web Developer (SSC/Q0503)

NSQF Level: 5

SEMESTER-II

Paper INT-VC-2026: Computer Application in Printing and Graphics

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit I: (Marks:10)

Introduction to DTP, trends in printing technology, usage of computers in printing. DTP printing technology. Introduction to DTP software's, Use of Text tool Adobe, Photoshop Corel Draw. Story editing, formatting.

Unit II: (Marks:10)

Working with graphics: using different graphic tools importing graphics working with colour, table editing. Desk Top Publishing Hardware, Macintosh, Cost estimation of DTP.

Unit III: (Marks:10)

Graphics Definitions – Print Design Vs Digital Design – Elements of Graphic Design – Tools of Organization – Architecture of Type/Font – Building Blocks of Graphic Design: Whitespace, Rules, Borders, Boxes, Shadows, Bleeds – Illustrations – Working with Photographs – Working with Color

Designing for Print: Newsletters – Newspapers – Magazines – Brochures – Pamphlets – Posters

Unit IV: (Marks:10)

Animation Definition – Types of Animation: Cel Animation, Stop Motion Animation, Computer Animation, Frame by Frame, Keyframe Animation – Applications – Hardware – Software – Considerations for selecting tool Animation Techniques: Transformation – Compositing – Color Correction – Modeling – Lighting – Masking – Layering – Shading – Particles

Unit V: (Marks:10)

Rendering and Career Prospects

Rendering: Types – Features – Techniques – Real-Time Rendering – Software Creators: Visual Development artist, Layout artist, Character animator, Cleanup artist, Color stylist, Graphic Designer, Animator, Effects animator, Composer

Unit VI: (Marks:10)

Image Processing

Raster Graphics – Vector Graphics – Image File Formats: Windows Formats, Macintosh Formats, Cross Platform Formats – Audio & Video File formats – Audio & Video Streaming Formats – Graphics and Animation for Web – Web File Formats – CODEC: Lossy Vs Lossless, Compression Techniques

LABORATORY

1. Introduction to Computer Terminologies.
2. Use of different Hardware devices.
3. Use of Word-Processing Softwares.
4. DTP and its features.
5. Softwares used in Printing.
6. Page set-up with different sizes and margins.
7. Preparation of Text rich documents.
8. Different kinds of Scanners, their working and uses.
9. Image and Text merging.
10. Modifications and Editing of Illustrations and Text.
11. Using various tools of Printing Softwares.
12. Introduction to photoshop-how you can differentiate it from illustrator, different types of the formats, their compatability to different software, introduction of tool box, uses of different filters, masking and working on images, creating a presentation using software.
13. Quark express :Pagemake up, formating and editing in the software.
14. Flash : Introduction of 2-D animations, study of tool box, menu bar, how you can use them in your industry, how you can create different effects like moving on selected path, masking of images, etc.

QP: Test Engineer (SSC/Q1301) / Web Developer (SSC/Q0503)

NSQF Level: 5

SEMESTER-II

Paper INT-VC-2036: Internet and Web Technology

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit I:

(Marks:20)

Introduction to internet: Internet, Growth of internet, Anatomy of internet, History of WWW and basic internet terminologies, Browsers, Electronic mail. Internet Applications: Commerce on the internet, Governance on the internet, Impact of internet on society.

Unit II:

(Marks:10)

Internet technology and protocols: What is networks ? Need of computer networks. Characteristics of LAN, MAN, WAN.A brief idea of OSI reference model and TCP/IP .Difference between OSI and TCP/IP.Physical topologies (Bus , Ring , Tree , Star , Hybrid etc ..)Logical topologies (protocols) A brief description of Ethernet, FDDI , ATM , Token ring .

Unit III:

(Marks:10)

File transfer protocol: Introduction to FTP & terminologies, FTP servers and authentication, GUI based FTP clients, Browser based FTP clients.

Unit IV:

(Marks:10)

Internet management security concepts: Overview of internet security, Firewalls. Internet security management concepts & information. Privacy & copyright issues.

Unit V:

(Marks:10)

HTML: Introduction to HTML, basics & elements of HTML, attributes, headings, paragraphs, links, Images, Lists, Tables, Forms, Frames. Client side scripting: Introduction to JavaScript & its basics, data types, variables operators, functions looping, objects, arrays, strings. Server side scripting: Introduction to PHP, basic programming principles & database connectivity.

LABORATORY

HTML

Each student should do at least 12 experiments from the following list.

1. Create a HTML document consisting of HTML heading, paragraphs and images.
2. Create a HTML document and insert comments in the HTML source code and insert horizontal lines.
3. Construct HTML document to set the font of a text , size of the font, style of the font.
4. Create a HTML document to show how to create hyperlinks.
5. Create a HTML document to use an image as a link.
6. Create a HTML document to open link in a new browser window.
7. Create a HTML document to jump to another part of a document (on the same page).
8. Create a HTML document to insert images from another folder or another server.
9. Create an image-map, with clickable regions.
10. Create a HTML document with all table elements (Table, Caption, Table Row, Table Data element, Table Heading Element, THEAD, TFOOT, TBODY)
11. Create HTML document to make an unordered list, an ordered list, different types of ordered lists, different types of unordered lists, Nested list, Definition list.
12. Create HTML form with the all FORM elements (text fields, password field, Checkboxes, Radio buttons, Select elements, Drop-down list with a pre-selected value, Textarea (a multi-line text input field) and buttons.
13. Create HTML document with all Frame elements (FRAMESET, FRAME, NOFRAMES, and INLINE FRAME).
14. Create a HTML document to add AUDIO and VIDEO.
15. Create a HTML document to aligning images (Let the image float to the left/right of a paragraph)
16. Create a HTML document to jump to a specified section within a frame
17. Construct a HTML document with CSS to set the background colour of a page.
18. Construct a HTML document with CSS to set an image as the background of a page
19. Construct HTML document with CSS to Set the text color of different elements and align the text.
20. Construct HTML document to set different colours to visited/unvisited links, Specify a background colour for links

XML

Each student should do at least 2 experiments from the following list.

