

FACULTY OF ENGINEERING AND TECHNOLOGY

Syllabus

For

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT) (Semester: I – VI)

Session: 2016–17



GURU NANAK DEV UNIVERSITY AMRITSAR

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*Bachelor of Vocation (B.Voc.)
(Software Development) Semester System*

Eligibility:
+2 pass in any stream.

Scheme of Syllabus

Semester – I:

Paper No.	Paper	M. Marks
Paper–I	Fundamentals of Information Technology	50
Paper–II	Web Technology	50
Paper–III	Programming using C Language	50
Paper–IV	Lab I: Office Automation and Web Technology	75
Paper–V	Lab II: Programming in C Language	75
Paper–VI	Communication Skills in English – I	50
Paper–VII	Punjabi Compulsory / ਮੁੱਢਲੀ ਪੰਜਾਬੀ	50
Total:		400

Semester – II:

Paper No.	Paper	M. Marks
Paper–I	Internet Applications	50
Paper–II	Data Structure	50
Paper–III	Object Oriented Programming	50
Paper–IV	Lab I: Programming in C++	75
Paper–V	Lab II: Practical based on Data Structure	75
Paper–VI	Communication Skills in English – II (Th. 35+ Pr. 15)	50
Paper–VII	Punjabi Compulsory / ਮੁੱਢਲੀ ਪੰਜਾਬੀ	50
Total:		400

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Semester–III:

Paper No.	Paper	M. Marks
Paper–I	Database System	50
Paper–II	Java Programming	50
Paper–III	Software Engineering Methodology	50
Paper–IV	* Environmental Studies – I	50
Paper–V	Lab I: Lab based on SQL & PL/SQL	50
Paper–VI	Lab II: Java Programming	50
Paper–VII	Minor Project: Software Module based on Web Technology/Database/ Programming Language	150
Total:		400

Semester–IV:

Paper No.	Paper	M. Marks
Paper–I	Open Source Software	50
Paper–II	Information Security	50
Paper–III	Operating System	50
Paper–IV	* Environmental Studies – II	50
Paper–V	Lab I: Practical based on Android Development	100
Paper–VI	Lab II: Open Source Software Tool	75
Paper–VII	Lab III: Practical based on ASP.Net using C#	75
Total:		400

* Marks of Paper EVS will not be included in Grand Total.

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Semester-V:

Paper No.	Paper	M. Marks
Paper-I	Software Project Management and Business Solution	50
Paper-II	Software Re-engineering	50
Paper-III	Software Testing & Quality Assurance	50
Paper-IV	Lab I: Soft Skills in IT	50
Paper-V	Lab II: System and Network Administration	100
Paper-VI	Lab III: Software Testing (Case Tools)	100
Total		400

Semester-VI:

Paper No.	Paper	M. Marks
Paper-I	Project Dissertation (Industrial Training and Project in Software/IT industry)	400
Total		400

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – I*

Paper–I: Fundamentals of Information Technology

Time: 3 Hrs.

Max. Marks: 50

Note:

- (i) **The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.**
- (ii) **The student can use only Non–programmable & Non–storage type calculator.**

An overview of computer system: Block diagram of Computer, Components of Computers, and advantages of computer.

[6 Hrs.]

I/O and storage Devices: Keyboard, mouse, pens, touch screens, Bar Code reader, joystick, Monitor, printers, plotters, Primary storage (Storage addresses and capacity, type of memory), Secondary storage, Magnetic storage devices and optical storage devices

[12 Hrs.]

Number System: decimal, binary, octal, hexadecimal numbers and their–conversions

[12 Hrs.]

Development Tools: Editors, Translators, Compilers, Interpreters, Linkers Loaders, Debuggers.

[8 Hrs.]

Programming Tools: Problem Analysis, Program Constructs (Sequential, Decision, Loop), Algorithms, Flowcharts, Pseudo code, Decision table.

[12 Hrs.]

Data Communications: Introduction to Data Communication, Network and its types, topologies, Transmission Media and modes.

[10 Hrs.]

References:

1. V.K. Jain: Fundamentals of Information Technology.
2. Norton, Peter: Introduction to Computers, McGraw Hill
3. Computer Fundamentals, P.K. Sinha

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Paper–II: Web Technology

Time: 3 Hrs.

Max. Marks: 50

Note:

- (i) **The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.**
- (ii) **The student can use only Non–programmable & Non–storage type calculator.**

Introduction to Web Development

Webpage, Website, Static Website, Dynamic Website, Web Servers, Web Browsers

[10 Hrs.]

Introduction to HTML/DHTML

HTML Basics, HTML Elements (Tags), Structure of HTML Program, Attributes, Headings, Paragraphs, Formatting, Links, Images, Tables, Lists, Forms, Frames, Where to put Tables, Lists, Images, Forms, CSS in DHTML, Implementation of WebPages using CSS.

[15 Hrs.]

Introduction to JavaScript:

How & Where to put the JavaScript Code, JavaScript Statements, Comments, Variables, Operators, Control Statements, Loops, Popup Boxes, Functions.

[10 Hrs.]

Introduction to Dreamweaver

Understanding Workspace Layout, Managing Websites, Creating a Website, Using Dreamweaver Templates, Adding New WebPages, Text and Page Format, Inserting Tables, Lists, Images, Adding Links.

[15 Hrs.]

Purchasing a Domain Name & Web Space

Domain Name & Web Space, Getting a Domain Name & Web Space (Purchase or Free), Uploading the Website to Remote Server.

[10 Hrs.]

Suggested Readings / Books:

1. Web Enabled Commercial Application Development HTML (Ivan Bayross)
2. JavaScript, a Beginner's Guide John Pollock, Third Edition
3. Dreamweaver CS5 for Dummies Janine C. Warner, Paperback Edition
4. The Essential Guide to Dreamweaver CS4 David Powers

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Paper III: Programming using C Language

Time: 3 Hrs.

Max. Marks: 50

Note:

- (i) **The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.**
- (ii) **The student can use only Non-programmable & Non-storage type calculator.**

C language preliminaries: Introduction to C, Identifiers and Key Words, Data types, Constants, Variables, Expressions, Statements,.

[10 Hrs.]

Operators and I/O functions: Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators, getchar, putchar, printf, gets, puts

[10 Hrs.]

Control Statements: While, Do-while and for statements, Nested loops, If-else, Switch, Break – Continue statements.

[10 Hrs.]

Functions: Brief overview, types, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion.

[8 Hrs.]

Arrays and Pointers Defining, processing an array, passing arrays to a function, multi-dimensional arrays, Introduction to pointers, Operations on pointers, Pointers and array.

[10 Hrs.]

Structure and Union: : A simple structure, specifying the structure, defining a structure variable Accessing Structure member, Structure within structure, union, difference between structure and union.

