

Assam University, Silchar



Four Year Undergraduate Programme

Implemented under NEP 2020

Effective from the Academic Year 2023-24

Syllabus of Bachelor of Vocation (B. Voc.) Information Technology

**Approved in the 95th meeting of the Academic Council and the 19th meeting of the
Standing Committee of the Academic Council on 13th December 2023 vide Resolution
No. SCAC:19:12-23:8**



**Head
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Programme Specific Outcome

On successful completion of the FYUG B.Voc. (Information Technology) Programme, students will be able to:

1. Acquire various skills in the field of Information Technology. This includes skills related to various office automation tools like MS Office, PowerPoint, MS Excel, etc., and their applications.
2. Gain knowledge about the fundamentals of computer systems and their working. Further students will be able to develop programming skills with programming languages C, JAVA, Python, etc. by actually designing programs in concerned laboratories.
3. Learn about digital electronics, computer networking, operating systems, and related areas both theoretically and with practice by performing rigorous experiments in the laboratories.
4. Design, develop, and implement data structures and algorithms for problem-solving in various domains by virtue of training in the laboratories.
5. Learn scripting and web development tools like PHP, JavaScript, etc., and apply these to design and develop real-world tools.
6. Equip themselves with the knowledge of financial accountancy and develop expertise in software like Tally.
7. Get exposure to the modern concepts of computing like Artificial Intelligence, Cyber Security, Animation, E-Commerce, and various Internet Technologies as part of this Programme.
8. Get training in soft skills, languages, and management through various allied courses.
9. Get industrial exposure in the field of information technology through an internship with industry.
10. Seek employment in various jobs in the Government sector as well as IT and related industries and perform various roles related to software development, testing, and maintenance.

Table 1: Semester wise list of B. Voc. (Information Technology) DSC Course

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-DSC-101	Fundamentals of Computer Systems	2	2-0-0
	BVIT-DSC-102	Office Tools and Applications	2	2-0-0
II	BVIT-DSC-151	Computer Network	2	2-0-0
	BVIT-DSC-152	(A) Introduction to Digital Electronics	2	2-0-0
		(B) Digital Electronics Laboratory	2	0-0-4
III	BVIT-DSC-201	Data Structure	4	4-0-0
	BVIT-DSC-202	Database Management System	3	3-0-0
IV	BVIT-DSC-251	Java Programming	3	3-0-0
	BVIT-DSC-252	Operating System	3	3-0-0
	BVIT-DSC-253	Operating System Laboratory	4	0-0-8
V	BVIT-DSC-301	Java Script	2	2-0-0
	BVIT-DSC-302	Graphic Design and Applications	2	2-0-0
	BVIT-DSC-303	(A) Java Script Laboratory	2	0-0-4
		(B) Graphic Design and Application Laboratory	2	0-0-4
VI	BVIT-DSC-351	Web Development with PHP	3	3-0-0
	BVIT-DSC-352	Introduction to Artificial Intelligence Frameworks	2	2-0-0
	BVIT-DSC-353	Internet Technologies	3	3-0-0
	BVIT-DSC-354	(A) Web Development with PHP Laboratory	4	0-0-8
		(B) Artificial Intelligence Tools Laboratory	4	0-0-8
VII	BVIT-DSC-401	(A) Digital Marketing	2	2-0-0
		(B) Digital Marketing Laboratory	3	0-0-6
	BVIT-DSC-402	(A) Animation and Visual Effects	2	2-0-0
		(B) Animation and Visual Effects Laboratory	3	0-0-6
	BVIT-DSC-403	Cyber Security	2	2-0-0
	BVIT-DSC-404	Mobile Application Development Laboratory	3	0-0-6
VIII	BVIT-DSC-451	Design and Analysis of Computer Algorithms	4	4-0-0

Table 2: Semester wise list of B. Voc. (Information Technology) DSM Course

Semester	Subject	Course Code	Title of The Course	Credits	L-T-P
I	BVOC-DSM-1	BVIT-DSM-101	(A) Programming Skills using C	2	2-0-0
			(B) Programming Skills using C Laboratory	3	0-0-6
II	BVOC-DSM-2	BVIT-DSM-151	Computer Network Laboratory	3	0-0-6
III	BVOC-DSM-1	BVIT-DSM-201	Database Management System Laboratory	4	0-0-8
IV	BVOC-DSM-1	BVIT-DSM-251	Java Programming Laboratory	4	0-0-8
	BVOC-DSM-2	BVIT-DSM-252	(A) E-Commerce	2	2-0-0
			(B) E-Commerce Laboratory	2	0-0-4
V	BVOC-DSM-1	BVIT-DSM-301	(A) Python Programming	2	2-0-0
			(B) Python Programming Laboratory	4	0-0-8
	BVOC-DSM-2	BVIT-DSM-302	(A) Financial Accounting and Tally	2	2-0-0
			(B) Financial Accounting and Tally Laboratory	2	0-0-4
VI	BVOC-DSM-2	BVIT-DSM-351	Internet Technologies Laboratory	4	0-0-8
VII	BVOC-DSM-1	BVIT-DSM-401	(A) Software Engineering	2	2-0-0
			(B) Software Engineering Laboratory	3	0-0-6
VIII	BVOC-DSM-2	BVIT-DSM-451	Multimedia	4	4-0-0

Table 3: Semester wise list of B. Voc. (Information Technology) SEC Course

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-SEC-101	Office Tools and Applications Laboratory	3	0-0-6
II	BVIT-SEC-151	OS Installation, Internet, hardware Assembling Laboratory	3	0-0-6
III	BVIT-SEC-201	Data Structure Laboratory	4	0-0-8
IV	-	-	-	
V		Internship with Industry/Community Engagement/Field Study	2	
VI	-	-	-	
VII	-	-	-	
VIII		Project	12	

Table 4: Semester wise list of B. Voc. (Information Technology) IDC Course (1st Year)

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-IDC-101	Fundamentals of Information Technology	3	3-0-0
II	BVIT-IDC-151	Introduction to Web Technology	3	3-0-0

* NOTE:

- Mathematics may be chosen as an IDC paper
- Evaluation method and marks distribution for combined paper i.e. Theory + Practical shall be as follows:

Theory: End Semester Examination - 35 Marks, Internal Test - 15 Marks

Practical: End Semester Examination - 35 Marks, Internal Test - 15 Marks
- For 2 credit paper, marks distribution shall be as follows:

End Semester Examination - 35 Marks, Internal Test - 15 Marks
- For papers of 35 and 50 marks, the end semester examination shall be of 2 hours duration.

Syllabi of B. Voc. (Information Technology) DSC Courses

Semester	: I
Course Type	: DSC
Course Code	: BVIT-DSC-101
Name of the Course	: Fundamentals of Computer Systems
Learning level	: Foundation or Introductory Course
Credits	: 2
Contact Hours	: 2 hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course

Objectives:

1. To understand basics of computer, computer software & hardware and working with OS.
2. To understand basics of computer languages and Internet
3. To apply computing in problem solving.

UNIT I

Computer Definition, Characteristics of Computers, Evolution of Computers & its applications, Types of Computers, Basic Organization of a Digital Computer, Computer design, Computer Architecture, Central Processing Unit, Input devices, Output devices,

UNIT II

Computer Memory and Storage: Primary Memory, Secondary Memory, auxiliary memory, RAM, ROM, Cache Memory, Floppy Disk, Hard Disk, SSD, Optical disk: CD, CD ROM, CD-R, CD-RW, DVD, DVD-ROM, Recordable DVD,

UNIT III

Hardware and Software: Definition, Difference between hardware and Software, Software types, uses of software, Custom-made Software, Shrink-wrapped software. Operating System: Basics of Operating System, Functions of Operating System.

UNIT IV

Computer Language: Definition, Types of Languages, Language Processors: Assembler, Interpreter, Compiler, Linker and Loader; Processing Data: Transforming data into information, Representation and processing of data in Computer, Factors affecting processing speed.

UNIT V

Algorithm and flowchart: Definition, Creation of Flowcharts and Algorithms of simple problems-Swapping contents of two variables, largest of three numbers, solving quadratic equations, Factorial of numbers, Divide and Conquer strategy.

Networking and Internet: Understanding basics of Networking and Internet, Need for Networking, Components of Networking, Major services of Internet, www, E-mail.

Text Books:

1. Pradeep K. Sinha and Priti Sinha, **Computer Fundamentals**, BPB Publication, 8th Edition, 2018.
2. V. Rajaraman, **Introduction to Information Technology**, PHI Learning; 3rd edition, 2018
3. Anita Goel, **Computer Fundamentals**, Pearson Education India; First Edition, 2010

Reference Books

1. David Riley and Kenny Hunt, **Computational Thinking for Modern Solver**, Chapman and Hall/CRC; 1st edition, 2014.
2. Glenn Brookshear, **Computer Science: An Overview**, Pearson Education; Twelfth edition, 2017.
3. Puneet Kumar, Sushil Bhardwaj, *et al.*, **Introduction to Information Technology**, Kalyani Publishers; 2018th edition, 2018.

Course outcomes: After successfully completing this course, a student will be able to:

1. Converse in basic computer terminology
2. Possess the knowledge of basic software and hardware peripherals
3. Know and use different number systems.