21. Construct an XML document that contain information about products of an organization.
22. Construct an XML document that contain information of 5 students (such as roll no., name , address, class).
23. Construct an XML document that contain details of 10 books.

JAVAScript

Each student should do at least 9 experiments from the following list.

24. Write a program in javascript to accept a name from the user and display the same name in an alert box.
25. Write a program in javascript to display a message in a confirm box.
26. Write a program in javascript to display the message ‘_time is running out’ in the status bar.
27. Write a program in JavaScript to enter marks of a student and find his/her grade according to the following:
if marks >= 90 then grade A
if marks >= 80 then grade B
if marks >= 70 then grade C
if marks >= 60 then grade D
else fail.

28. Write a program in JavaScript to create a button and when the button is clicked the message "Hello World" is displayed on an alert box..
29. Write a program in JavaScript to accept 2 nos from the user and show the working of all arithmetic operators.
30. Write a program in JavaScript to accept 2 strings and concatenate them.
31. Write a program in JavaScript to display the current date and time.
32. Write a program in JavaScript to find the length of an array.
33. Write a program in JavaScript to check whether a string is palindrome or not.
34. Write a program in JavaScript that responds to a mouse click anywhere on the page(using mouse click).
35. Write a program in JavaScript to display the contents of a check box in a alert box.
36. Write a program to validate a form in the user id and password forms.
37. Write a program in JavaScript to crate a welcome cookie, Button animation, Image map with added JavaScript Simple timing, Timing event in an infinite loop

Suggested Reading:

1. HTML & XML an Introduction. PHI .
2. A. S. Godbole, A. Kahate; Web Technologies; Tata McGrew-hill;
3. Andrew S. Tanenbaum; Computer Network; PHI; (Fourth Edition);

QP: Master Trainer to Junior Software Developer (SSC/Q0509)

NSQF Level: 6

SEMESTER III

Paper - INT-VC-3016: Data Structure and Algorithm

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit I: Introduction to data structure (Marks:10)

Basic concept, Abstract data types, Fundamental and derived data types, Representation, primitive data structures.

Unit II: Arrays (Marks:10)

Single and multidimensional arrays, Address calculation using column and row major ordering, Various operations on Arrays, Matrix multiplication.

Unit III: Stack and Queues (Marks:10)

Representation of stacks and queue using arrays and linked-list, Circular queues, Applications of stacks Conversion from infix to postfix and prefix expressions, postfix evaluation algorithm

Unit IV: Linked lists (Marks:10)

Singly linked list; operations on Linked-list, Circular linked lists, Doubly linked lists.

Unit V: Trees (Marks:7)

Basic terminology, Binary tree traversal methods - Preorder, Inorder and Postorder . Application of binary tree, Binary search tree, insertion and search operations on binary search tree.

Unit VI: Searching and sorting (Marks:7)

Searching: Sequential and binary searches, Sorting - Insertion, selection, bubble, quick, merge, radix.

Unit VII: Graphs (Marks:6)

Definition of Graph, Graph terminology, Directed, Undirected & Weighted graphs, Graph representation: Adjacency matrix, Adjacency lists.

LABORATORY

1. Write a c program to implement bubble sort.
2. Write a c program to implement selection sort.
3. Write a c program to represent a queue as an array.
4. Write a c program to find sum of sort the element using Bubble sort.
5. Write a c program to implement stack with push and pop operations. Also check for overflow and underflow.
6. Write a c program to sort the element of a two dimensional matrix column wise and display the entered matrix and sorted matrix.
7. Write a c program to sort the element of 2-d matrix row wise and display sorted matrices.

BOOKS RECOMMENDED :

1. Robert L. Kruse; Data Structures and Program Design; Prentice Hall, 1987. (Second Edition).
2. A. S. Tanenbaum; Data Structure using C; PHI.
3. H. Sahani; Fundamentals of Data Structure in C; Orient Publications. (Second Edition).

QP: Master Trainer to Junior Software Developer (SSC/Q0509)

NSQF Level: 6

SEMESTER III

Paper INT-VC-3026: Software Engineering

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit I: Introduction

(Marks: 15)

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 Planning

(Marks:15)

Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management.

Unit III: Software Design

(Marks:15)

Data design, Architectural design, Interface design, Function Oriented Design, Object Oriented Design, Cohesion & Coupling, Classification of Cohesiveness & Coupling, Software Metrics: different types of project matrices.

Unit IV: Software Testing and Maintenance

(Marks:15)

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. Software quality Assurance.

CASE tools--- Analysis tools, design tools, SQA tools, software testing tools.

Suggested Readings:

1. Rajeev Mall —Software Engineering| PHI
2. Pressman Roger — Software Engineering A Practitioners Approach| Tata McGraw Hill
3. James F. Peters, Witold Pedrycz —Software Engineering An Engineering Approach

QP: Master Trainer to Junior Software Developer (SSC/Q0509)

NSQF Level: 6

SEMESTER III

Paper INT-VC-3036: Object Oriented Programming using C++

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit I: Principles of Object Oriented Programming (Marks:10)

Basic concept of OOP, Procedural programming vs OOP, Advantages of OOP, OOP languages
Concept of Class, Objects, Concept of Inheritance and encapsulation, Operator overloading,
Dynamic Binding, Overview of OPP using C++
Basic programs using C++

Unit II: Elements of C++ Language (Marks:10)

Keywords and Identifiers in C++, Variables and Constants, Declaration and Initialization of
Variables, Concept of Dynamic Initialization of variables, Enumerated variables, Basic Data Types,
Arrays and Strings, User Defined Data types, Arithmetic, Relational, Logical Operators and
Operator Precedence, Manipulators,
Type Conversions and type cast operators, Console I/O: cin, cout functions.
Control Statements.-if; if-else; else....if; switch statements
Loops: for, while, do-while, Break, continue, go to

Unit III: Functions (Marks:5)

Syntax of a Function, Function Prototype, Calling function, Function definition, Passing arguments
and returning values. Pass by value, pass by reference. Passing and returning structure variables
Inline and overloaded function, Default arguments, returning by reference.