[6 Hrs.]

Data Files: Opening, closing, creating, processing and unformatted data files.

[6 Hrs.]

References:

1. Let us C, Yashwant Kanetkar
2. C – programming E. Balagurusamy Tata McGraw Hill
3. Complete reference with C Tata McGraw Hill

Bachelor of Vocation (B.Voc.)
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Paper–IV: Lab – I: Office Automation and Web Technology

Time: 3 Hrs.

Max. Marks: 75

Practical based on Office Automation and Web Technology

- **Office Automation:** MS Word, MS Excel, MS PowerPoint
- **Web Technology:** HTML, DHTML, Dreamweaver

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Paper–V: Lab – II: Programming in C Language

Time: 3 Hrs.

Max. Marks: 75

Practical based on Programming in C language

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Paper-VI: Communication Skills in English – I

Time: 3 Hours

Max. Marks: 50

Course Contents:

1. Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings; Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.

Activities:

- a) Active reading of passages on general topics
- b) Comprehension questions in multiple choice format
- c) Short comprehension questions based on content and development of ideas

2. Writing Skills: Guidelines for effective writing; writing styles for application, resume, personal letter, official/ business letter, memo, notices etc.; outline and revision.

Activities:

- a) Formatting personal and business letters.
- b) Organising the details in a sequential order
- c) Converting a biographical note into a sequenced resume or vice-versa
- d) Ordering and sub-dividing the contents while making notes.
- e) Writing notices for circulation/ boards

Suggested Pattern of Question Paper:

The question paper will consist of five skill-oriented questions from Reading and Writing Skills. Each question will carry 10 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.

10x5=50 Marks

- i) Multiple choice questions on the language and meanings of an unseen passage.
- ii) Comprehension questions with short answers on content, progression of ideas, purpose of writing etc. of an unseen passage.
- iii) Personal letter and Official/Business correspondence
- iv) Making point-wise notes on a given speech/ technical report OR
Writing notices for public circulation on topics of professional interest
- v) Do as directed (10x1= 10 Marks) (change of voice, narration, combination of 2 simple sentences into one, subject-verb agreement, using appropriate tense, forms of verbs.

Recommended Books:

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
2. *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP

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Paper–VII: ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)

ਸਮਾਂ : 3 ਘੰਟੇ

ਕੁਲ ਅੰਕ : 50

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਗਿਆਨ ਮਾਲਾ** (ਵਿਗਿਆਨਕ ਤੇ ਸਮਾਜ-ਵਿਗਿਆਨਕ ਲੇਖਾਂ ਦਾ ਸੰਗ੍ਰਹਿ),
(ਸੰਪਾ. ਡਾ. ਸਤਿੰਦਰ ਸਿੰਘ, ਪ੍ਰੋ. ਮਹਿੰਦਰ ਸਿੰਘ ਬਨਵੈਤ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ,
ਅੰਮ੍ਰਿਤਸਰ।
ਲੇਖ : ਪਹੀਆ ਪ੍ਰਦੂਸ਼ਣ, ਭਰੂਣ ਹੱਤਿਆ ਦੇ ਦੇਸ਼ ਵਿਚ, ਨਾਰੀ ਸ਼ਕਤੀ, ਵਾਤਾਵਰਣੀ ਪ੍ਰਦੂਸ਼ਣ
ਅਤੇ ਮਨੁੱਖ, ਏਡਜ਼ : ਇਕ ਗੰਭੀਰ ਸੰਕਟ।
2. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)
(ਪ੍ਰੋ. ਮੋਹਨ ਸਿੰਘ, ਅੰਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ, ਸ਼ਿਵ ਕੁਮਾਰ ਬਟਾਲਵੀ, ਸੁਰਜੀਤ ਪਾਤਰ, ਪਾਸ਼)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
3. **ਪੈਰੂ ਰਚਨਾ**
4. **ਪੈਰੂ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ।**
5. (ੳ) **ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ** : ਉਚਾਰਨ ਅੰਗ, ਉਚਾਰਨ ਸਥਾਨ ਤੇ ਵਿਧੀਆਂ, ਸਵਰ, ਵਿਅੰਜਨ, ਸੁਰ।
(ਅ) **ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ** : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ, ਪੰਜਾਬੀ
ਉਪਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ।
6. **ਮਾਤ ਭਾਸ਼ਾ ਦਾ ਅਧਿਆਪਨ**
(ੳ) ਪਹਿਲੀ ਭਾਸ਼ਾ ਦੇ ਤੌਰ ਉੱਤੇ
(ਅ) ਦੂਜੀ ਭਾਸ਼ਾ ਦੇ ਤੌਰ ਉੱਤੇ

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ:

- | | |
|---|------------|
| 1. ਕਿਸੇ ਨਿਬੰਧ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿਚੋਂ ਇਕ) । | 10 ਅੰਕ |
| 2. ਆਤਮ ਅਨਾਤਮ : ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ, ਕਲਾ ਪੱਖ | 10 ਅੰਕ |
| 3. ਪੈਰੂ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਉੱਤੇ ਪੈਰੂ ਲਿਖਣ ਲਈ
ਕਿਹਾ ਜਾਵੇ । | 05 ਅੰਕ |
| 4. ਪੈਰੂ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਪੰਜ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ। | 05 ਅੰਕ |
| 5. ਨੰਬਰ 5 ਉੱਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ 'ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ। | 10 ਅੰਕ |
| 6. ਨੰਬਰ 6 ਵਿਚ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਪਹਿਲੀ ਭਾਸ਼ਾ ਅਤੇ ਦੂਜੀ ਭਾਸ਼ਾ ਵਜੋਂ
ਅਧਿਆਪਨ, ਮਹੱਤਵ ਅਤੇ ਸਮੱਸਿਆਵਾਂ ਬਾਰੇ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ,
ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਦੋ ਦਾ ਉੱਤਰ ਦੇਣਾ ਹੋਵੇਗਾ। | 5×2=10 ਅੰਕ |

Bachelor of Vocation (B.Voc.)
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PAPER–VII: ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Punjabi Compulsory)

ਸਮਾਂ : 3 ਘੰਟੇ

ਕੁਲ ਅੰਕ: 50

ਪਾਠ-ਕ੍ਰਮ

1. ਪੈਂਤੀ ਅੱਖਰੀ; ਪੈਰ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ ਅਤੇ ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਲਗਾਂ ਮਾਤਰਾਂ
2. ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ)
3. (ੳ) ਵਿਸ਼ਰਾਮ ਚਿੰਨ੍ਹਾਂ ਦੀ ਵਰਤੋਂ,
 (ਅ) ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ, ਲਿੰਗ ਅਤੇ ਵਚਨ