Semester	: I
Course Type	: DSC
Course Code	: BVIT-DSC-102
Name of the Course	: Office Tools and Applications
Learning level	: Foundation or Introductory Course
Credits	: 2
Contact Hours	: 2 hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives:

To enable the students to study MS Office and to enrich the practical knowledge in MS Office

UNIT I

Introduction to Word Processing, Word Processing Concept, Working with Word Document, Editing Text, Formatting: Text Formatting, Paragraph formatting, Shortcut keys, Header and footer, Find and Replace, Page Layout, Inserting Page Number and Bullet list, Insert Pictures, clip Arts, Working with shape, Inserting Equations and Symbols, Table: Creating, filling and formatting table, Mail Merge

UNIT II

Spreadsheet concepts, Managing worksheets; Formatting, Entering Data, Editing and Printing a worksheet; Spreadsheet addressing, Handling operators in formula, Data Manipulation: Entering data, Filling Continuous Rows and Columns, Highlighting Values, Find & Replace, Inserting rows, columns and sheets, Inserting Symbol, pictures, Data from external files, Organizing Charts and graphs, Formatting spreadsheet.

UNIT III

Setting Formula- Finding total in Row or column, Mathematical operation (Addition, Subtraction, Multiplication, Division and Exponentiation) Mathematical, Statistical, Logical, and Lookup functions: SUM, SUMIF, SUMIFS, AVERAGE, AVERAGEIF, AVERAGEIA, Day, DAYS, EXP, TRUE, FALSE, FACT, FLOOR, IF, IFERROR, LEN, LENB, MID, MIDB, ROUNDDOWN, ROUNDUP, SUBTOTAL, TRIM, TRUNC, VLOOKUP, Goal Seek features, Sorting, Filtering, validation, Consolidation.

UNIT IV

Creating and Working with database: Database Concept, Creating a New Database, creating Table, Modifying a Table, Form: Definition, uses of form, Creating form using Form Wizard, Query: Concept, Creating Query, Creating Query using AND and OR operators, Report: Concept, Creating report, Creating Mailing Labels using Label Wizard. Filtering and Sorting, Adjusting and rearranging Rows and Columns.

UNIT V

Basic of presentations: Opening new presentation, creating presentation, setting presentation styles, adding text to presentation, Formatting Presentation, Working with templates, Adding Graphics to Presentation: Insert Pictures, sounds, Movies, Tables, shapes into presentation, Adding effects to the presentation- setting Animation and Transition effect.

Text Books:

1. Sushila Madan, Introduction to Essential tools, Mayur Publications, 2012
2. Joan Lambert, Microsoft Office-2016 step by step, Microsoft Press, 2015

Reference Books

1. Curtis Frye (Author), Joan Lambert (Author), Microsoft Office Step by Step (Office 2021 and Microsoft 365), Pearson Education (US), 2022
2. Bittu Kumar, Mastering MS Office , V&S Publishers, 2017

Course outcomes: *After successful completion of this course, students will be able to*

1. *Perform documentation and presenting skills.*
2. *Proficient in using Windows, Word Processing Applications, Spreadsheet Applications,*
3. *Database Applications and Presentation Graphics Applications.*

Semester	: II
Course Type	: DSC
Course Code	: BVIT-DSC-151
Name of the Course	: Computer Network
Learning level	: Foundation or Introductory Course
Credits	: 2
Contact Hours	: 2 hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives:

1. *To build an understanding of the fundamental concepts of computer networking.*
2. *To familiarize the student with the basic taxonomy and terminology of the computer networking area.*
3. *To introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.*
4. *To independently understand basic computer network technology.*
5. *To identify the different types of network topologies and protocols.*
6. *Enumerate the layers of the OSI model and TCP/IP model*

UNIT- I

Data Communication Fundamentals and Techniques: Analog and digital signal; data-rate limits; digital to digital line encoding schemes; pulse code modulation, parallel and serial transmission; digital to analog modulation, transmission media
Introduction to Computer Network: Network definition, Network topology, network classification, Network protocol, OSI model, TCP/IP model

UNIT-II

Networks Switching Techniques and Access mechanisms: Circuit switching; packet switching- connectionless datagram switching, connection-oriented virtual circuit switching, dial-up modems; digital subscriber line; cable TV for data transfer.

UNIT- III

Data Link Layer Functions and Protocol: Error detection and error correction techniques; data-link control- framing and flow control- stop and wait, sliding window protocol, error control- hamming code, priority, checksum, cyclic redundancy check.

UNIT -IV

Multiple Access Protocol and Networks: Random Access -pure aloha, slotted aloha, CSMA; Ethernet LANs; connecting LAN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways;

UNIT -V

Networks Layer Functions and Protocols: Classful and classless IP addressing, Subnetting and supernetting, Routing; routing algorithms- link, state and distance vector; IPv4 protocol. Overview of Application layer protocol: DNS protocol; HTTP protocol; FTP.

Text Books:

1. B. A. Forouzan: Data Communications and Networking, Fourth edition, THM, 2007
2. A. S. Tanenbaum: Computer Networks, Fourth edition, PHI, 2007
3. Introduction to Computer Networks and Cyber Security: Chwan-Hwa (John) Wu, J. David Irwin. CRC Press

Reference Books

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson.
2. Understanding communications and Networks. 3rd Edition, W. A. Shay. Cengage Learning
3. Computer Networks, L. L. Peterson and B S Davic, 4th edition. ELSEVIER
4. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurosc. K. W Ross. 3rd Edition, Pearson Education

Course outcomes: *After successfully completing this course, a student will be able to:*

1. *Understand the concepts of Data Communication.*
2. *Study the functions of OSI Layers.*
3. *Familiarize with the Transmission Media, Flow Control and Error Detection & Correction.*
4. *Understand fundamental concepts in Routing, Addressing & working of Transport Protocols.*
5. *Gain familiarity with common networking & Application Protocols*

Semester	: II
Course Type	: DSC
Course Code	: BVIT-DSC-152 (A)
Name of the Course	: Introduction to Digital Electronics
Learning level	: Foundation or Introductory Course
Credits	: 2
Contact Hours	: 2 hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives:

1. *To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.*
2. *To prepare students to perform the analysis and design of various digital electronic circuits.*

UNIT I

Number System: Analog System, digital system, numbering system, binary number system, octal number system, hexadecimal number system, conversion from one number system to another, floating point numbers, Excess – 3 code, Gray code, Alphanumeric codes – ASCII Code, EBCDIC, Error detection and correction,

UNIT II

Binary Arithmetic: Binary addition, Binary subtraction, Negative number representation, Subtraction using 1's complement and 2's complement, Binary multiplication and division, Arithmetic in octal number system, Arithmetic in hexadecimal number system.

UNIT III

Boolean Algebra and Logic Gates: Introduction, Logic (AND OR NOT), Boolean theorems, Boolean Laws, De Morgan's Theorem, Reduction of Logic expression using Boolean Algebra, Deriving Boolean expression from given circuit, exclusive OR and Exclusive NOR gates, Universal Logic gates

UNIT IV

Minterm, Maxterm and Karnaugh Maps: Introduction, minterms and sum of minterm form, maxterm and Product of maxterm form, Reduction technique using Karnaugh maps –
2/3/4/5/6 variable K-maps, Grouping of variables in K-maps, K-maps for product of sum form, minimize Boolean expression using K-map.

UNIT V

Arithmetic Circuits: Introduction, Adder, BCD Adder, Excess – 3 Adder, Binary Subtractors, BCD Subtractor, Multiplexer, Demultiplexer

Sequential Circuits: Flip-Flop: Introduction, Terminologies used, S-R flip-flop, D flip-flop, JK flip-flop, Race-around condition, Master – slave JK flip-flop, T flip-flop, Application of flip-flops.

Text Books:

1. NG Palan, Digital Electronics and Logic Design 1st Edition, Technova, 1st Edition, 2017.
2. R. P. Jain, Kishor Sarawadekar, Modern Digital Electronics, Tata McGraw Hill, 5th Edition, 2022.

Reference Books:

1. A. K. Maini, Digital Electronics - Principles, Devices and Applications, John Wiley & Sons Inc, 1st Edition, 2007.
2. Leach, Malvino, Saha, Digital Principles and Applications, McGraw Hill Education, 8th Edition, 2014

Course Outcomes: *After successful completion of the course, the students will be able to*

1. *Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.*
2. *Understand and examine the structure of various number systems and its application in digital design.*
3. *Understand, analyze and design various arithmetic and sequential circuits.*

Semester	: II
Course Type	: DSC
Course Code	: BVIT-DSC-152 (B)
Name of the Course	: Digital Electronics Laboratory
Learning level	: Foundation or Introductory Course
Credits	: 2
Contact Hours	: 4 hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives:

1. *To familiarize students with logic gates and their ICs and universal gates*
2. *To provide the knowledge of different logic gates implementations*
3. *To prepare students to perform the analysis and design of various digital electronic circuits.*

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

Study of Logic gates and their ICs and universal gates:

- Study of AND, OR, NOT, XOR, XNOR, NAND and NOR gates
- Implement AND, OR, NOT, XOR, XNOR using NAND gates.
- Implement AND, OR, NOT, XOR, XNOR using NOR gates.