Unit IV: Classes and Object (Marks:5)

Definition and Declaration of a Class, Declaration of members, Declaration of objects, Objects as
function arguments. Array of objects. Returning objects from function. Structures and classes.

Unit V: Constructors and Destructors (Marks:5)

Concept of constructors, Types of constructors, Parameterized constructor, Constructor with default
arguments, Copy constructors, Dynamic Initialization of Objects, Concept of Destructors.

Unit VI: Operator Overloading (Marks:5)

Concept of Operator Overloading, Unary and Binary Operators, Overloading of unary and binary
operators.

Unit VII: Derived Classes and Inheritance (Marks:5)

Concept of inheritance, Derived and Base Class- Definition and Declaration. Types of Inheritance,
Public, Private and Protected Access, Constructors in Derived Classes

Unit VIII: Pointer

(Marks:10)

Pointer Basics, Address Operator and Pointer Variables, Pointer Arithmetic, New And Delete Operator, Null Pointer, Reference and Constant pointer, Array of Pointers, Pointers to Object and Pointers to Pointer.

Unit IX: Virtual Function & Polymorphism

(Marks:5)

Pointers to Derived Objects and Virtual Functions, Early binding vs. Late binding, Abstract Classes and Pure Virtual Function.

LABORATORY

Each student should do at least 5 assignments from the following list.

1. Define a class named *triangle* to represent a triangle using the lengths of the three sides. Write a constructor to initialize objects of this class, given the lengths of the sides. Also write member functions to check
 - (a) if a triangle is isosceles
 - (b) if a triangle is equilateralWrite a main function to test your functions.
2. Define a structure *employee* with the following specifications. *empno* : integer *ename* : 20 characters *basic*, *hra*, *da* : float *calculate()* : a function to compute net pay as basic+hra+da with float return type. *getdata()* : a function to read values for empno, ename, basic, hra, da. *dispdata()* : a function to display all the data on the screen . Write a main program to test the program.
3. Define a class *circle* to represent circles. Add a data member *radius* to store the radius of a circle. Write member functions *area()* and *perimeter()* to compute the area and perimeter of a circle.
4. Define a class *complex* with two data members *real* and *imag* to represent real and imaginary parts of a complex number. Write member functions *rpart()* : to return the real part of a complex number *ipart()* : to return the imaginary part of a complex number *add()* : to add two complex numbers. *mul()* : to multiply two complex numbers.
5. Define a class *point* with two data members *xordinate* and *yordinate* to represent all points in the two dimensional plane by storing their x co-ordinate and y co-ordinate values. Write member functions *dist()* : to return the distance of the point from the origin. *slope()*: to return the slope of the line obtained by joining this point with the origin. Write constructors with zero, one and two arguments to initialize objects. Also write a friend function to compute the distance between two points.
6. Define a class to store matrices. Write suitable friend functions to add and multiply two matrices.
7. Define a class *student* with the following specification:
rollno : integer sname : 20 characters
Derive two classes *artst* and *scst*. The class *artst* will represent students belonging to arts stream and the class *scst* will represent students belonging to science stream. The *artst* class will have additional data members *ph*, *hs*, *en* and *as* to store marks obtained by a student in three subjects Philosophy, History, English and Assamese. The class *scst* will have additional data members *ph*, *ch*, *ma* and *en* to store marks obtained in Physics, Chemistry, Mathematics and English. Write the following member functions in the classes *artst* and *scst* *ctotal()* : a function to calculate the total marks obtained by a student *takedata()* : function to accept values of the data members *showdata()* : function to display the marks sheet of a student .
8. Write a program to implement Inheritance in C++.

Suggested Readings::

1. Robert Laffore; Object Oriented Programming in Turbo C++; Galgotia Publication,1996; (Fourth Edition).
2. E. Balaguruswamy; Object Oriented Programming with C++;Tata McGrahill, 1997; (Third Edition) ;
3. Yashavant Kanitkar; Visual C++ Programming; BPB Publications,1998.
4. S.B. Lippman; C++ Primer; Addison Wesley, 1995 ; (Third Edition).
5. Stastroup; The Elements of C++ Programming; Addison Weiley Publication, 1995.

SEC PAPER
SEMESTER III

Paper - INT-SE-3014: Basics of Computer & Office Automation

Total Credit: 4

Total Marks: 100

End Semester Exam = 50 (Theory)

Internal Assessment / Practical = 50

UNIT 1: Introduction to Computer

(Marks: 15)

Computer and Latest IT gadgets, Evolution of Computers & its applications, Basics of Hardware and Software, Central Processing Unit, Input devices, Output devices, Computer Memory & storage, Application Software, Systems Software, Utility Software, Open source and Proprietary Software, Mobile Apps.

UNIT 2: Word Processing

(Marks: 15)

Introduction to Word Processing, Features, Creating, Saving & Closing a document, Opening an Existing document, Editing a Document, Formatting Features (Paragraph Formats, Aligning text & paragraph, Border and Shading, Header & Footers, Bullet & Numbering), Inserting & Editing a Table, Inserting Picture, Checking & Spelling Correction, Page Setup, Print Preview, Printing a document, Mail Merge, Document Template & Wizards.