ਅੰਕ ਵੰਡ ਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਪੈਂਤੀ ਅੱਖਰੀ ਦੀ ਬਣਤਰ ਅਤੇ ਤਰਤੀਬ ਨਾਲ ਸੰਬੰਧਿਤ ਪ੍ਰਸ਼ਨ। 10 ਅੰਕ
 (ਦੋ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚੋਂ ਇੱਕ ਕਰਨਾ ਹੋਵੇਗਾ)
 ਕਵਰਗ, ਚਵਰਗ, ਤਵਰਗ, ਟਵਰਗ ਆਦਿ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ ਪੁੱਛਿਆ ਜਾ ਸਕਦਾ ਹੈ। ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ ਅਤੇ ਲਗਾਂ ਮਾਤਰਾਂ ਦੀ ਵਰਤੋਂ ਨਾਲ ਸੰਬੰਧਿਤ ਪ੍ਰਸ਼ਨ (ਦੋ ਵਿਚੋਂ ਇੱਕ ਕਰਨਾ ਹੋਵੇਗਾ) 10 ਅੰਕ
2. ਬਿੰਦੀ, ਟਿੱਪੀ ਅਤੇ ਅੱਧਕ ਦੀ ਵਰਤੋਂ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ 10 ਅੰਕ
3. (ੳ) ਵਿਸ਼ਰਾਮ ਚਿੰਨ੍ਹਾਂ ਦੀ ਵਰਤੋਂ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ 10 ਅੰਕ
 (ਅ) ਨਾਂਵ ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ ਅਤੇ ਲਿੰਗ ਵਚਨ ਸੰਬੰਧੀ ਮੁੱਢਲੀ ਕਿਸਮ ਦੇ ਪ੍ਰਸ਼ਨ (ਦੋ ਵਿਚੋਂ ਇੱਕ ਕਰਨਾ ਹੋਵੇਗਾ) 10 ਅੰਕ

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Paper–I: Internet Applications

Time: 3 Hrs.

Max. Marks: 50

Note:

- (i) **The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.**
- (ii) **The student can use only Non–programmable & Non–storage type calculator.**

Introduction: About internet and its working, business use of internet, services offered by internet, evaluation of internet, internet service provider (ISP), windows environment for dial up networking (connecting to internet), audio on internet, internet addressing (DNS) and IP addresses).

[12 Hrs.]

E–Mail: Concept, Advantage and disadvantage, structure of an e–mail message, working of e–mail (sending and receiving messages), managing e–mail (creating new folder, deleting messages, forwarding messages, filtering messages) Implementation of outlook express.

[12 Hrs.]

Internet Protocol: Introduction, file transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCP/IP.

[6 Hrs.]

WWW: Introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page and bookmark).

[6 Hrs.]

Intranet and Extranet Introduction, application of intranet, business value of intranet, working of intranet, role of extranet, working of extranet, difference between intranet and extranet.

[10 Hrs.]

Search Engine: About search engine, component of search engine, working of search engine, difference between search engine and web directory.

[6 Hrs.]

News Group: Basic concepts of newsgroup, connecting to a news server, subscribing to newsgroup, organization of articles, reading messages, posting replies and new messages, managing newsgroup and messages.

[8 Hrs.]

References:

Internet and its Applications by Ackerman.
Internet – The Complete Reference

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Paper-II: Data Structure

Time: 3 Hrs.

Max. Marks: 50

Note:

- (i) **The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.**
- (ii) **The student can use only Non-programmable & Non-storage type calculator.**

Basic Data Structure: Introduction to Data Structure, Common Operations on Data Structures, Algorithm Complexity, Big O Notation, Time – Space trade off between Algorithms.

[7 hrs.]

Arrays: Define Array, Representing Arrays in Memory, Various Operations on Linear Arrays, Linear Search and Binary Search

[8 hrs.]

Linked Lists: Types of Linked Lists, Representing Linked Lists in Memory, Advantages of using Linked Lists over Arrays, Various Operations on Linked Lists.

[8 hrs.]

Stacks: Description of STACK structure, Implementation of Stack using Arrays and Linked Lists, Push and Pop operations of Stack, Applications of Stacks – Converting Arithmetic expression from infix notation to polish and their subsequent evaluation

[8 hrs.]

Queues: Description of queue structure, Implementation of queue using arrays and linked lists, Insertion and Deletion operations in Circular Queue, description of priorities of queues, dequeues.

[8 hrs.]

Trees: Description of Tree Structure and its Terminology, Binary Trees and Binary Search trees and their representation in Memory

[7 hrs.]

Graphs: Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix and Adjacency list, BSF and DFS traversal of the graph

[7 hrs.]

Sorting techniques: Sorting Algorithms, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort

[7 hrs.]

References:

1. Seymour Lipschutz, Theory and Problems of Data Structures, Schaum's Outline Series, McGraw Hill Company.
2. Tanenbaum, Data Structure using C.

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Paper-III: Object Oriented Programming

Time: 3 Hrs.

Max. Marks: 50

Note:

(i) **The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.**

(ii) **The student can use only Non-programmable & Non-storage type calculator.**

Object-Oriented Programming Concepts: Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, basic concepts of object-oriented programming, Data Types, Operators and Control Structures. **[8 hrs.]**

Standard Input/output: Concept of streams, hierarchy of console stream classes, input/output using cin (>>) and cout (<<), formatting output using ios class functions, flags and manipulators. **[4 hrs.]**

Functions: Defining and accessing function, passing arguments to functions, inline functions, static function and storage classes. **[4 hrs.]**

Classes and Objects: Specifying a class, creating class objects, accessing class members, access specifiers, static members, friend function, empty classes and nested classes. **[8 hrs.]**

Pointers and Dynamic Memory Management: dynamic memory management using *new* and *delete* operators, pointer to an object, *this* pointer, pointer related problems - dangling/wild pointers, null pointer, memory leak and allocation failures. **[6 hrs.]**

Constructors and Destructors: Need for constructors and destructors, Default Constructor, Parameter Constructor and Copy Constructor, destructors, constructors and destructors with static members. **[8 hrs.]**

Inheritance: Introduction, defining derived classes, types of inheritance: Multiple, Multilevel, Hybrid and Hierarchical Inheritance, virtual base class, overriding member functions, **[8 hrs.]**

Operator Overloading: Overloading operators, rules for overloading operators, overloading of various operators: unary and binary operators, type conversion: implicit and Explicit. **[7 hrs.]**

Polymorphism: Concept of binding - early binding and late binding, function overloading, virtual functions, pure virtual functions, abstract classes, virtual destructors. **[7 hrs.]**

Recommended Books:

1. Lafore R., **Object Oriented Programming in C++**, Waite Group.
 2. E. Balagurusamy, **Object Oriented Programming with C++**, Tata McGraw Hill.
 3. Bjarne Stroustrup, **The C++ Programming Language**, Addison Wesley.
- Herbert Schildt, **The Complete Reference to C++ Language**, McGraw Hill-Osborne.