Implement the given Boolean expressions using minimum number of gates:

- Verifying De Morgan's laws.
- Implement given expressions using minimum number of gates.

Implement Adder and Subtractor Arithmetic circuits:

- Design and implement Half adder and Full adder.
- Design and implement BCD adder.
- Design and implement binary subtractor
- Design and implement BCD subtractor.

Implement Multiplexer and Demultiplexers:

- Design and implement 4:1 multiplexer.
- Design and implement 1:4 demultiplexer

Course Outcomes:

1. *Identify basic requirements for a design application and propose a cost effective solution.*
2. *Develop skill to build, and troubleshoot digital circuits*

Syllabi of B. Voc. (Information Technology) DSM Courses

Semester	: I
Course Type	: DSM
Course Code	: BVIT-DSM-101(A)
Name of the Course	: Programming Skills using C
Learning level	: Foundation or Introductory Course
Credits	: 2
Contact Hours	: 2 hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objective:

1. *To introduce the concepts of programming and programming language C.*
2. *To explain the concepts of functions and programme structure in C*
3. *To explain how to write and implement C programs*
4. *To explain the concept and working of pointers and files in C*

UNIT I

Introduction to C programming – Overview of Procedural Programming Language, History of C, Data Types, Expressions, Operations – input, output; Identifiers and keywords, Defining and initializing variables, scope of variables, Writing simple C programs; Control structures (WHILE, DO-WHILE, FOR, IF-ELSE, SWITCH, BREAK, CONTINUE, GOTO STATEMENTS, nested loops etc.) and writing programs using control structures;

UNIT II

Arrays: Declaring and defining an Array, Accessing elements in an Array, Manipulating array elements using loops, Two Dimensional Arrays: Defining, Declaring and Initializing two dimensional Array; Introduction to Multi-dimensional arrays

UNIT III

Functions – Defining and accessing functions in C, passing arguments to a function, Call by Value, Call by reference, specifying argument data types – Illustration with example programs and problem solving through programs; Function prototypes, Recursion in C – writing recursive programs.

UNIT IV

Structures and Unions – Basics of structures, processing of structures, user defined data types (typedef), Structures and functions – passing structures to a function, Self-referential structures, Table lookup, UNIONS. Writing programs and problem solving with structure and union

UNIT V

Input and output – Standard input and output, Formatted output – printf, Variable length argument, Formatted input - scanf; Data files – opening and closing data file, creating a data file, processing a data file, file access, The C pre-processor, Use of header files,

Text Books:

1. Brian W. Kernighan and Denis M. Ritchie, **The C Programming Language**, Pearson Education India; 2nd edition, 2015.
2. Byron S Gottfried, **Programming with C**, McGraw Hill Education; 4th Edition, 2018.
3. E Balagurusamy, **Programming in ANSI C**, McGraw Hill Education; Eighth edition, 2019

4. V. Rajaraman, **Computer Programming in C**, PHI Learning Private Limited; Second edition, 2019

Reference Books:

1. Yashavant P. Kanetkar, **Let Us C**, BPB; 16th edition, 2017.
2. Kamthane, **Programming in C**, Pearson Education India; 3rd edition, 2015.

Course Outcome: *After successful completion of the course, the students will be able to*

1. *Learn the concepts of Programming in C*
2. *Learn thoroughly the building blocks of C programming language*
3. *Write and implement C programs and solve problems through programming*
4. *Learn the Concept of pointers and files in C & Programming with C.*
5. *Design and implement programs using pointers and files in C.*

Semester	: I
Course Type	: DSM
Course Code	: BVIT-DSM-101(B)
Name of the Course	: Programming Skills using C Laboratory
Learning level	: Foundation or Introductory Course
Credits	: 3
Contact Hours	: 6 hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives:

1. *To explain design and implementation of C programs*
2. *To explain writing and executing programs with control structures and functions*
3. *To explain writing and executing programs with pointers in C*
4. *To explain writing and executing programs with structures and unions*
5. *To explain writing and executing programs with files in C*

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

List of laboratory programming assignments (not limited to these)

1. WAP to print the sum and product of an integer digits.
2. WAP to reverse a number
3. WAP to compute the sum of the first n terms of the following series
$$S = 1 + 1/2 + 1/3 + 1/4 + \dots$$
4. WAP to compute the sum of the first n terms of the following series