UNIT 3: Spreadsheet

(Marks: 10)

Introduction to Spreadsheet, creating, saving and editing a workbook, Inserting, deleting Worksheets, Working with Formula & Cell referencing, Functions, working with ranges - creating, editing and selecting ranges, AutoFormat Feature, Changing alignment, Character styles, Date Format, Border & Colors etc. Previewing & Printing a worksheet, Creating Charts & Graphs. Database in worksheet, macro, linking and embedding

UNIT 4: Presentation Tools

(Marks: 10)

Creating & saving Presentations, Opening an existing Presentation, Working in different views, Working with slides, Adding and Formatting Text, Formatting Paragraphs, Checking Spelling and correcting typing mistakes, Adding clip art and other pictures, Inserting Animation, Designing slide shows, Running and controlling slide show, Printing Presentation.

LABORATORY

1. Introduction to MS-WORD Feature, File creation, Storing, Modification, Formation, Creation of Table, Splitting and Merging cells, Mail Merge etc.
2. Introduction to MS-EXCEL Feature, File creation, Storing, Modification, Use of Formulas and Functions etc.
3. Introduction to MS-PowerPoint Feature, File creation, Storing, Modification, Insertion of new Slides, Pictures, Tables etc.
4. Application Software Installation
5. Installing Standard Software
6. Creating and Configuring Email Account
7. Configuring Web Browser
8. Windows BOOT Process.

Suggested Readings

5. Microsoft Office – Complete Reference – BPB Publication
6. Learn Microsoft Office – Russell A. Stultz – BPB Publication
7. Courter, G Marquis (1999). Microsoft Office 2000: Professional Edition. BPB.
8. Koers, D (2001). Microsoft Office XP Fast and Easy. PHI.

QP: Master Trainer to Junior Software Developer (SSC/Q0509)

NSQF Level: 6

SEMESTER IV

Paper INT-VC-4016: Operating System

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit I: Introduction:

(Marks: 8)

What is an operating system, batch systems, multiprogrammed, time-sharing systems, personal-computer systems, parallel systems, distributed systems, real-time systems.

Unit II: Processes:

(Marks:8)

Process Concept, Thread, design issues of thread, user space thread and kernel space thread, Usage of thread. Process states, Operation on Processes:- creation and termination. Implementation of process:- process table.

Unit III: Process Synchronization:

(Marks: 8)

Race condition, Critical-Section, mutual exclusion. Solution to race condition and synchronization: - disabling interrupt, test-and-set-lock, Peterson's solution, semaphore, mutex, monitor, message passing. Classical problems:- The Dining philosopher, sleeping barber and readers-and-writers (bounded buffer) problems and their solution.

Unit IV: Scheduling

(Marks: 6)

Basic Concepts, preemptive and non preemptive scheduling. Scheduling Algorithms. Types of scheduling: - batch, interactive and real-time. Goals of scheduling algorithms, FCFS, SJF, RR, priority, multiple queues, three-level scheduling.

Unit V: Deadlocks:

(Marks: 5)

System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. Banker's algorithm.

Unit VI: Memory management:

(Marks: 10)

Multiprogramming. Address binding (relocation), and protection. Swapping. Virtual memory: - logical versus physical address space, paging, page fault, page table and its entries, demand paging, multi level page table, TLB, its entries and working. Page replacement algorithms: - LRU, optimal, NRU, FIFO, second chance, clock, NFU. Working set. What is segmentation, what are its benefits and drawbacks.

Unit VII: File system**(Marks: 10)**

What is file, file naming, file types(directory, regular, device), sequential access and random access files, file attributes, operations on file, hierarchical directory structure, pathname (relative and absolute), operation on directories, disk layout, disk partition, file system layout, disk block allocation:-contiguous allocation linked list allocation, FAT, i-nodes, directories in UNIX, file system security

Unit VIII: I/O management**(Marks: 5)**

Basic principles and overall structure of I/O management subsystem, Device controllers, layers of the I/O subsystem:- interrupt handlers device driver, device independent I/O software and user space I/O software.

LABORATORY

Dos command ,Linux command (copy,paste,move,create directory,remove command) Installation of XP , Dual boot .

Suggested reading:

1. Modern Operating System, Tanenbaum, PHI Publication.
2. Operating System by Galvin

QP: Master Trainer to Junior Software Developer (SSC/Q0509)

NSQF Level: 6

SEMESTER IV

Paper INT-VC-4026: Programming in JAVA

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit I: Java language basics

(Marks:30)

Basic features, Java virtual machine concepts, Data types:- primitive data types and variables, Java Key words, integer and floating point data type, character and Boolean types, declaring and initialization variables. Java operators, Expressions, Statements-- selection statements, control statements, iterative statements, jump statements.

Classes & Objects

Creating objects, assigning object reference variables, Introducing methods.

Arrays

Static methods, Constructors, Overloading constructors., Strings, and Vector, This Keyword , Using object as parameters:- argument passing, returning objects, Method Overloading , garbage collection , the Finalize() method.

Inheritance and Polymorphism

Inheritance basics, access control, multilevel inheritance, method overriding, abstract classes, polymorphism, Final keyword, Multithreaded programming,

I/O in Java

I/O basics, Streams and stream classes, reading from and writing to console, reading and writing files

Unit II: Java applets

(Marks: 10)

The Applet Class, Applet Architecture, An Applet skeleton: initialization and termination, handling events, HTML Applet Tag, Control.

Unit III: Networking

(Marks: 10)

Socket overview -- datagram socket and TCP/IP based server socket, Internet Addressing --- DNS, UR, Event handling Drivers in Java.

Unit IV: Java Database Connectivity

(Marks: 10)

Establishing a connection (JDBC, ODBC connectivity) , transactions with database.

LABORATORY

Each student should do at least 8 assignments from the following list.