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – II*

Paper–IV: Lab – I: Programming in C++

Time: 3 Hrs.

Max. Marks: 75

Practical based on Programming in C++

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – II

Paper-V: Lab – II: Practical based on Data Structure

Time: 3 Hrs.

Max. Marks: 75

Practical based on Data Structure

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – II*

Paper– VI: COMMUNICATION SKILLS IN ENGLISH – II

Time: 3 Hours

Max. Marks: 50

Theory Marks: 35

Practical Marks: 15

Course Contents:

- 1. Listening Skills:** Barriers to listening; effective listening skills; feedback skills. Attending telephone calls; note taking.

Activities:

- Listening exercises – Listening to conversation, News and TV reports
- Taking notes on a speech/lecture

- 2. Speaking and Conversational Skills:** Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics.

The study of sounds of English, stress
Situation based Conversation in English
Essentials of Spoken English

Activities:

- Making conversation and taking turns
- Oral description or explanation of a common object, situation or concept
- Giving interviews

Suggested Pattern of Question Paper:

The question paper will consist of seven questions related to speaking and listening Skills. Each question will carry 5 marks. The nature of the questions will be as given below:-

Two questions requiring students to give descriptive answers.

Three questions in the form of practical exercises requiring students to give an appropriate response to a question, a proposal, a proposition, an invitation etc. For example, the paper setter may give a proposition and ask the students to agree or disagree with it or introduce a character giving invitations and ask the students to accept or refuse it etc.

Two questions requiring students to transcribe simple words in IPA symbols, marking stress.

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – II*

PRACTICAL / ORAL TESTING

Marks: 15

Course Contents:

1. Oral Presentation with/without audio visual aids.
2. Group Discussion.
3. Listening to any recorded or live material and asking oral questions for listening comprehension.

Questions:

1. Oral Presentation will be of 5 to 10 minutes duration. (Topic can be given in advance or it can be of student's own choice). Use of audio visual aids is desirable.
2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.

Note: Oral test will be conducted by external examiner with the help of internal examiner.

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – II

PAPER–VII: ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)

ਸਮਾਂ : 3 ਘੰਟੇ

ਕੁਲ ਅੰਕ : 50

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਗਿਆਨ ਮਾਲਾ** (ਵਿਗਿਆਨਕ ਤੇ ਸਮਾਜ-ਵਿਗਿਆਨਕ ਲੇਖਾਂ ਦਾ ਸੰਗ੍ਰਹਿ)
(ਸੰਪ. ਡਾ. ਸਤਿੰਦਰ ਸਿੰਘ, ਪ੍ਰੋ. ਮਹਿੰਦਰ ਸਿੰਘ ਬਨਵੈਤ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ, 2007
ਲੇਖ : ਸਾਹਿਤ ਤੇ ਲੋਕ ਸਾਹਿਤ, ਅੱਖਾਂ, ਅਚੇਤਨ ਦਾ ਗੁਣ ਤੇ ਸੁਭਾਅ, ਕੰਪਿਊਟਰ ਅਤੇ ਇੰਟਰਨੈੱਟ, ਮਨੁੱਖੀ ਅਧਿਕਾਰ।
2. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ) (ਕਹਾਣੀਆਂ)
ਪਠਾਣ ਦੀ ਧੀ (ਸੁਜਾਨ ਸਿੰਘ), **ਸਾਂਝੀ ਕੰਧ** (ਸੰਤੋਖ ਸਿੰਘ ਧੀਰ), **ਉਜਾੜ** (ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ), **ਘੋਟਣਾ** (ਮੋਹਨ ਭੰਡਾਰੀ), **ਦਲਦਲ** (ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
3. **ਸ਼ਬਦਫ਼ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ** : ਪਰਿਭਾਸ਼ਾ, ਮੁੱਢਲੇ ਸੰਕਲਪ
4. **ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ**
5. **ਪੈਰ੍ਹਾ ਰਚਨਾ**
6. **ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ**
7. **ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ**

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ:

- | | | |
|------|--|--------|
| 1. | ਕਿਸੇ ਨਿਬੰਧ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿਚੋਂ ਇਕ) । | 10 ਅੰਕ |
| 2. | ਆਤਮ ਅਨਾਤਮ : ਸਾਰ, ਵਿਸ਼ਾ ਵਸਤੂ, ਪਾਤਰ ਚਿਤਰਣ, ਸਾਹਿਤ ਨੂੰ ਦੇਣ | 10 ਅੰਕ |
| 3-4. | 3-4 ਨੰਬਰ ਉੱਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ। | 10 ਅੰਕ |
| 5. | ਪੈਰ੍ਹਾ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਉੱਤੇ ਪੈਰ੍ਹਾ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇ । | 05 ਅੰਕ |
| 6. | ਪੈਰ੍ਹਾ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਪੰਜ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ | 05 ਅੰਕ |
| 7. | ਨੰਬਰ 7 ਵਿਚ ਅੱਠ ਅਖਾਣ ਅਤੇ ਅੱਠ ਮੁਹਾਵਰੇ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਪੰਜ-ਪੰਜ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤ ਕੇ ਅਰਥ ਸਪੱਸ਼ਟ ਕਰਨੇ ਹੋਣਗੇ। | |

5+ 5=10 ਅੰਕ

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – II

PAPER–VII: ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Punjabi Compulsory)

ਸਮਾਂ: 3 ਘੰਟੇ

ਕੁਲ ਅੰਕ: 50

ਪਾਠ – ਕ੍ਰਮ

- | | |
|---|--------|
| 1. ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ
ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ | 20 ਅੰਕ |
| 2. ਭਾਸ਼ਾ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ
ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ | 15 ਅੰਕ |
| 3. ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ
ਸਾਧਾਰਨ ਵਾਕ: ਕਿਸਮਾਂ
ਸੰਯੁਕਤ ਵਾਕ: ਕਿਸਮਾਂ
ਮਿਸ਼ਰਤ ਵਾਕ: ਕਿਸਮਾਂ
ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ ਦੇ ਵਿਭਿੰਨ ਸਮਾਜਿਕ ਪ੍ਰਸੰਗ | 15 ਅੰਕ |