$$S = 1 - 2 + 3 - 4 + 5 \dots$$

5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
6. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
7. WAP to compute the factors of a given number.
8. WAP to print a triangle of stars as follows (take number of lines from user):

```

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

9. WAP to perform following actions on an array entered by the user:
 - i. Print the even-valued elements
 - ii. Print the odd-valued elements
 - iii. Calculate and print the sum and average of the elements of array
 - iv. Print the maximum and minimum element of array
 - v. Remove the duplicates from the array
 - vi. Print the array in reverse order

The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

10. Write a program that swaps two numbers using pointers.
11. WAP to Create a File & Store Information
12. WAP to Illustrate Reading of Data from a File
13. WAP to read name and marks of n number of students from user and store them in a file.
14. WAP to read name and marks of n number of students from user and store them in a file. If the file previously exists, add the information of n students.

Course outcomes: After successful completion of the course, the students will be able to

1. Students should develop a strong foundation in C programming language, including syntax, data types, control structures, functions, and file handling.
2. Students should be able to analyze problems, design algorithms, and implement efficient solutions using C programming.
3. Students should develop skills in identifying and resolving errors in C code. They should be proficient in using debugging tools and techniques to identify and fix issues, ensuring the correctness and reliability of their programs.

Semester	: II
Course Type	: DSM
Course Code	: BVIT-DSM-151
Name of the Course	: Computer Network Laboratory
Learning level	: Foundation or Introductory Course
Credits	: 3
Contact Hours	: 6 hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives:

- 1. Help students apply the theoretical concepts of Computer networking in a practical setting.*
- 2. Enhancing students' programming skills by providing practical programming exercises.*
- 3. It should encourage students to write code, debug, and test their implementations of algorithms.*
- 4. Enhancing students' skills by providing practical knowledge of routing configuration.*

This paper provides practical knowledge of Computer Networking. List of laboratory programming assignments (not limited to these):

1. Write a program to implement Redundancy Check (CRC) error detection algorithm for noisy channel.
2. Write a program to implement stop and wait protocol for noisy channel.
3. Write a program to implement go back n sliding window protocol.
4. Write a program to implement distance vector routing algorithm
5. WAP to find the address of the local machine
6. WAP A program that prints the address of www.youtube.com
7. WAP A program that prints all the addresses of www.youtube.com
8. Write a program to testing the characteristics of an IP address i.e. you have to check whether given address is AnyLocalAddress, LoopbackAddress, LinkLocalAddress, SiteLocalAddress or MulticastAddress.
9. Write a program to enter the IP address of any node and check whether a particular node is reachable from the current host.
10. IP Routing: RIP, Static, OSPF, EIGRP Configuration

Course outcomes: *After successful completion of the course, the students will be able to*

- 1. Students should be able to demonstrate a solid understanding of mechanisms used in Computer Networking.*
- 2. They should be able to explain the Error detection algorithms, Stop & Wait protocol, go back n sliding window protocol.*
- 3. They should be able to test the characteristics of an IP address*
- 4. Students should be able to perform the different routing configuration*

Syllabi of B. Voc (Information Technology) SEC Courses

Semester	: I
Course Type	: SEC
Course Code	: BVIT-SEC-101
Name of the Course	: Office Tools and Applications Laboratory
Learning level	: Foundation or Introductory Course
Credits	: 3
Contact Hours	: 6 hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives:

- 1. To trains students how to use MS Word application in office work such as creating professional-quality documents; store, organize and analyze information;*
- 2. To provide practical knowledge of use of Arithmetic operations and functions in Excel;*
- 3. To provide the concept of creating dynamic slide presentations with animation, narration, images, and much more, digitally and effectively.*
- 4. To provide the database concept with respect to MS-Access*

This paper provides practical knowledge of MS-Word, MS-Excel, MS-Access and MS-Power Point. List of laboratory programming assignments (not limited to these):

1. Create a telephone directory.
 - The heading should be 16-point Arial Font in bold
 - The rest of the document should use 10-point font size
 - Other headings should use 10-point Courier Now Font
 - The footer should show the page number as well as the date last updated.
2. Design a time-table form for your college.
 - The first line should mention the name of the college in 16-point Arial Fort and should be bold

- The second line should give the course name/teacher's name and the department in 14-point Arial.
 - Leave a gap of 12-points.
 - The rest of the document should use 10-point Times Now Roman font,
 - The footer should contain your specifications as the designer and date of creation.
3. Create the following one page documents.
 - a) Compose a note inviting friends to a get-together at your house, including a list of things to bring with them.
 - b) Design a certificate in landscape orientation with a border around the document.
 4. Create the following document: A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
 5. Convert following text to a table, using comma as delimiter

Color, Style, Item

Blue, A980, Van

Red, X023, Car

Green, YL724, Truck

Name, Age, Sex

Bob, 23, M

Linda, 46, F

Tom, 29, M

6. Create a student worksheet containing roll numbers, names and total marks. Open a document in Word and insert the excel worksheet using –
 - i. Copy/Paste
 - ii. Embedding
 - iii. Linking
7. The term wise marks for APS class of 20 students are stored in 3 separate sheets named term1, term2 and term3. Create At worksheet that contains student names and their total and average marks for the entire year. Give proper headings using headers. Make the column headings bold and italic. The 4th worksheet should contain college name as the first line. Make it bold, italic and center it.

8. Consider the following employee worksheet –

Full Name	Grade (I/II/III)	Basic Salary	HRA	PF	Gross	Net	Vehicle Allowance

HRA is calculated as follows

Grade	HRA (% of Basic
1	40
2	35
3	30

Gross Basic+HRA +VA

Net= Gross -PF

PF is 8% for all grades

VA is 15000, 10,000 and 7000 for Grade-I, II and III

- Find max, min and average salary of employees in respective Grade
 - Count no. of people where VA>HRA
 - Find out most frequently occurring grade
 - Extract records where employee name starts with "A " has HRA> 10000
 - Print Grade wise report of all employees with subtotals of net salary and also grand totals.
 - Extract records where Grade is 1 or 2 and salary is between 10000 and 20000 both inclusive.
9. In a meeting of a marketing department of an organization it has been decided that price of selling an item is fixed at Rs40. It was resolved to increase the sale of more of more items and getting the profit of Rs40,000/ Use Goal Seek to find out how many items you will have to sell to meet your profit figure.
10. To study the variation in volume with pressure for a sample of an air at constant temperature by plotting a graph for P - V and P-P/V. Sample observations are:-

Pressure (P)	Volume (V)	PV	P/V
75	20		
78.9	19		
83.3	18		
88.2	17		

11. Plot the charts for marks obtained by students (out of 50) vs frequency (total number of students in the class is 50)
12. Create the following worksheet containing year wise sale figure of five salesmen in Rs.

Salesmen	2015	2016	2017	2018
Mohan	10000	15000	18000	24000
Mitra	12000	17000	14000	20000
Shika	8000	14000	17000	15000
Rohit	13000	17000	13500	16000

Mangla	19000	21000	13000	17000
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- Calculate maximum and minimum sales made by each salesmen
- Calculate maximum and minimum sales made in each year
- Draw a bar graph representing the sales made by each person
- Draw a pie graph representing the sale made by salesmen in year 2015.

13. Consider the following worksheet for APS 1st year students:

Sn	Name	PH	CY	BY	MT	CS	Total marks	%	Grade

Grade is calculated as follows:

- If % $\geq$ 90, Grade A
 - If % $\geq$ 80 & <90, Grade B
 - If % $\geq$ 70 & <80, Grade C
 - If % $\geq$ 60 & <70, Grade D
 - Otherwise student will declare fail
- Calculate the grade using IF function
 - Sort data according to total marks
 - Apply filter to display the marks of the students having more than 65% marks
 - Enter SN of a student and find out the Grade of the student using VLOOKUP
 - Extract all records where name Begins with A, Contains A and Ends with A.

14. Import a table from excel into Word

15. Import a graph or chart from excel into word

16. Perform the following in MS-Access

- Create a database in MS Access to store the student information with the required fields using Access.
- Design a form using form wizard in MS Access to view, add, delete and modify the student record in the database.

17. Design a query in MS access to retrieve the student information whose address is located in Silchar.

18. Design a Report in MS access to retrieve the student information whose address is located in Silchar.

19. Create five Power Point slides to give advantage/ disadvantages of computer, application of computers and logical structure of computer.

20. Create five Power point slides. Each slide should support different format. In these slides explain areas of applications of IT. Make slide transition time as 10 Seconds.

Course Outcomes: *After successful completion of the course, the students will be able to*

1. *Create professional-quality documents and store, organize & analyze information;*
2. *perform Arithmetic operations and use various mathematical and statistical functions in Excel;*
3. *Create dynamic slide presentations with animation, Transition effectively.*
4. *Perform database related operations in MS-Access*

Semester	: II
Course Type	: SEC
Course Code	: BVIT-SEC-151
Name of the Course	: OS Installation, Internet, hardware Assembling Laboratory
Learning level	: Foundation or Introductory Course
Credits	: 3
Contact Hours	: 6 hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives:

1. *Familiarize the students with OS installation concept, Component and terminology of OS*
2. *Introduce the concept of Internet including its impact on Communication, collaboration and Information sharing*
3. *Provide an understanding of computer Hardware and its functions, OS installation.*
4. *Provide an understanding of web browser, G-mail, cookies, firewall settings.*

This paper provides practical knowledge of OS installation, Internet, Hardware Assembling. List of laboratory programming assignments (not limited to these):