1. Write a program to display the first n Fibonacci numbers using function.
2. Write a program to display the prime numbers within a given range. Write a function to check whether a given integer is prime or not and use it.
3. Write a program to Multiply two matrices using function
4. Write a program to display the upper Triangle and lower Triangle of a given square matrix using function.
5. Write a function to check if a given square matrix is symmetric or not. Write a main function to implement it.
6. Write a program to read a m X n matrix and calculate the Row sum and Column Sum of the matrix
7. Write a function to read in an integer and print the representation of the number using the sign and magnitude representation scheme using 8 bits. The program should check for overflow/under flow conditions. The left most bit is to be used as the sign bit.
8. Write a program to merge two sorted arrays.
9. Write a program to implement selection sort using function.
10. Write a program to count the number of vowels in a string.
11. Write a program to concatenate two strings using function (without using library function).
12. Write a program to convert a string from upper case to lower case and vice versa.

Suggested Reading

1. Programming in Java, E. Balaguruswamy, Tata Mc-Graw Hill.
2. Patrik Naughton & Herbert Schildt — The complete reference java

Unit I: Sets, Relations and Functions

(Marks:10)

Sets, relations, properties of binary relations, closures of relation, equivalence relations, equivalence classes and partitions. Partial ordering relations and lattices. Functions, one to one and onto, principles of mathematical induction.

Unit II: Graph Theory

(Marks:10)

Basic Definition of graph. Connectivity of graph, cut points cycles, Hamiltonian graphs, trees, different Characterization of trees, bipartite graph, Algorithms on graph, Breadth first search, Depth first search.

Unit III: Combinatorics

(Marks:10)

Basic of counting principles, principle of inclusion exclusion, application of inclusion and exclusion. Pigeonhole principle, generalized Pigeonhole principle and its application, permutations and combinations, permutations with repetitions, combinations with repetitions, permutations of sets with indistinguishable objects.

Unit IV: Matrices

(Marks:10)

Row and column operations, vectors and matrices, partitioning of matrices, representing relations using matrices, Determinant of a square matrix, minor, cofactor, the Cayley-Hamilton theorem, inverse of a matrix, product form of inverse. Rank of a matrix. Solutions of simultaneous linear equations, existence of solutions, solution by Gaussian elimination, Eigen values and Eigen vectors.

Unit V: Logic

(Marks:10)

Connectives, truth tables, normal forms CNF, DNF, Converting expressions to CNF and DNF, Theory of inference, Propositional calculus. Boolean Algebra. Predicate calculus (only introduction), predicates and quantifiers.

Unit VI: Vector Space

(Marks:10)

Definition and examples of vector spaces. Elementary properties of \mathbb{R} as a vector space. Subspaces of a vector space. Union, intersection and sum of two subspaces. Subspaces generated by a subset of a vector space. Definition, example and properties of linearly independent and dependent set of vectors. Basis and dimension of a vector space. Examples of finite dimensional vector spaces.

Suggested Readings :

1. Discrete Mathematical Structure, Kolman /Rahman Pearson Education.
2. Discrete Mathematics and its Applications, K. H. Rosen, Mc-Graw Hill International Ed.
3. Discrete Mathematics structures with applications to Computer Science, J. P. Tremblay and R. Manohar, Mc-Graw Hill.
4. Discrete Mathematics, N. Ch. S.N. Iyengar, K. A. Venkatesh, V. M. Chandrasekaran, P. S. Arunachalam.

SEC PAPER
SEMESTER IV
Paper INT-SE-4014: E-Commerce Technologies

Total Credit: 4

Total Marks: 100

End Semester Exam = 50 (Theory)

Internal Assessment / Practical = 50

Unit I: An introduction to Electronic commerce

(Marks: 15)

What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, Electronic Commerce and Electronic Business models (C2B,C2C, B2B,B2C,B2G,G2B,G2C)

Unit II: The Internet and WWW

(Marks: 10)

Evolution of Internet, Domain Names and Internet Organization (.edu, .com,.mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Registering a Domain Name, Web promotion

Unit III: Internet Security

(Marks: 10)

Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime (Laws, Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Digital Signature (How it Works)

Unit IV: Electronic Data Exchange

(Marks: 15)

Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash

Unit V: Planning for Electronic Commerce

(Marks: 5)

Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Strategies for developing electronic commerce web sites

Unit VI: Internet Marketing

(Marks: 5)

The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

Books Recommended:

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.
2. Kamlesh K Bajaj and Debjani Nag , E- Commerce , 2005.
3. Gray P. Schneider , Electronic commerce, International Student Edition, 2011,
4. HENRY CHAN, RAYMOND LEE, THARAM DILLON, ELIZABETH CHANG
5. E-COMMERCE, FUNDAMENTALS AND APPLICATIONS, Wiely Student Edition, 2011

Software Lab based on E-Commerce Technologies

E-commerce concepts are to be implemented in developing a website using a combination of following technologies:

1. HyperText Markup Language (HTML)
2. Cascading Style Sheets (CSS)
3. JavaScript
4. ASP
5. PHP
6. XML
7. Joomla

SEC PAPER
SEMESTER V

Paper INT-SE-5014: Animation and Media Design

Total Credit: 4

Total Marks: 100

End Semester Exam = 50 (Theory)

Internal Assessment / Practical = 50

Unit I: Multimedia and Flash Preliminaries

(Marks: 15)

Multimedia - understanding multimedia; experiencing and interacting with the message. The Multimedia Computer and its components - multimedia hardware standards, the sound card, video card, the CD-Rom/DVD drive, Multimedia Software - types and examples of multimedia software, animation, interactive programming, audio and video software, the place of Adobe Premiere and Macromedia Flash; other commonly used post production software like Adobe After Effects, Combustion, etc. Introduction to Flash – the different aspects and uses of Flash; the Flash interface – the different windows, panels, the toolbox; Flash help system and how to use it, Working with Flash Tools – Flash tools and how to use them: navigation and viewing tools, selection tools, drawing tools; strokes and fills in Flash and how to create and edit them; tools and panels for working with colours in Flash; text in Flash, different types of text blocks and how to work with them.