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ:** ਸੰਯੁਕਤ ਸ਼ਬਦ; ਸਮਾਸੀ ਸ਼ਬਦ (ਜਿਵੇਂ ਲੋਕ ਸਭਾ); ਦੋਹਰੇ ਸ਼ਬਦ / ਦੁਹਰਰੁਕਤੀ (ਜਿਵੇਂ ਧੂੜ ਧਾੜ / ਭਰ ਭਰ), ਮਿਸ਼ਰਤ ਸ਼ਬਦਾਂ ਦੀ ਬਣਤਰ/ਸਿਰਜਨਾ; ਅਗੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਉਪ ਭਾਸ਼ਾ), ਪਿਛੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਰੰਗਲਾ), ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ: ਪੜਨਾਵੀਂ ਰੂਪ, ਕਿਰਿਆ/ਸਹਾਇਕ ਕਿਰਿਆ ਦੇ ਰੂਪ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ: ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਮੌਸਮਾਂ, ਗਿਣਤੀ ਨਾਲ ਸੰਬੰਧਿਤ ।
2. I. ਭਾਸ਼ਾ ਅਤੇ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਮਹੱਤਵ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ
II. ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ
3. **ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ:** ਕਰਤਾ ਕਰਮ ਕਿਰਿਆ; ਸਾਧਾਰਨ ਵਾਕ, ਬਿਆਨੀਆ, ਪ੍ਰਸ਼ਨਵਾਚਕ, ਆਗਿਆਵਾਚਕ, ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਵਾਕਾਂ ਦੀਆਂ ਕਿਸਮਾਂ; ਸੁਤੰਤਰ ਅਤੇ ਅਧੀਨ ਉਪਵਾਕ; ਸਮਾਨ (ਤੇ/ਅਤੇ) ਅਤੇ ਅਧੀਨ (ਜੋ/ਕਿ) ਯੋਜਕਾਂ ਦੀ ਵਰਤੋਂ; ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ: ਵਿਭਿੰਨ ਸਮਾਜਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸੰਗ; ਘਰ ਵਿਚ, ਬਾਜ਼ਾਰ ਵਿਚ, ਮੇਲੇ ਵਿਚ, ਸ਼ੋਪਿੰਗ ਮਾਲ/ਸਿਨੇਮੇ ਵਿਚ, ਵਿਆਹ ਵਿਚ, ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਵਿਚ, ਦੋਸਤਾਂ ਨਾਲ ਆਦਿ।

Bachelor of Vocation (B.Voc.)
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ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪਹਿਲੇ ਯੂਨਿਟ ਵਿੱਚੋਂ ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਨਾਲ ਸਬੰਧਿਤ 5-5 ਅੰਕਾਂ ਦੇ ਤਿੰਨ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇਕ-ਇਕ ਜਾਂ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।
ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਸ਼ਬਦਾਵਲੀ ਨਾਲ ਸਬੰਧਿਤ ਇਕ-ਇਕ ਅੰਕ ਦੇ ਪੰਜ (ਆਬਜੈਕਟਿਵ) ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

20 ਅੰਕ

2. ਦੂਸਰੇ ਯੂਨਿਟ ਵਿੱਚ ਭਾਸ਼ਾ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ ਨਾਲ ਸਬੰਧਿਤ 5-5 ਅੰਕਾਂ ਦੇ ਤਿੰਨ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇੱਕ-ਇੱਕ ਜਾਂ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।

15 ਅੰਕ

3. ਤੀਜੇ ਯੂਨਿਟ ਵਿੱਚ ਪੰਜਾਬੀ ਵਾਕ-ਬਣਤਰ ਨਾਲ ਸਬੰਧਿਤ 5-5 ਅੰਕਾਂ ਦੇ ਦੋ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇਕ-ਇਕ ਜਾਂ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।

ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਿਹਾਰਕ ਵਰਤੋਂ ਨਾਲ ਸਬੰਧਿਤ 5 ਅੰਕਾਂ ਦਾ ਇਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛਿਆ ਜਾਵੇਗਾ, ਜਿਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਕਿਸੇ ਸਮਾਜਿਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸੰਗ ਵਿਚ ਵਰਤੇ ਜਾਂਦੇ ਪੰਜ ਵਾਕ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ।

ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਭਾਸ਼ਾ ਸਰਲ ਅਤੇ ਸਪਸ਼ਟ ਰੱਖੀ ਜਾਵੇ।

15 ਅੰਕ

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – III*

Paper-I: Database System

Time: 3 Hrs.

Max. Marks: 50

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Basic Concepts: Database, Database system, Database management system, Data independence, advantages and disadvantages, 3 level architecture and mapping DBMS vs. File System, DBA's Role, RDBMS.

[10 Hrs.]

Data Models: Relational model, Hierarchical model, Network model, comparison of these model, An overview of the E/R Model, E/R diagrams, Database design with the E/R model

[8Hrs.]

Normalization: Introduction to Normalization, Need of Normalization, various forms of Normalization (1NF, 2NF, 3NF, BCNF)

[9 Hrs.]

SQL: Introduction, Data Definition Language (DDL), Data Manipulation Language (DML), Data Control Language (DCL) statements, Views, Sub-queries, Access Rights.

[9 Hrs.]

Transaction Management and Concurrency Control: Introduction to Transaction Processing, Properties of Transactions, Concurrency Control, purpose of concurrency control, Techniques for concurrency control,

[10 Hrs.]

Database Recovery of database: Introduction, Need for Recovery, Recovery Techniques.

[10 Hrs.]

Database Security: Introduction, Threats, Counter Measures.

[7 Hrs.]

Reference Books:

1. C.J. Date: *An Introduction of Database System*", The Systems Programming Series, 6/Ed, Addison-Wesley Publishing Company, Inc., 1995.
2. Silberschatz, Korth & Sudarshan, "*Database System Concepts*", Third Ed., McGraw Hill International Editions, Computer Science Series-1997.
3. Parteek Bhatia and Gurvinder Singh, "*Simplified Approach to DBMS*", Kalyani Publishers, 2010.
4. Ivan Bayross, "*SQL/PLSQL: The Programming Language of Oracle*, 3rd Revised Edition, 2006.

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – III

Paper-II: Java Programming

Time: 3 Hrs.

Max. Marks: 50

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction: Evolution of Java, Importance of JAVA to Internet, Features of JAVA, Byte code, Object Oriented Approach, Data types, Type Conversion and Casting, One Dimensional and Multidimensional arrays **[8 Hrs.]**

Operators and Control Structures: Arithmetic, Bitwise, Relational, Boolean, Assignment Operators, Operator precedence, Selection Statements, Iteration Statements, Jump statements. **[8 Hrs.]**

Classes: Class Fundamentals, Declaring objects, introducing methods, constructors, this keyword, Overloading constructors, Recursion, Nested and Inner classes. **[8 Hrs.]**

Inheritance: Basics, Creating Multilevel hierarchy, Method Overriding, Abstract Classes. **[8 Hrs.]**

Packages and Interface: Packages, Access Protection, Importing Packages, Interfaces, Defining, Implementing, Applying Interfaces, Extending Interfaces **[7 Hrs.]**

Exception Handling: Fundamentals, Exception Types, uncaught exceptions, try and catch. **[7 Hrs.]**

Applets: Applet Basics, Applet Architecture, Applet: Display, Repaint, Parameter Passing, wrapper class **[6 Hrs.]**

AWT: Window Fundamentals, Working with Frame Windows, Graphics, Color and Fonts, Swings. **[8 hrs.]**

Recommended Books:

- Patrick Naughton & Herbert Schildt: The Complete Reference Java 2, Tata McGraw Hill Edition
- Paul Deitel & Harvey Deitel: Java, How to Program, PHI Learning Private Limited Edition.
- Balagurusamy: Programming in JAVA.