1. Demonstration of IBM compatible PC, motherboard and peripherals.
2. Demonstration of installation of one or more operating systems(Windows/Linux)
3. Interfacing of peripheral devices with respective OS.
4. System and Application Software maintenance
5. Web browsers, surfing the web, bookmarks, history, cookies, search toolbars, pop up blockers, browser settings.

6. Stages of creation of e-mail in G-mail, send and receive e-mails, searching of mails in the inbox, Introduction to outlook, attaching documents and signature to e-mails, creation of folders.
7. Firewall settings
8. Installation of Antivirus software and their applications.

Course Outcomes: *After successful completion of the course, the students will be able to:*

1. *Students should be able to demonstrate a OS installation and its configuration with different Hardware and Software.*
2. *Students should be able to solve the different OS installation problems.*
3. *Learn the concept of web browser, g-mail, Firewall setting*
4. *Students should be able to installation of different software such as Antivirus software.*

Syllabi of B. Voc (Information Technology) IDC Courses

Semester	: I
Course Type	: IDC
Course Code	: BVIT-IDC-101
Name of the Course	: Fundamentals of Information Technology
Learning level	: Foundation or Introductory Course
Credits	: 3
Contact Hours	: 3 hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives:

1. *Familiarize students with the fundamental concepts, components, and terminology of information technology.*
2. *Provide an understanding of computer hardware, software, and operating systems, including their functions and interrelationships.*
3. *Teach students how to organize, store, retrieve, and protect data and information effectively using IT tools and techniques.*
4. *Explore commonly used software applications and their practical applications, such as word processing, spreadsheets, databases, and presentation tools.*
5. *Introduce the concepts of computer networks, network protocols, and the Internet, including their impact on communication, collaboration, and information sharing.*

Unit-I

Introduction to Computer: Computer Definition, Characteristics of Computers, Evolution of Computers & its applications, IT tools and their applications, Types of Computers, Basic Organization of a Digital Computer, 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-II

Number System: Representation of numbers and characters in computers. Binary, Hexadecimal, Octal, BCD, ASCII, EBCDIC and Gray codes, Conversion of bases.

Operating System: Basics of Operating System, Functions of Operating System, Types of Operating System, Overview of Windows and Linux Operating system and its User Interface and differences

Programming Language Tools: Assembler, Compiler, Interpreter, Linker and Loader. Definition and concepts of algorithm and its different implementations - pseudo code, flowchart and Computer programs

Unit-III

IT Tools overview: Word Processing Basics, features of word processor, clipboard, font, page and paragraph formatting, table creation, page setup and spelling and grammar. Spreadsheet concept, Elements of Spreadsheet, Creating of Spreadsheet, cell address, formula bar, autofill, formulas and chart. Creation of Presentation, Creating a Presentation Using a Template, Creating a Blank Presentation, Inserting & Editing Text on Slides, Slide transition and Animation.

Unit-IV

Introduction to Internet and WWW: Basic of Computer Networks, Local Area Network (LAN), Metropolitan area Network (MAN), Wide Area Network (WAN), Network Topology, Internet, Concept of Internet & WWW, Applications of Internet, Website Address and URL, Introduction to IP Address, ISP and Role of ISP, Internet Protocol, Modes of Connecting Internet (HotSpot, Wifi, LAN Cable, BroadBand, USB Tethering), Exploring the Internet, Surfing the web, Popular Search Engines, Searching on Internet, Downloading Web Pages, Printing Web Pages

Unit-V

Overview of IT Enabled Services: Structure of E-mail, Using E-mails, Opening, Creating and Sending, forwarding and Replying to an E-mail message, Social Networking & e-Commerce, Facebook, Twitter, LinkedIn, Instagram, Instant Messaging, Introduction to Blogs, Basics of E-commerce, Netiquettes, Overview of e-Governance Services, e-Governance Services on Mobile, Digital Locker. Digital Financial Tools, Understanding OTP and QR Code, UPI, AEPS, USSD, Card [Credit / Debit], eWallet, PoS, Internet Banking, NEFT, RTGS, IMPS, Online Bill Payment

Text Books:

1. Pradeep K. Sinha and Priti Sinha, **Computer Fundamentals**, BPB Publication, 8th Edition, 2018.
2. V. Rajaraman, **Introduction to Information Technology**, PHI Learning; 3rd edition, 2018

3. Anita Goel, **Computer Fundamentals**, Pearson Education India; First Edition, 2010

Reference Books:

1. David Riley and Kenny Hunt, **Computational Thinking for Modern Solver**, Chapman and Hall/CRC; 1st edition, 2014.
2. Glenn Brookshear, **Computer Science: An Overview**, Pearson Education; Twelfth edition, 2017.
3. Puneet Kumar, SushilBhardwaj, *et al.*, **Introduction to Information Technology**, Kalyani Publishers; 2018th edition, 2018

Course Outcomes: *After successful completion of the course, the students will be able to:*

1. *Acquire a comprehensive understanding of the fundamental concepts, principles, and components of information technology.*
2. *Develop basic computer literacy skills, including proficiency in using operating systems, software applications, and file management*
3. *Demonstrate the ability to effectively organize, store, retrieve, and manage data using appropriate IT tools and techniques.*
4. *Gain practical skills in using commonly used software applications, such as word processing, spreadsheets, databases, and presentation tool as well as Stay updated on current and emerging trends in information technology, and understand their potential impact on various industries and society as a whole.*

Semester	: II
Course Type	: IDC
Course Code	: BVIT-IDC-151
Name of the Course	: Introduction to Web Technology
Learning level	: Foundation or Introductory Course
Credits	: 3
Contact Hours	: 3 hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives:

1. *Familiarize students with the fundamental concepts, components, and terminology of Web technology.*
2. *To explain the Fundamentals of HTML.*
3. *To explain the basic components of CSS.*
4. *Introduce the concepts of HTML Forms.*

Unit-I

Introduction to Internet and World Wide Web: Evolution and History of World Wide Web, Basic elements of the Internet, Internet Services, Web Browsers, Web Site,

Web Servers, Domain Name Servers (DNS), Hypertext Transfer Protocol, URLs, Searching and Web-Casting Techniques, Search Engines and Search Tools

Unit-II

Web Publishing: Hosting your site, Internet Service provider, Web terminologies, Phases of Planning and Designing your Web Site, Steps for developing your web site, choosing the Contents, Home Page, Domain names, Front page views, Adding picture, Links, Backgrounds, Relating Front page to DHTML

Unit-III

Web Development: Introduction to HTML, Basics of HTML Document Features, Anatomy of an HTML Tag, working with Text: Text styles, Text Structuring, Text Colors and Formatting Text, Background, Page Layouts

Unit-IV

List, Images and Forms: Working with Ordered and Unordered List, Tables and Frames, Hyperlinks, Images and Multimedia, Forms and Controls

Unit-V

Cascading Style Sheets: Introduction to Cascading Style Sheets (CSS), basis Syntax and Structure, CSS selectors, Ways of specifying style, CSS properties, CSS styling: Background, Text, Font, List, Tables and Links

Text Books:

1. Matthew MacDonald, **HTML5 The Missing Manual**, O'Reilly Media; 2011.
2. Thomas A. Powell, **Web Design: The Complete Reference**, Tata McGraw Hill; 5th Edition, 2000.
3. Raj Kamal, **Internet and Web Technologies**, McGraw Hill Education, 2017.
4. Ramesh Bangia, **Multimedia and Web Technology**, Laxmi Publications; 1st edition, 2007.

Reference Books:

1. Ivan Bayros, **Web Enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP**, BPB Publication; 4th revised edition, 2005.
2. Richard York: **Beginning CSS Cascading Style sheets for Web Design**, Wrox Press (Wiley Publishing); 2005.
3. Julie C. Meloni, **HTML, CSS and JavaScript All in one**, Pearson Education; Third Edition, 2020.

Course Outcomes: *After successful completion of the course, the students will be able to:*

1. *Apply the basics of Web Designing and Publishing.*
2. *Apply the HTML Tags and be able to create HTML static web pages*
3. *Able to style a Web page using CSS.*

Assam University, Silchar



Four Year Undergraduate Programme

Implemented under NEP 2020

Effective from the Academic Year 2023-24

Syllabus of Bachelor of Vocation (B. Voc.) Information Technology (2nd Year)

**Approved in the 96th meeting of the Academic Council on 12th April 2024
vide Resolution No. AC:96:04-24:5**

Programme Specific Outcome

On successful completion of the FYUG B.Voc. (Information Technology) Programme, students will be able to:

1. Acquire various skills in the field of Information Technology. This includes skills related to various office automation tools like MS Office, PowerPoint, MS Excel, etc., and their applications.
2. Gain knowledge about the fundamentals of computer systems and their working. Further students will be able to develop programming skills with programming languages C, JAVA, Python, etc. by actually designing programs in concerned laboratories.
3. Learn about digital electronics, computer networking, operating systems, and related areas both theoretically and with practice by performing rigorous experiments in the laboratories.
4. Design, develop, and implement data structures and algorithms for problem-solving in various domains by virtue of training in the laboratories.
5. Learn scripting and web development tools like PHP, JavaScript, etc., and apply these to design and develop real-world tools.
6. Equip themselves with the knowledge of financial accountancy and develop expertise in software like Tally.
7. Get exposure to the modern concepts of computing like Artificial Intelligence, Cyber Security, Animation, E-Commerce, and various Internet Technologies as part of this Programme.
8. Get training in soft skills, languages, and management through various allied courses.
9. Get industrial exposure in the field of information technology through an internship with industry.
10. Seek employment in various jobs in the Government sector as well as IT and related industries and perform various roles related to software development, testing, and maintenance.

Table 1: Semester wise list of B. Voc. (Information Technology) DSC Course

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-DSC-101	Fundamentals of Computer Systems	2	2-0-0
	BVIT-DSC-102	Office Tools and Applications	2	2-0-0
II	BVIT-DSC-151	Computer Network	2	2-0-0
	BVIT-DSC-152	(A) Introduction to Digital Electronics	2	2-0-0
		(B) Digital Electronics Laboratory	2	0-0-4
III	BVIT-DSC-201	Data Structure	4	4-0-0
	BVIT-DSC-202	Database Management System	3	3-0-0
IV	BVIT-DSC-251	Java Programming	3	3-0-0
	BVIT-DSC-252	Operating System	3	3-0-0
	BVIT-DSC-253	Operating System Laboratory	4	0-0-8