Unit II: Drawing in Flash

(Marks: 12)

Working with graphic objects in Flash – selecting, moving, transforming, grouping, stacking, and aligning objects; breaking apart objects and groups, **Drawing in Flash:** panels used for drawing in Flash, techniques for creating different types of basic and advanced shapes, masks; editing and modifying the shapes; importing artwork and bitmaps into Flash; type effects such as masked text, drop shadowed text and embossed text.

Unit III: Animation

(Marks: 15)

Animating in Flash – animation tools: the timeline and how to work with it, the library panel, symbols and instances, the movie explorer panel and its uses; Different methods of animation in Flash: frame by frame animation, tweening – shape tweening and techniques for refining shape tweens; motion tweening, motion tweening effects; motion along a path; animating using masks, editing animations, **Movie clips** - their uses, how to create them and edit them, nested movie clips; Flash buttons and how to create and animate them,

Animation using timeline effects – how to add a timeline effect and edit its settings.

Unit 4: Video, Audio and Exporting

(Marks: 10)

Working with Video and Sound: Video - overview of working with video in Flash and supported formats; sound – overview of working with audio in Flash, supported formats, adding sounds to a document and to buttons, sound editing controls, **Publishing and Exporting Flash movies and images** – Publishing Flash movies and images into formats such as SWF, HTML, GIF, JPEG, PNG and QuickTime; exporting Flash movies as image sequences and clips.

Unit 5: Action Script

(Marks: 8)

ActionScript: Introduction to ActionScript, basics syntax and data types, elements of writing and debugging scripts; Using ActionScript for interaction in a Flash movie – events and event handlers; simple Flash movies using basic event handling and navigation – creating product kiosks, interactive web pages and elementary animation using ActionScript,

Flash Learning Interactions: creating e-learning content using Flash learning interactions, different Flash learning interactions, using them and configuring them in a Flash movie.

LABORATORY

The list of the experiments will be prepared by the respected teacher of the course.

REFERENCE BOOKS

1. Macromedia Flash User Manual
2. Macromedia Flash online help system

QP: Software Developer (SSC/Q0501)

NSQF Level: 7

SEMESTER V

Paper INT-VE-5016: Computer Networks

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit I: (Marks:10)

Physical Layer : Data communications : components – Network criteria – physical structures – network models – categories of networks –interconnection of networks – inter network Protocols and standards : protocols-standards-standards organizations- internet standards Network models: Layered tasks – OSI model – layers in the OSI model – TCP/IP protocol suite.

Unit II: (Marks:10)

Digital Transmission: Digital to digital conversion: Line coding – line coding schemes – block coding - analog to digital conversion – PCM - transmission modes: serial transmission – parallel transmission

Analog Transmission: Digital to analog conversion: FSK-ASK-PSK Analog to Analog conversion: Amplitude modulation – Frequency modulation – phase modulation

Multiplexing: Frequency division multiplexing – Time division multiplexing

Transmission Media Guided media: Twisted pair cable – coaxial cable – fiber optic cable
Unguided media: radio waves - micro waves – infrared.

Unit III: (Marks:10)

Data Link Layer: Error correction and detection: Introduction- block coding-linear block codes cyclic codes-checksum. **Data link Control:** protocols-simplest protocol- stop and wait protocol-stop and wait automatic repeat request-go back n automatic repeat request-selective repeat-automatic repeat request-piggybacking. **Multiple Access:** Random access-Aloha-CSMA-CSMA/CD-CSMA/CA Controlled access: reservation, polling, token passing. Channelization: FDMA, TDMA, CDMA.

Unit IV: (Marks:10)

Wired LANs: Ethernet: IEEE standards, standard Ethernet- fast Ethernet. **Wireless LANS:** IEEE 802.11-architecture-MAC sublayer addressing mechanism, physical layer-Bluetooth: architecture-Bluetooth layers-radio layer-baseband layer-L2CAP-other upper layers.

Network Layer: Addressing IPV4 addresses - IPV6 Addresses

Internet Protocol: IPv4 –IPv6 **Address mapping protocols:** ARP – RARP.

Unit V: (Marks:10)

Routing protocols: Unicast routing protocols: distance vector routing, Link State routing **Multicast Routing protocols (Any two)** **Transport Layer:** Process to process delivery – UDP – TCP

Congestion control and QOS: Data traffic – congestion – congestion control – quality of service – techniques to improve quality of service.

Unit VI: (Marks: 10)

Application layer: & Network Security:

DNS: Name space – domain name space – distribution of name space

Electronic mail Architecture, FILE transfer: FTP, WWW and HTTP: Architecture – web documents – HTTP,**Network Security:** Introduction - definitions – two categories - symmetric key cryptography –traditional ciphers – asymmetric key cryptography

LABORATORY

Each student should do at least 4 assignments from the following list.

1. Write a server socket program using TCP/IP in java where the client side will send a request for an existing file to the server side and if the file exists in the server then send the contents of that particular file to the client in reply, otherwise display a message —file does not exist on the server, if exists displays the contents on the client side.
2. Develop a chat application using TCP/IP in java.
3. Develop a client-server application using TCP/IP in java to input user's information and finally send them to the server and store there in a file.
4. Develop a server socket program where the client takes principal, rate of interest and number of years and send them to the server. In the server receive this information and find the simple interest and finally send the result to the client again and display it on the client's VDU.
5. Configure a Local Area Network (Wired/Ethernet) in Linux environment.
6. Configure the network interface card using ifconfig command and also explore ping, ifdown and ifup commands.