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – III*

Paper–III: Software Engineering Methodology

Time: 3 Hrs.

Max. Marks: 50

Note:

- (i) **The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.**
- (ii) **The student can use only Non–programmable & Non–storage type calculator.**

Introduction to Software Engineering: Definition, Software characteristics, Software components, Software crisis, Software Applications, Software Engineering Paradigms, Software Development Life Cycle

[11 Hrs.]

Software Project Management: Introduction, Project planning, metrics for project size estimation, project estimation techniques, Cost estimation, COCOMO model, Project scheduling and milestones

[10 Hrs.]

Software Requirement Specification (SRS): Definition, Problem analysis, structuring information, Data flow diagram and data dictionary, structured analysis, Characteristics and component of (SRS), Metrics of SRS

[8 Hrs.]

Software Design and coding: Introduction, classification of design activities and design Methodologies, Cohesion and Coupling, Verification and validation, approaches to software design, introduction to various design approaches, Structured programming, Coding standards and guidelines.

[11 Hrs.]

Software Testing and metrics: Software Testing, levels of testing, Test case design, Design metrics, Coding metrics, Technical metrics, testing metrics.

[10 Hrs.]

Software maintenance: Definition need and types of Software maintenance

[5 Hrs.]

Trends in Software Engineering: Reverse Engineering, Re–engineering, CASE Tools

[5 Hrs.]

References:

1. Pressman : Software Engineering : A Practitioner’s Approach, 3rd Ed., TMH 2004
2. Flecher and Hunt : Software Engineering and CASE : Bridging and Culture G
3. An Integrated Approach to Software Engineering, Second Edition, Pankaj Jalote
4. Fundamentals of Software Engineering, Rajib Mall

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – III

Paper–IV: Environmental Studies–I
(Theory)

Time: 3 Hrs.

Max. Marks: 50

Theory Lectures: 1½ Hours/ Week

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying five marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks): It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying ten marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks): It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

1. **The Multidisciplinary Nature of Environmental Studies:** Definition, scope & its importance, Need for public awareness.
2. **Natural Resources:** Natural resources and associated problems. Role of an individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles.
 - a) **Forest Resources:** Use of over exploitation, deforestation, case studies. 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, dams-benefits and problems.
 - c) **Mineral Resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - d) **Food Resources:** World food problems, change caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, salinity, case studies.
 - e) **Energy Resources:** Growing of energy needs, renewable and non-renewable energy resources, use of alternate energy sources, case studies.
 - f) **Land Resources:** Land as a resource, land degradation, soil erosion and desertification.
3. **Ecosystem:**

Concept of an ecosystem, Structure and function of an ecosystem; Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.

Types, characteristic features, structure and function of - forest ecosystem, grassland ecosystem, desert ecosystem and aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

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4. Social Issues and Environment:

- From unsustainable to sustainable development
 - Water conservation, rain water harvesting, watershed management; Wasteland reclamation.
 - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents
 - Environmental Protection Act; Air (prevention and Control of Pollution) Act ; Water (prevention and Control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislation.
- * Road Safety Rules & Regulations: Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs
- * Accident & First Aid: First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance

5. National Service Scheme

- **Introduction and Basic Concepts of NSS:** History, philosophy, aims & objectives of NSS; Emblem, flag, motto, song, badge etc.; Organizational structure, roles and responsibilities of various NSS functionaries.
- **Health, Hygiene & Sanitation:** Definition, needs and scope of health education; Food and Nutrition; Safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan); National Health Programme; Reproductive health.

References/Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – III

Paper–V: Lab-I: SQL & PL/SQL

Time: 3 Hrs.

Max. Marks: 50

Practical Lab based on SQL and PL/SQL

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(Software Development) Semester – III

Paper–VI: Lab – II: Java Programming

Time: 3 Hrs.

Max. Marks: 50

Practical based on Programming in JAVA

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – III*

Paper–VII: Minor Project

Time: 3 Hrs.

Max. Marks: 150

Minor Project: Software Module based on Web Technology/Database/ Programming Language.

General Instructions:

1. The Software Module of the Minor Project shall be submitted to the College/Institute till 15th November.
2. The minor project shall be developed in groups, consisting of at most two students in a group.
3. The evaluation of the Minor Project (Software Module) shall be done by one external examiner appointed by the University and one internal examiner from College (as per other practical examination)

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Paper–I: Open Source Software

Time: 3 Hrs.

Max. Marks: 50

Note:

- (i) **The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.**
- (ii) **The student can use only Non–programmable & Non–storage type calculator.**

Open Source Software: Introduction to Open Source Software, Need of Open Source Software, Advantages of Open Source Software, Application of Open Source Software, Categories of Open Source Software and Specific Characteristics of OSS.

Organization and Management of OSS: OSS development Process, Taboos and norms in OSS development, The OSS development life cycle

Development of OSS: Methodology and languages used to develop open source products, Cross Platform code

Software and Intellectual Property Rights: Basic Principles of Copyright Law, Contracts, Patents, Licenses, Issues with copyrights and patents, Open Source Software Licensing

Open source operating systems: LINUX: Introduction, General Overview, Kernel Mode and user mode, Process, Advanced Concepts, Scheduling, Personalities, Cloning, Signals, Development with Linux.

Open Source Database: MYSQL: Introduction, Setting up account, starting, terminating and writing your own SQL programs, Record selection Technology, Working with strings, Date and Time, Sorting Query Results, Generating Summary, Working with metadata Using sequences, MYSQL and Web.

Books Recommended:

- Joseph Feller & Brian Fitzgerald, Understanding Open Source Software Development, Pearson Education Limited, 2002.
- Paul Kavanagh, Open Source Software: Implementation and Management, Elsevier Digital Press, 2004.
- Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications, 2003
- Steve Suchring, “MySQL Bible”, John Wiley, 2002
- Joseph Feller, Perspectives on Free and Open Source Software, MIT Press Books, 2005.
- Chris Dibona, Danese Cooper, Mark Stone, Open Sources 2.0, The Continuing Evolution, O’Reilly, 2006.

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – IV

Paper–II: Information Security

Time: 3 Hrs.