V	BVIT-DSC-301	Java Script	2	2-0-0
	BVIT-DSC-302	Graphic Design and Applications	2	2-0-0
	BVIT-DSC-303	(A) Java Script Laboratory	2	0-0-4
		(B) Graphic Design and Application Laboratory	2	0-0-4
VI	BVIT-DSC-351	Web Development with PHP	3	3-0-0
	BVIT-DSC-352	Introduction to Artificial Intelligence Frameworks	2	2-0-0
	BVIT-DSC-353	Internet Technologies	3	3-0-0
	BVIT-DSC-354	(A) Web Development with PHP Laboratory	4	0-0-8
		(B) Artificial Intelligence Tools Laboratory	4	0-0-8
VII	BVIT-DSC-401	(A) Digital Marketing	2	2-0-0
		(B) Digital Marketing Laboratory	3	0-0-6
	BVIT-DSC-402	(A) Animation and Visual Effects	2	2-0-0
		(B) Animation and Visual Effects Laboratory	3	0-0-6
	BVIT-DSC-403	Cyber Security	2	2-0-0
	BVIT-DSC-404	Mobile Application Development Laboratory	3	0-0-6
VIII	BVIT-DSC-451	Design and Analysis of Computer Algorithms	4	4-0-0

Table 2: Semester wise list of B. Voc. (Information Technology) DSM Course

Semester	Subject	Course Code	Title of The Course	Credits	L-T-P
I	BVOC-DSM-1	BVIT-DSM-101	(A) Programming Skills using C	2	2-0-0
			(B) Programming Skills using C Laboratory	3	0-0-6
II	BVOC-DSM-2	BVIT-DSM-151	Computer Network Laboratory	3	0-0-6
III	BVOC-DSM-1	BVIT-DSM-201	Database Management System Laboratory	4	0-0-8
IV	BVOC-DSM-1	BVIT-DSM-251	Java Programming Laboratory	4	0-0-8
	BVOC-DSM-2	BVIT-DSM-252	(A) E-Commerce	2	2-0-0
			(B) E-Commerce Laboratory	2	0-0-4
V	BVOC-DSM-1	BVIT-DSM-301	(A) Python Programming	2	2-0-0
			(B) Python Programming Laboratory	4	0-0-8
	BVOC-DSM-2	BVIT-DSM-302	(A) Financial Accounting and Tally	2	2-0-0
			(B) Financial Accounting and Tally Laboratory	2	0-0-4
VI	BVOC-DSM-2	BVIT-DSM-351	Internet Technologies Laboratory	4	0-0-8
VII	BVOC-DSM-1	BVIT-DSM-401	(A) Software Engineering	2	2-0-0
			(B) Software Engineering Laboratory	3	0-0-6
VIII	BVOC-DSM-2	BVIT-DSM-451	Multimedia	4	4-0-0

Table 3: Semester wise list of B. Voc. (Information Technology) SEC Course

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-SEC-101	Office Tools and Applications Laboratory	3	0-0-6
II	BVIT-SEC-151	OS Installation, Internet, hardware Assembling Laboratory	3	0-0-6
III	BVIT-SEC-201	Data Structure Laboratory	4	0-0-8
IV	-	-	-	
V		Internship with Industry/Community Engagement/Field Study	2	
VI	-	-	-	
VII	-	-	-	
VIII		Project	12	

Table 4: Semester wise list of B. Voc. (Information Technology) IDC Course (1st Year)

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-IDC-101	Fundamentals of Information Technology	3	3-0-0
II	BVIT-IDC-151	Introduction to Web Technology	3	3-0-0
III	BVIT-IDC-201	Cyber Security	3	3-0-0

* NOTE:

- Mathematics may be chosen as an IDC paper
- Evaluation method and marks distribution for combined paper i.e. Theory + Practical shall be as follows:

Theory: End Semester Examination - 35 Marks, Internal Test - 15 Marks Practical:
End Semester Examination - 35 Marks, Internal Test - 15 Marks
- For 2 credit paper, marks distribution shall be as follows:

End Semester Examination - 35 Marks, Internal Test - 15 Marks
- For papers of 35 and 50 marks, the end semester examination shall be of 2 hours duration.

Syllabus of B. Voc. (Information Technology) DSC Courses

Semester	: III
Course Type	: DSC
Course Code	: BVIT-DSC-201
Name of the Course	: Data Structure
Learning level	: Intermediate-level course
Credits	: 4
Contact Hours	: 4 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: The course objective is to

- 1. Introduce the basic concepts and principles of data structures, including their definition, properties, and characteristics.*
- 2. Familiarize students with the implementation of various data structures using programming languages, including arrays, linked lists, stacks, queues, trees, graphs, and hash tables.*
- 3. How to analyze the time and space complexity of different data structures and algorithms, enabling them to make informed decisions regarding their selection and usage.*
- 4. Cover various searching and sorting algorithms, including linear search, binary search, bubble sort, insertion sort, selection sort, merge sort, quicksort, and their analysis.*
- 5. Cover the concepts of hashing, hash functions, collision resolution techniques, and the implementation and applications of hash tables.*

UNIT I

Introduction – Data and Information, Program Structures, Abstract Data Type, Static and Dynamic Data Structures. **Arrays:** Single and Multidimensional arrays, Representation of array in memory, address calculations, sparse arrays. **Recursion:** Developing Recursive Definition of Simple Problems and their implementation; Advantages and Limitations of Recursion.

UNIT II

Stacks: Operation and Implementation of stack; Application of stack; Limitations of Array representation of stack; Prefix, Infix and Postfix expressions, conversion of these expressions from one to another. **Queues:** Operation and Implementation of queue; Application of queue; Types of Queues: Priority Queue, Circular queue. **Linked List:** Introduction; Types of Linked list-Linked lists, circular lists, doubly linked lists; implementation of stack and queue using linked list.

UNIT III

Trees: Introduction to Tree Structures; - Binary trees (Insertion, deletion and Traversal), threaded binary trees (Insertion, deletion and Traversal); Preorder, Inorder and Postorder tree traversal; binary search trees; AVL search trees, B-trees.

UNIT IV

Searching and Sorting: Linear and Binary Search, and Comparison of Linear and Binary Search;
Sorting – Insertion Sort, Selection Sort, Bubble Sort, Merge Sort, Quick Sort, Heap Sort; and comparison of Sorting Techniques.

UNIT V

Hashing: Introduction to Hashing; Hash Table, Hash Key, Hash Function, Characteristics of Good Hash Functions, Types of Hash Functions, Collision, Resolving Collision by Open Addressing & closed Addressing: Linear probing, Quadratic probing

Graph: Introduction to Graph- Adjacency Matrix and List, Graph Search Algorithms-DFS, BFS,

Course Learning Outcomes: After successful completion of the course, the students will be able to:

- 1. Demonstrate a solid understanding of various data structures, including arrays, linked lists, stacks, queues, trees and hash tables.*
- 2. Develop proficiency in implementing data structures using programming languages, including creating and manipulating data structures through appropriate algorithms.*
- 3. Apply analytical skills to analyze the time and space complexity of algorithms associated with different data structures, allowing for informed decision-making in algorithm selection.*
- 4. Enhance critical thinking skills and problem analysis abilities by identifying the appropriate data structures and algorithms to solve given problems efficiently.*

Text Books:

1. Seymour Lipschutz, **Data Structures**, Schaum's Outline Series, TMH, 4th Edition, 2019.
2. Adam Drozdek, **Data Structures and Algorithms in C++**, Cengage Learning, 3rd Edition, 2012.
3. Sartaj Sahni, **Data Structures, Algorithms and Applications in C++**, Universities Press, 2nd Edition, 2011.

Reference Books:

1. D.S Malik, **Data Structure using C++**, Cengage Learning, Second Edition, 2010.
2. Aaron M. Tenenbaum, Moshe J. Augenstein, Yedidyah Langsam, **Data Structures Using C and C++**, PHI, 2nd Edition, 2009.
3. Robert L. Kruse, **Data Structures and Program Design in C++**, Pearson, 3rd Edition, 1999.

Semester	: III
Course Type	: DSC
Course Code	: BVIT-DSC-202
Name of the Course	: Database Management System
Learning level	: Intermediate-level course
Credits	: 3
Contact Hours	: 3 Hours per week

Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: The course objective is to

- 1. Understand the fundamentals of databases, including definitions, types of databases and their applications in various domains*
- 2. Learn data modeling techniques such as Entity-Relationship Diagrams (ERDs) and normalization to design efficient and scalable database schemas.*
- 3. Understand the principles of relational databases, including tables, rows, columns, keys (primary, foreign), relationships, and constraints.*
- 4. Gain proficiency in SQL for database querying, data manipulation (insertion, deletion, modification), data definition (creating tables, indexes) etc.*
- 5. Learn about transaction properties (ACID), concurrency control mechanisms (locking, timestamps), and recovery techniques (undo, redo, logging) to ensure data consistency and reliability.*

UNIT I

Introduction to DBMS: Database; Traditional file approach; File system vs Database management system' Characteristics of DBMS; Advantages & disadvantages of DBMS; DBMS languages; database system architecture and data independence. RDBMS & its terminologies; Concept of keys (primary key, alternate key, candidate key, composite key, superkey and foreign key); Fundamental integrity constraints (entity integrity, domain integrity & referential integrity).

UNIT II

Entity Relationship(ER) Modeling: Entity types, relationships, constraints

Relation data model: Relational model concepts, relational constraints, relational algebra, relational Calculus: Tuple and Domain Calculus.

UNIT III

Database design: Phases of database design, Entities & attributes, Entity type, Entity sets Relationship type, relationship sets & instances. ER diagram: naming conventions & design issues .Conversion of ER diagram into relational table.

Database design: Mapping ER/EER model to relational database, functional dependencies, Lossless decomposition, Normal forms (up to BCNF).

UNIT IV

Normalization: Normal forms based on primary keys (1NF, 2NF, 3NF & BCNF), Functional dependencies, Lossless decomposition

Transaction Processing: ACID properties, concurrency control (Locking, timestamps), Recovery techniques (Undo, Redo, Logging)

UNIT V

SQL: SQL Data types, Creation, Insertion, Viewing, Updation, Deletion of tables, Renaming, Dropping of tables. Database Manipulation in SQL: SQL constructs SELECT command, WHERE command,

Logical operators, grouping data from tables in SQL: GROUP BY, ORDER BY, HAVING clauses. Definition & use of nested queries; Computations on table: Data Joins – Joining multiple tables, joining a table to itself. Views Creation, Renaming the column of a view, destroys View, Security Locks

Course Learning Outcomes: *After successful completion of the course, the students will be able to:*

1. *Demonstrate a solid understanding of fundamental database concepts, including data models, schemas, keys, relationships, and database management system architectures*
2. *Demonstrate proficiency in SQL (Structured Query Language) for database querying, data manipulation, data definition, and data control operations on relational databases.*
3. *Apply database management concepts and techniques to analyze, design, and implement solutions for real-world database problems and scenarios*
4. *Evaluate and critique database designs, implementations, and performance optimizations, and propose improvements*

Text Books:

1. R. Elmasri, S.B. Navathe, **Fundamentals of Database Systems**, Pearson Education, 6th Edition, 2010.
2. A. Silberschatz, H.F. Korth, S. Sudarshan, **Database System Concepts**, McGrawHill, 6th Edition, 2010.

Reference Books:

1. C. J. Date, **An Introduction to Database Systems**, Pearson India, 8th edition, 2005.