SUGGESTED READINGS:

1. Behrouz A Forouzan, Data communication and networking, McGraw-Hill, 5

QP: Software Developer (SSC/Q0501)

NSQF Level: 7

SEMESTER V

Paper INT-VE-5026: System Administration Using LINUX

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit I:

(Marks:15)

What is System Administration? Duties of a System Administrator. Basic features of the Linux operating system. Installation requirements, Partitioning the Hard drive in Linux, Installing the Linux system, installing and configuring software in linux, Linux kernel program, system Startup and Shutdown. Standard I/O, Standard error, redirection and piping.

Unit II:

(Marks:15)

Basics of Linux file system: hierarchy and types. absolute and relative path names. Basic commands for files and directories- ls, cp, mv, rm, mkdir, rmdir, more, creating and viewing files, mounting and unmounting file systems and partitions. Structure of /etc/fstab file and its purpose. I-node, directories, hard link, symbolic link. setting user and group ownership of files and access permissions, study of different linux shells (sh, bash, csh, zsh). Environment variable. Bash variables, login vs non-login shells. Shell script basics. Introduction to grep, awk, perl)

Unit III:

(Marks:10)

Basic commands for starting and stopping processes, basic process attributes and their role in access control. Examining the list of running processes on the system and understand the data presented there. Background process, Sending signals to processes and modifying process priorities. Job control. Crontab file format, Backup and Restore procedure, configuring the print queue, selecting the printer driver, editing the printer configuration, deleting printer setting default printer.

Unit IV:

(Marks:10)

Managing user accounts: Adding a user, password, Creating Groups, adding and deleting groups, viewing user account information, understanding the “root” account, implementing sudo. What is file ownership and access permission,, System monitoring and logging, Monitoring memory usage, disk space usage and I/O activity. Logging and its necessity, Customizing system Log information.

Unit V:**(Marks:10)**

The rules governing IP address classes and netmasks, Network Address, Netmask and Gateway. configuring Interface with ifconfig, adding routes, ping, netstat, traceroute, telnet, Understanding the significance of the /etc/services file and well known port numbers. Basics of configuring NFS, NIS, DNS, FTP, Squid Proxy, DHCP server, iptables and firewall. Basic Network Security Issues.

LABORATORY

1. Write a shell program to find the addition of two numbers.
2. Write a shell program to display numbers from 1 to 9.
3. Write a shell program to find biggest numbers between two numbers.
4. Write a shell program to check whether numbers is Prime or not.
5. Write a shell program to find the factorial.

Suggested Readings

1. Red Hat Linux:Proffitt:PHI
2. Introduction to system Administration: IBM series:PHI
3. Essential System Administration: Frisch:O'REILLY

QP: Software Developer (SSC/Q0501)

NSQF Level: 7

SEMESTER V

Credit:6

(Total Marks 100)

Paper **INT-VE-5036**: OJT / Mini Project

OJT + MINI PROJECT REPORT + VIVA

1. ON JOB TRAINING :40

2.PROJECT REPORT : 40

3.VIVA: 20

On job training to be conducted in Software farm, Software industry, Govt and semi govt agencies for a minimum of 5 to 7 days.

SEC PAPER
SEMESTER VI

Paper INT-SE-6014: Information Security and Cyber Laws

Total Credit: 4

Total Marks: 100

End Semester Exam = 50 (Theory)

Internal Assessment / Practical = 50

Unit I: Cyber Laws

(Marks: 15)

Meaning of Cyber world and cyber law, The internet and online resources, Security of information, Computer security and Security threats, The language of cyber space, legal enactments of cyber laws.

Unit II: Cyber Crimes

(Marks: 15)

Introduction , Classification , Offences under the Information Technology Act 2000 - Computer related crimes , Digital forgery , Cyber defamation , Cyber pornography , Cyber stalking or harassment , Hacking and Cracking , Tampering with computer source documents , Publishing of obscene information in electronic form, Breach of confidentiality and privacy, Online theft, Internet fraud, Spoofing , Sniffing, e-mail spamming and bombing , Financial crimes, Data alteration /Destruction , ATM fraud , Identity Theft , Malicious programs, Cyber terrorism.

Unit III: Information Technology Act–2000 and its various Terms and Provision

(Marks: 15)

History, object, Essence, and specifics of the Act, Salient features, e – Governance, Digital Signature , Cryptography, Digital Signature Certificate, Legal recognition of Digital Signature , Legal recognition of Electronic documents, Offences and Contraventions, Penalties and Adjudications, Digital evidence and Cyber forensics, Legal software and Legal Process outsourcing (LPO).

Unit IV: Regulation of Cyber Space

(Marks: 15)

Freedom of Expression in cyberspace, The cyber Regulation Appellate Tribunal, Need for regulations in cyber space, Scope of cyber Laws in e- Commerce, e – Taxation and online Contracts, Global Efforts on electronic Communication and Protection.

Prescribed Legislations : Information Technology Act 2000

SUGGESTED READINGS:

1. Cyber law and Crimes - Barkha and U. Rama Mohan
2. Cyber Laws – Justice Yatindra Singh
3. Cyber Law in India : Law on Internet (Pioneer book Publication , Delhi) –Dr . Farooq Ahmed
4. Internet Law - Chris Reed
5. Law relating to computers , Internet and e – commerce (Universal Law Publication co. , Delhi) – Nandan Kamath
6. Information Technology : Law and Practice (Universal Publication Co. Delhi) – Vakul Sharma .
7. Legal diamention of cyberspace (Indian Law Institute Publication , Delhi) - S . K. Verma and Raman Mittal .
8. Cyber Crime Law Enforcement , Security and Surveillance in the Information age (Rout Leadge) , 2000 – Brian Loader and Douglas Thomas .

QP: Software Developer (SSC/Q0501)

NSQF Level: 7

SEMESTER VI

Paper INT-VE-6016: Android Application Development

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit 1: Introduction

(Marks: 10)

Android and its importance, Brief history about Android, Pre-requisites to learn Android, Development tools, Android architecture-software stack.