Max. Marks: 50

Note:

- (i) **The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.**
- (ii) **The student can use only Non–programmable & Non–storage type calculator.**

Introduction to Security: Meaning of Security, Attacks, Computer Crime, Methods of Defense
[6 Hrs.]

Encryption: Cryptography, Substitution Ciphers, Transpositions, Encryption Algorithms, Symmetric Encryption Data Encryption Standards (DES), Advanced Encryption Standards(AES), Public Key Encryption, Hash Functions, Key exchange, Digital Signatures.
[8 Hrs.]

Viruses and Malicious Code: Program security, Control against Program Threats
[6 Hrs.]

Operating Systems Security: Access Control, File Protection, User Authentication, Security Policies, Models of Security
[7 Hrs.]

Database Security: Security requirements, Reliability and Integrity, Protecting sensitive data, multilevel security
[7 Hrs.]

Security in Networks Threats, Attacks, Protocol Flaws, Impersonation, Spoofing, Denial of Service, Networks security control,
[8 Hrs.]

Security in Networks Firewalls, Intrusion Detection, Secure e–mail
[6 Hrs.]

Risk Analysis and Security Planning Security Policies, Physical Security
[6 Hrs.]

Legal and Ethical Issues: Protection of data and Information Laws, Employees rights, Software failure, Computer Crime, Privacy and Ethics
[6 Hrs.]

References:

1. The Basics of Information Security: Understanding the Fundamentals of InfoSec in Theory and Practice by Jason Andress Syngress; 1 edition (June 24, 2011)
2. Information Systems Security: Security Management, Metrics, Frameworks And Best Practices by Nina Godbole, Wiley India Pvt Ltd

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – IV

Paper–III: Operating System

Time: 3 Hrs.

Max. Marks: 50

Note:

- (i) **The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.**
- (ii) **The student can use only Non–programmable & Non–storage type calculator.**

Introduction: Definition, Early Systems, Simple Batch system, Multi programmed Batch. Time Sharing Systems, Personal Computer System, Parallel Systems, Distributed Systems, Real–time Systems.

[6 Hrs.]

Processes: Process concepts, Process Scheduling, threads.

[6 Hrs.]

CPU–Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, algorithm evaluation.

[8 Hrs.]

Process Synchronization: Background critical – section problem, semaphores, classical problem of synchronization.

[7 Hrs.]

Memory Management: Background, Logical v/s Physical address space, mapping, continuous allocation, paging, segmentation.

[8 Hrs.]

Virtual Memory: Background, demand paging, performance of demand paging, page replacement, page replacement algorithms, allocation of frames, thrashing.

[10 Hrs.]

Secondary Storage Structures: Disk structures, Disk scheduling, Disk Reliability.

[7 Hrs.]

Deadlocks: System Model, Deadlock characterization, methods for handing deadlocks, Deadlocks Prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock, combined approach to deadlock handling.

[8 Hrs.]

References:

1. “Operating System Concepts”, Fourth edition by Silberschatz Galvin Addison Wesley.
2. “Operating Systems: A Design Oriented Approach” by Crowley, Published by Tata McGraw Hill.
3. “Operating Systems” Second edition by Dietel, Addison Wesley.

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – IV*

**Paper–IV: Environmental Studies–II
(Theory)**

Time: 3 Hrs.

Max. Marks: 50

Theory Lectures: 1½ Hours/ Week

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying five marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks): It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying ten marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks): It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

1. Biodiversity and its Conservation:

Definition: Genetic, species and ecosystem diversity, Biogeographical classification of India.

Value of Biodiversity: Consumptive use; productive use, social, ethical, aesthetic and option values.

Biodiversity at global, National and local levels. India as mega-diversity nation; Hot-spots of biodiversity.

Threats to Biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts

Endangered and endemic species of India.

Conservation of Biodiversity: *In situ* and *Ex-situ* conservation of biodiversity.

2. Environmental Pollution: Definition, Causes, effects and control measures of - air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards.

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.

*Bachelor of Vocation (B.Voc.)
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3. Human Population and the Environment

1. Environment and human health
2. Population growth, variation among nations
3. Population explosion-Family welfare programme
4. HIV / AIDS
5. Value education
6. Women and child welfare

4. National Service Scheme

- **Entrepreneurship Development:** Definition & Meaning; Qualities of good entrepreneur; Steps/ ways in opening an enterprise; Role of financial and support service Institutions.
- **Civil/Self Defense:** Civil defense services, aims and objectives of civil defense; Needs for self defense training.

5. Drug Use and Abuse in Society:

- Concept and Overview, extent of the problem, drug use as a social problem, causes of drug uses-Biological, socio-cultural, psychological
- Types of Drugs and Identification of Abuse: Familiar drugs-tobacco, caffeine, over the counter drugs; Restricted drugs- opiates, hallucinogens, marijuana; Performance enhancing drugs; Uppers and downers- stimulants and depressants
- Impact of Drug Abuse: Individual level-biological and psychological, family, social and national.
- Management and Prevention of Drug Abuse: Medical and psychological; role of family, schools, media and legislation.

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – IV

References/Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.
11. Espejo, R. (2002). Drug Abuse, Greenhaven Press.
12. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – IV*

Paper-V: Lab I: Practical based on Android Development

Time: 3 Hrs.

Max. Marks: 100

Practical based on Application Development in Android

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – IV

Paper–VI: Lab – II: Open Source Software Tools

Time: 3 Hrs.

Max. Marks: 75

Practical based on Open Source Software Tools

Case Study of Open Source Software like PHP, PYTHON, PERL & Mozilla

Bachelor of Vocation (B.Voc.)
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Paper-VII

Lab – III: Practical based on ASP.Net using C#

Time: 3 Hrs.

Max. Marks: 75

Practical based on ASP.Net using C#

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – V*

Paper-I: Software Project Management and Business Solutions

Time: 3 Hrs.