2. R. Ramakrishnan, J. Gehrke, **Database Management Systems**, 3rd Edition, McGraw Hill, 2002.

Semester	: IV
Course Type	: DSC
Course Code	: BVIT-DSC-251
Name of the Course	: Java Programming
Learning level	: Intermediate-level course
Credits	: 3
Contact Hours	: 3 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: *The course objective is to*

1. *Understand the basics of Java programming language syntax, including variables, data types, operators, and expressions.*

2. *Learn the principles of object-oriented programming, including classes, objects, inheritance, polymorphism, and encapsulation*
3. *Learn how to handle exceptions in Java using try-catch blocks, and understand the concept of checked and unchecked exceptions*
4. *Learn how to perform input and output operations in Java, including file handling, reading from/writing to files, and using streams.*
5. *Learn how to connect Java applications to databases using JDBC (Java Database Connectivity).*

UNIT-I

Introduction to Java, Basic Features, Java Virtual Machine, Compiling and Executing a Java Program, Primitive Data Types, Variables, Java Keywords, Integer and Floating Point Data Type, Character and Boolean Types, Declaring and Initialization Variables, Type casting, Java Operators, Expressions, control statements, Arrays.

UNIT-II

Defining & Using Classes, Controlling Access to Class Members, Class Constructors, Method Overloading, Class Variables & Methods, Objects as parameters, final classes, Object class, Garbage Collection, The Finalize () Method, This Keyword, Final Keyword, Polymorphism.

UNIT III

Inheritance Basics, Access Control , Inheritance Types, Abstract Classes, Package, Defining Package, Package naming, Accessibility of Packages, Using Package Members, Interfaces, Implementing Interfaces, Interface and Abstract Classes.

UNIT-IV

Errors, Types of Errors, Exception Handling: -try, catch, throw, throws, Multithreaded Programming- Extends Thread class, Runnable interface , join and is alive method, I/O in Java ,Text Streams, Stream Tokenizer, Buffered Stream , Print Stream, Random Access File, The String Class ,String Buffer Class and Methods.

UNIT-V

Java Applets: Introduction to Applets, Applets Programming, Layouts and Layout Manager, Container. Event handling – Event Handling Mechanisms , the design and Implementation of GUIs using the AWT controls, Swing components of Java such as labels, buttons, text fields, layout managers, menus, Choice List, Radio button, Text area etc.

Java Database Connectivity: Establishing A Connection, Transactions with Database.

Course Learning Outcomes: *After successful completion of the course, the students will be able to:*

1. *Demonstrate a solid understanding of fundamental programming concepts.*
2. *Apply object-oriented programming principles*
3. *Understand and apply the syntax and features of the Java programming language, including packages, access modifiers, interfaces, etc.*
4. *Demonstrate proficiency in handling exceptions in Java programs using try-catch blocks, throwing and catching exceptions*

5. *Design and develop graphical user interfaces (GUIs) using Java Swing, including creating windows, panels, buttons, text fields, and event handling*

Text Books:

1. Ken Arnold, James Gosling, David Homes, "**The Java Programming Language**", 4th Edition, 2005.
2. James Gosling, Bill Joy, Guy L Steele Jr, Gilad Bracha, Alex Buckley, "**The Java Language Specification, Java SE 8 Edition (Java Series)**", Published by Addison Wesley, 2014.
1. Joshua Bloch, "**Effective Java**", Addison-Wesley, 2nd Edition, 2008.

Reference Books:

1. Bruce Eckel, "**Thinking in Java**", 3rd Edition, PHI, 2002.
2. E. Balaguruswamy, "**Programming with Java**", 4th Edition, McGraw Hill.2009.
3. Paul Deitel, Harvey Deitel, "**Java: How to Program**", 10th Edition, Prentice Hall, 2011.

Semester	: IV
Course Type	: DSC
Course Code	: BVIT-DSC-252
Name of the Course	: Operating System
Learning level	: Intermediate-level course
Credits	: 3
Contact Hours	: 3 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: *The course objective is to*

1. *To explain the main components of OS and their working.*
2. *To familiarize the operations performed by OS as a resource Manager*
3. *To impart various scheduling policies of the OS.*
4. *To teach different memory management techniques*

UNIT I

Operating systems overview: Introduction, operating system operations, types of operating systems–multiprogramming systems, batch systems , time sharing systems; operating systems for personal Computers & workstations, Process management, memory management, storage management, protection and security, distributed systems.

Operating systems structures: Operating system services and systems calls, system programs, operating system structure, operating systems generations.

UNIT II

Process Management: System view of the process and resources, process abstraction, process hierarchy, threads, threading issues, thread libraries; Process Scheduling, non-pre-emptive and preemptive scheduling algorithms.

UNIT III

Concurrency and synchronization: Process synchronization, critical section problem, Peterson's solution, semaphores, classic problems of synchronization, readers and writers problem, dining philosophers problem, monitors, synchronization examples(Solaris), atomic transactions. Comparison of UNIX and windows.

UNIT IV

Deadlocks: System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock

Memory Management: Physical and virtual address space; memory allocation strategies –fixed and variable partitions, paging, segmentation, virtual memory.

UNIT V

File and I/O Management: Directory structures, file operations, file allocation methods, device management.

Protection and Security: Policy mechanism, Authentication, Internal access Authorization.

Course Learning Outcomes: *After successful completion of the course, the students will be able to:*

1. *Outline various concepts and features of Operating systems.*
2. *Compare various operating systems with respect to characteristics and features*
3. *Implement algorithms of CPU Scheduling, Memory Scheduling and disk scheduling.*
4. *Make changes in the OS configurations as per need*

Text Books:

1. A Silberschatz, P.B. Galvin, G. Gagne, **Operating Systems Concepts**, John Wiley Publications. 8th Edition, 2008.
2. A.S. Tanenbaum, **Modern Operating Systems**, Pearson Education, 3rd Edition, 2007.

Reference Books:

2. G. Nutt, Operating Systems: A Modern Perspective, Pearson Education, 2nd Edition 1997.
3. W. Stallings, Operating Systems, Internals & Design Principles, PHI, 5th Edition, 2008.

Semester	: IV
Course Type	: DSC
Course Code	: BVIT-DSC-253
Name of the Course	: Operating System Laboratory
Learning level	: Intermediate-level course
Credits	: 4
Contact Hours	: 8 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: *The course objective is to*

1. *To implement various CPU Scheduling Algorithms*
2. *To implement Process Creation and Inter Process Communication.*
3. *To implement Deadlock Avoidance and Deadlock Detection Algorithms*
4. *To implement Page Replacement Algorithms*
5. *To implement File Organization and File Allocation Strategies*

This paper provides practical knowledge of Operating Systems. List of laboratory programming assignments (not limited to these):

1. Write C programs to implement the various CPU Scheduling Algorithms
2. Implementation of Shared memory and IPC
3. Bankers Algorithm for Deadlock Avoidance
4. Implementation of Deadlock Detection Algorithm
5. Write C program to implement Threading & Synchronization Applications
6. Implementation of the following Memory Allocation Methods for fixed partition
 - a. First Fit
 - b. Worst Fit
 - c. Best Fit
7. Implementation of Paging Technique of Memory Management
8. Implementation of the following Page Replacement Algorithms
 - a. FIFO
 - b. LRU
 - c. LFU
9. Implementation of the various File Organization Techniques
10. Implementation of the following File Allocation Strategies
 - a. Sequential
 - b. Indexed

c. Linked

Course outcomes: *After successful completion of the course, the students will be able to*

1. *Compare the performance of various CPU Scheduling Algorithms*
2. *Implement Deadlock avoidance and Detection Algorithms*
3. *Create processes and implement IPC*
4. *Analyze the performance of the various Page Replacement Algorithms*
5. *Implement File Organization and File Allocation Strategies*

Syllabus of B. Voc. (Information Technology) DSM Courses

Semester	: III
Course Type	: DSM
Course Code	: BVIT-DSM-201
Name of the Course	: Database Management System Laboratory
Learning level	: Intermediate-level course
Credits	: 4
Contact Hours	: 8 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives:

1. *Database Application Development*
2. *SQL Querying and Data Manipulation*
3. *Database Design and Implementation*
4. *Database Connectivity and Interaction*

This paper provides practical knowledge of SQL queries. List of laboratory programming assignments (not limited to these):

1. 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 specify the non-weak & weak entity types, key attributes & key types, relationship types, instances, constraints and participations.
2. To study Basic SQL commands (create database, create table, use drop, insert) and execute the following queries using these commands:
 - Create a database named “Employee”.
 - Use the database “Employee” and create a table — “Empl” with attributes- “ename”, “ecity”, “salary”, “enumber”, “eaddress”, “deptname”.
 - Create another table — “Company” with attributes – “cname”, “ccity”, “empnumber” in the database – “Employee”.
3. To study the viewing commands (select, update) and execute the following queries using these commands:
 - a. Find the names of all employees who live in Delhi.
 - b. Increase the salary of all employees by Rs. 5,000.
 - c. Find the company names where the number of employees is greater than 10,000.
 - d. Change the Company City to Gurgaon where the Company name is —TCS.

4. To study the commands to modify the structure of table (alter, delete) and execute the following queries using these commands:
 - a. Add an attribute named “Designation” to the table “Emp”.
 - b. Modify the table “Emp”, Change the datatype of “salary” attribute to float.
 - c. Drop the attribute “deptname” from the table “emp”.
 - d. Delete the entries from the table “Company” where the numbers of employees are less than 500.
5. To study the commands that involve compound conditions (and, or, in, not in, between, not between, like, not like) and execute the following queries using these commands:
 - a. Find the names of all employees who live in —Gurgaon” and whose salary is between Rs. 20,000 and Rs. 30,000.
 - b. Find the names of all employees whose names begin with either letter —A or —B.
 - c. Find the company names where the company city is —Delhi and the number of employees is not between 5000 and 10,000.
 - d. Find the names of all companies that do not end with a letter —A.
6. To study the aggregate functions (sum, count, max, min, average) and execute the following queries using these commands:
 - a. Find the sum and average of salaries of all employees in the computer science department.
 - b. Find the number of all employees who live in Delhi.