Unit 2: Get started with Android

(Marks: 10)

Installation of Android Studio, SDK, emulator, Creating your first Project App, Explore project structure- Manifest, java, res, gradle, Activity, Layout, Common UI components, Creating UI through code, Run the application in Emulator and Android device.

Unit 3: Activities

(Marks: 10)

Creating a new activity, Application context, Intent, Activity Life cycle, Communicating among Activities, connecting to internet resource, WebView.

Unit 4: Designing User Interface

(Marks: 10)

Using Button control, ArrayList, Spinner, ListView, GridView, Adapters, Sidebar Menus, Notification (toast, Status bar), Adding image, audio, Video.

Unit 5: Background Task and Local File Storage

(Marks: 10)

Broadcast Receiver, services in Android, Reading/writing local data, Accessing the Internal File system.

Unit 6: Database

(Marks: 10)

SQLite- Introducing SQLite, SQLiteOpenHelper and creating a database, Opening and closing a database, Inserts, updates, and deletes operation, Data Binding, using content provider, firebase, storing and sharing data in the cloud.

LABORATORY

Each student should do at least 6 experiments from the following list.

1. Create an application with two fields (Number 1, Number2). On clicking button the sum of the two numbers are displayed on another text field.
2. Create a Login application with two fields (username and password). On successful login go to next screen, also pass user name to next screen. And on failing login, alert user using Toast.
3. Create an application with two fields (name and value). On clicking button, the value on the two fields passes to the next screen and display it on text field.
4. Create an application with a button. On clicking the button open browser with an URL.(open google page)
5. Create a spinner with names of some countries. On selecting a particular country, Display a toast message with currency name of that country.
6. Create an application with Navigation side bar menu item. On clicking the sidebar menu item, it open activity page of that particular menu item.
7. Create an application with static Broadcast Receiver features. When a SMS comes, it displays an alert message.
8. Create an application to display an image and button. On button click the image is changed. The images are put inside the resource folder.
9. Create an application with a button. On clicking it, notification is displayed on top of the app. When swipe and click it display second activity page.
10. Create an application with two button for start and stop services. On clicking start button it will play default ringtone in the background. On clicking stop button it stops.
11. Create an application to play a video.
12. Create an application with a text field. On clicking the Add button the content of the text field is save to a file in internal memory storage. On clicking the Load button the content of the file in the internal storage is displayed again in the text field.
13. Create an application to create a database in Sqlite with a table of user information (id, name, marks etc.). The application can also perform insert, retrieve, update and delete operation.

Reference Books

1. Grant Allen, Beginning Android 4, A press, 2012.
2. Wei-Meng Lee, Beginning android 4 application Development, John Wiley & sons, Inc, 2012.
3. Android programming for Beginners by John Horto, Packt Publishing Ltd.

QP: Software Developer (SSC/Q0501)

NSQF Level: 7

SEMESTER VI

Paper INT-VE-6026: Database Design and Programming

Total Credit: 6

Total Marks: 100

End Semester Exam = 80 (Theory = 60, Practical = 20)

Internal Assessment = 20 (Sessional =10, Practical =06, Attendance = 04)

Unit I: Introduction to database design (Marks: 10)

Software development life cycle (software development cost, structures system analysis and design, structured system analysis, structured design), Database development life cycle (DDLDC), Database design approach (Bottom-up, top-down, inside-out, mixed strategy).

Phases of database design – Data requirement collection & analysis, conceptual database design, DBMS selection, logical & physical database design, prototyping, database implementation and tuning.

Unit II: Database Transaction and recovery (Marks: 15)

Transaction processing- transaction and system concepts, desirable properties, schedules and Recoverability, Concurrency control- locking techniques, concurrency control based on timestamp ordering.

Database recovery- concepts and techniques; Security and authentication- issues, access control techniques, introduction to multilevel security.

Unit III: Different types of database (Marks: 10)

Concepts of object-oriented databases; Standards, languages and design, Object relational database systems, Concepts of Image, multimedia, and spatial databases, Introduction to distributed database- Data fragmentation, replication, allocation

Unit IV: Introduction to SQL and database programming (Marks:15)

Specifying constraints, Complex SQL queries, views (virtual tables in SQL), concept of cursor and triggers. Stored procedure, transactions and cursors. Issues and techniques, Approaches to database programming. Typical sequence of interaction in database programming. Embedded SQL, Dynamic SQL and SQLJ: Retrieving single tuple with embedded SQL, Retrieving multiple tuples with embedded SQL using Cursors , Specifying queries at runtime using dynamic SQL, Embedding SQL commands in JAVA, Retrieving multiple tuples in SQLJ using Iterators. Database programming with function calls SQL/CLI and JDBC: SQL function calls for JAVA programming.

UNIT V: XHTML, CSS, ASP, PHP (Marks: 10)

Introduction to XHTML, HTML Vs XHTML, What is CSS, its use, creation of CSS, ASP and its use, basic programming using ASP, PHP and its use, creating dynamic pages using PHP and connection with MySQL, Basic programming using PHP for performing simple Database operations.

LABORATORY

Different experiments using SQL, XHTML, ASP, PHP, Design with CSS

Suggested Readings:

1. Fundamentals of database management system by Elmasri and Navathe, Pearson Ed.
2. MySQL for professionals by Ivan Bayross
3. Database System Concepts by Silberschatz, Korth and Sudarshan, Mc-Graw Hill.

QP: Software Developer (SSC/Q0501)

NSQF Level: 7

SEMESTER VI

Credit: 6

(Total Marks 100)

Paper INT-VE-6036: OJT / Major Project

OJT + PROJECT REPORT + VIVA

1. ON JOB TRAINING :40

2.PROJECT REPORT : 40

3.VIVA: 20

On job training to be conducted in Software farm, Software industry, Govt and semi govt agencies for a minimum of 5 to 7 days.

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