Max. Marks: 50

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction to Software Project Management: Project Definition, Contract Management, Activities covered By Software Project Management, Overview of Project Planning, Stepwise Project Planning. **[6 Hrs.]**

Project Evaluation: Strategic Assessment, Technical Assessment, Cost Benefit Analysis, Cash Flow Forecasting, Cost Benefit Evaluation Techniques, Risk Evaluation. **[8 Hrs.]**

Activity Planning Objectives, Project Schedule, Sequencing and Scheduling Activities, Network Planning Models – Forward Pass , Backward Pass , Activity Float , Shortening Project Duration , Activity on Arrow Networks , Risk Management , Nature Of Risk , Types Of Risk , Managing Risk , Hazard Identification , Hazard Analysis , Risk Planning And Control. **[12 Hrs.]**

Monitoring and Control Creating Framework , Collecting The Data , Visualizing Progress , Cost Monitoring , Earned Value , Prioritizing Monitoring , Getting Project Back To Target , Change Control , Managing Contracts , Introduction , Types Of Contract , Stages In Contract Placement , Typical Terms Of A Contract , Contract Management , Acceptance. **[12 Hrs.]**

Managing People and Organizing Teams Introduction, Understanding Behavior, Organizational Behaviour: A Background, Selecting The Right Person For The Job, Instruction In The Best Methods, Motivation, The Oldham, Hackman Job Characteristics Model, Working In Groups, Becoming A Team, Decision Making, Leadership, Organizational Structures , Stress, Health And Safety, Case Studies. **[12 Hrs.]**

Business Solutions Information system in Global Business: How Businesses use Information system, ethical and Social Issues in IS, DSS: Enhancing Decision making, Business Intelligence tools, E-commerce: types, web based business, ERP, EDI **[10 Hrs.]**

Recommend Books

1. Bob Hughes, Mike Cotterell, “Software Project Management”, Third Edition, Tata McGraw Hill, 2004.
2. Ramesh, Gopaldaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
3. Royce, “Software Project Management”, Pearson Education, 1999.
4. Jalote, “Software Project Management in Practice”, Pearson Education, 2002.

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – V*

Paper-II: Software Re-engineering

Time: 3 Hrs.

Max. Marks: 50

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction to Software Re-engineering: Software Reengineering and its importance, goals of reengineering, Software reengineering process model, software reengineering tools and Business process reengineering: Business processes, A BPR Model. **[12 Hrs.]**

Legacy Software Structure: Legacy software structure and distribution: Layered distribution model, Legacy software distribution, Architectural problems. **[6 Hrs.]**

Reverse Engineering: Need of reverse engineering, Reverse engineering process, Reverse engineering to understand data, Reverse engineering user interfaces, Tools for reverse engineering. **[8 Hrs.]**

Restructuring: Code restructuring: Characteristics of unstructured code, Characteristics of structured code, Restructuring problems, Data restructuring (Data reengineering): Data reengineering process, Data problems, Approaches: Data cleanup, Data extension, Data migration, Need for Data migration, data migration process, Tools for restructuring. **[12 Hrs.]**

Refactoring: Introduction to refactoring, Principles of refactoring, Need for refactoring, Problems with refactoring, Refactoring and design, Refactoring and performance. Different refactoring techniques and their use, refactoring tools. **[9 Hrs.]**

Forward Engineering: Introduction to forward engineering, Goals of forward engineering, Forward engineering for client/server applications, Tools for forward engineering, forward engineering v/s reverse engineering **[7 Hrs.]**

Software Reuse: Software Reuse Success Factors, Reuse Driven Software Engineering in a Business, Use case Components, Object Components, Layered Architecture. **[6 Hrs.]**

RECOMMENDED BOOKS:

1. Software Engineering, Ian Sommerville, Addison-Wesley, 6th Edition.
2. Software Engineering, A Practitioner's Approach, Roger S. Pressman, 6th Edition.
3. Software Reuse: Architecture, Process and Organization for Business Success, Ivar Jacobson, Martin Griss, Patrik Jonsson, Pearson Education, 2000

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – V*

Paper-III: Software Testing & Quality Assurance

Time: 3 Hrs.

Max. Marks: 50

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction: Overview of Software Engineering, Software Process, Process Models, Overview of Project Management Process and its Phases.

[8 Hrs.]

Software Quality Assurance Concepts and Standards: Quality Concepts, Quality Control, Quality Assurance, SQA Activities, Software Reviews, Formal Technical Reviews, Review Guidelines, Software Reliability, Software Safety, Quality Assurance Standards, ISO 9000, ISO 9001:2000, ISO 9126 Quality Factors, CMM, TQM, Six Sigma, SPICE, Software Quality Assurance Metrics.

[13 Hrs.]

Software Testing and Techniques: Introduction and Testing Types, Verification and Validation, Test Strategies for Conventional and Object Oriented Software, Metrics for Testing, Debugging Process, Debugging Strategies, Different Testing Techniques: Black Box and White Box Testing, Basis Path Testing, Graph Matrices, Graph Based Testing Methods.

[12 Hrs.]

Object Oriented Testing Methods: Applicability of Conventional Test Case Design Methods, Issues in Object Oriented Testing, Fault-Based Testing, Scenario-Based Testing, Random Testing and Partition Testing for Classes, Interclass Test Case Design.

[10 Hrs.]

Testing Process and Specialized Systems Testing: Test Plan Development, Requirement Phase, Design Phase and Program Phase Testing, Testing Client/Server Systems, Testing Web based Systems, Testing Off the-Shelf Software, Testing in Multiplatform Environment, Testing for Real Time Systems, Testing Security.

[12 Hrs.]

References

Ian Sommerville, Software Engineering, Seventh Edition, Pearson Education.

R.S. Pressman, Software Engineering: A Practitioner's Approach, Sixth Edition, Tata McGraw-Hill.

William E. Perry, Effective Methods for Software Testing, Second Edition, John Wiley & Sons.

Paul C. Jorgensen, Software Testing: A Craftsman's Approach, Third Edition, Auerbach Publications, Taylor and Francis Group, 2010.

Yogesh Singh, Software Testing, Cambridge University Press.

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – V*

Paper-IV: Lab I: Soft Skills in IT

Time: 3 Hrs.

Max. Marks: 50

Verbal Communication: Public speaking, group discussion, presentation skills, interview skills, listening and observation skills.

Written communication: project proposals, Technical reports, grammar and vocabulary for effective technical writing, Technical resume

Personality Development: Personal grooming, Dressing for interviews, dressing for office, leadership, group dynamics and team building, conflict management, Critical Thinking, Reflective Thinking and Decision making, problem Solving Skills and Time management

Technical etiquettes: Etiquettes in office as well as social settings, email etiquettes, telephone etiquettes.

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*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – V*

Paper-V: Lab II: System and Network Administration

Time: 3 Hrs.

Max. Marks: 100

Lab based on System and Network Administration

*Bachelor of Vocation (B.Voc.)
(Software Development) Semester – V*

Paper-VI: Lab III: Software Testing (Case Tools)

Time: 3 Hrs.

Max. Marks: 100

Practical Based on Software Testing (Case Tools)

Bachelor of Vocation (B.Voc.)
(Software Development) Semester – VI

Paper-I: - Project Dissertation

M. Marks: 400

General Instructions:

Report based on Industrial Training and project shall be submitted to the College/Institute till April 30.

The evaluation of the work shall be done by the following panel of examiners prior to the theory examination:

- (a). Internal Examiner
- (b). Head/ Head Nominee of coordinating department of the college for this UGC scheme
- (c). External Examiner (to be appointed by the University)