 - c. Find the maximum and the minimum salary in the HR department.
7. To study the grouping commands (Group by, Order By) and executes the following queries using these commands:
 - a. List all employee names in descending order.
 - b. Find the number of employees in each department where the number of employees is greater than 5.
 - c. List all the department names where the average salary of a department is Rs.10, 000.
8. To study the commands involving data constraints and execute the following queries using the commands:
 - a. Alter table —”Emp” and make — “enumber” as the primary key.
 - b. Alter table — “Company” and add the foreign key constraint.
 - c. Add a check constraint in the table — “Emp” such that salary has the value between 0 and Rs.1,00,000.
 - d. Alter table — “Company” and add unique constraint to column cname.
 - e. Add a default constraint to column ccity of Table Company with the value — “Delhi”.
9. To study the commands for aliasing and renaming and execute the following queries using these commands:
 - a. Rename the name of the database to “Employee1”.
 - b. Rename the name of table “Emp” to “Emp1”.
 - c. Change the name of the attribute “ename” to “empname”.
10. To study the commands for joins (cross join, inner join, outer join) and execute the following queries using these commands:
 - a. Retrieve the complete record of an employee and its company from both the table using joins.

- b. List all the employees working in the company „TCS“.
11. To study the various set operations and execute the following queries using the commands:
 - a. List the enumber of all employees who live in Delhi and whose company is in Gurgaon or if both conditions are true.
 - b. List the enumber of all employees who live in Delhi but whose company is not in Gurgaon.
12. To study the various scalar functions and string functions (power, square, substring, reverse, upper, lower, concatenation) and execute the following queries using these commands:
 - a. Reverse the names of all employees.
 - b. Change the names of company cities to uppercase.
 - c. Concatenate name and city of the employee.
13. To study the commands for views and execute the following queries using the commands:
 - a. Create a view having ename and ecity.
 - b. In the above view change the ecity to „Delhi“ where ename is „John“.
 - c. Create a view having attributes from both the tables.
 - d. Update the above view and increase the salary of all employees of the IT department by Rs.1000.
14. To study the commands involving indexes and to execute the following queries:
 - a. Create an index with the attribute ename on the table employee.
 - b. Create a composite index with attributes cname and ccity on Table Company.
 - c. Drop all indexes created on Table Company.

Course Learning Outcomes: After successful completion of the course, the students will be able to:

1. *Write SQL queries to retrieve, update, delete, and manipulate data stored in relational databases.*
2. *Establish database connections from Java applications, handle database transactions, manage database resources, and implement error handling and exception management strategies.*

Semester	: IV
Course Type	: DSM
Course Code	: BVIT-DSM-251
Name of the Course	: Java Programming Laboratory
Learning level	: Intermediate-level course
Credits	: 4
Contact Hours	: 8 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives:

1. *Java Programming Skills Development.*
2. *Object-Oriented Design and Implementation.*
3. *Data Structure and Algorithm Implementation.*
4. *Graphical User Interface (GUI) Development.*
5. *Database Application Development*

This paper provides practical knowledge of Java Programming and SQL queries. List of laboratory programming assignments (not limited to these):

1. Write a java program to implement the following operation at one Dimensional array
 - a. Element Searching
 - b. Element insertion
 - c. Elements deletion.
2. Write a java program to implement each following 2D array operation
 - a. Matrix Addition
 - b. Matrix Subtraction
 - c. Matrix Multiplication
 - d. Matrix division.
3. Write a java program to implement following each type of constructor- default constructor, parameterized constructor, clone constructor.
4. Write a java program to implement method overloading.
5. Write different java programs to implement each following types of inheritance- signal level, Multi-level without super key word, Multi-level with super key word.
6. Write different java programs to implement each following types of exception handling mechanism- Try, Catch, Throw, Throws, Finally.
7. Write different java programs to implement multi-threading using runnable interface, extending thread class.
8. Develop a suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism.
9. Develop a Java package with simple Stack and Queue classes. Use JavaDoc comments for documentation.
10. Write different java programs to implement various type of layout manager.
11. Write a program to demonstrate different mouse handling events like mouseClicked(),mouseEntered(), mouseExited(), mousePressed, mouseReleased() and mouseDragged().
12. Write a program to demonstrate different keyboard handling events.
13. Write a java program to implement database connectivity with Sql code.
14. Write a program using JDBC to perform: a) insert b) delete c) update and d) search operations.
15. Develop a multi-threaded GUI application of your choice.

Course Learning Outcomes: After successful completion of the course, the students will be able to:

- 1. Demonstrate proficiency in Java programming by implementing various programming tasks, exercises, and projects using Java language features and libraries.*
- 2. Design and develop graphical user interfaces (GUIs) for Java applications using Swing including creating interactive components and event handling.*
- 3. Integrate Java applications with relational databases using JDBC (Java Database Connectivity) to perform database operations such as querying, insertion, deletion, and modification.*

Semester	: IV
Course Type	: DSM
Course Code	: BVIT-DSM-252(A)
Name of the Course	: E-Commerce
Learning level	: Intermediate-level course
Credits	: 2
Contact Hours	: 2 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: The course objective is to enable the student to become familiar with the mechanism for conducting business transactions through electronic means.

UNIT I

Introduction: Meaning, nature, concepts, advantages, disadvantages and reasons for transacting online, types of E-Commerce, e-commerce business models (introduction, key elements of a business model and categorizing major E-commerce business models), forces behind e-commerce; Design, Building and Launching E-Commerce Website; Outsourcing and In-house development of Website.

UNIT II

Security and Encryption: Needs and concepts, the e-commerce security environment: (dimension, definition and scope of e-security), security threats in the E-commerce environment (security intrusions and braches, attacking methods like hacking, sniffing, cyber-vandalism etc.), technology solutions (Encryption, security channels of communication, protecting networks and protecting servers and clients).

UNIT III

IT Act 2000 and amendments, Cyber Crimes, Digital Signature, Electronic Governance, Attribution, Acknowledgement and dispatch of electronic records, Regulation of certifying authorities, Digital Signature certificates, duties of subscribers, Penalties and adjudication, Appellate Tribunal, Offences.

UNIT IV

E-payment System: Models and methods of e-payments (Debit Card, Credit Card, Smart Cards, e-money), digital signatures (procedure, working and legal position), payment gateways, online banking (meaning concepts, importance, electronic fund transfer, automated clearing house, automated ledger posting, risks involved in e-payments).

UNIT V

Online Business Transactions: Meaning, purpose, advantages and disadvantages of transacting online, E-commerce applications, online services (financial, travel and career), auctions, online portal, online learning, publishing and entertainment, Online shopping (Amazon, Snapdeal, Alabama, Flipkart etc.).

Introduction to HTML: tags and attributes: Text Formatting, Fonts, Hypertext Links, Tables, Images, Lists, Forms

Course Learning Outcomes: After successful completion of the course, the students will be able to:

- 1. To apply in an integrative and summative fashion the students' knowledge in all fields of business studies by drafting a website presence plan.*
- 2. To understand the factors needed in order to be a successful in ecommerce*
- 3. To gain the skills to bring together knowledge gathered about the different components of building a web presence*
- 4. To critically think about problems and issues that might pop up during the establishment of the web presence*
- 5. To apply WordPress as a content management system (CMS), Plan their website by choosing colour schemes, fonts, layouts, and more*

Text Books:

1. Kenneth C. Laudon and Carlo Guercio Traver, *E-Commerce*, Pearson Education.
2. David Whiteley, *E-commerce: Strategy, technology and Applications*, McGraw Hill Education
3. Bharat Bhaskar, *Electronic Commerce: Framework, Technology and Applications*, 4th Ed, McGraw Hill Education.

Reference Books:

1. PT Joseph, *E-Commerce: An Indian Perspective*, PHI Learning
2. T.N. Chhabra, *E-commerce*, Dhanpat Rai & Co.
3. Sushila Madan, *E-Commerce*, Taxmann
4. T.N. Chhabra, Hem Chand Jain, and Aruna Jain, *An Introduction to HTML*, Dhanpat Rai & Co.

Semester	: IV
Course Type	: DSM
Course Code	: BVIT-DSM-252(B)
Name of the Course	: E-Commerce Laboratory
Learning level	: Intermediate-level course
Credits	: 2
Contact Hours	: 4 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: The course objective is to

- 4. Help students apply the theoretical concepts of E-Commerce in a practical setting. It should provide exercises and programming assignments that require students to implement and manipulate E-Commerce websites.*
- 5. Helps students to understand the complete working principles of different E-commerce websites.*
- 6. Enhancing students' programming skills by providing practical programming exercises.*
- 7. It should encourage students to write code, debug, and test their implementations of E-commerce websites.*

This paper provides practical knowledge of data structure. List of laboratory programming assignments (not limited to these):

1. Discuss Web site and write down the Good features of websites
2. Define Browser. Discuss Online and Offline Browser
3. Discuss Search Engine, its types with examples
4. Discuss HTML and other languages used for Website design
5. List out Various tags available in HTML
6. Simple exercises using HTML
7. Create a Website with minimum Details
8. List out the Web sites dealing with E-Commerce
9. Log on to Web Sites dealing with E- Commerce and list out the facilities available.
10. Trading stocks online, ordering products / journals / books etc.
11. Online, travel and tourism services
12. Employment placement and job market,
13. Internet banking, auctions, online publishing, advertising-Online.
14. Online shopping

Course Learning Outcomes: After successful completion of the course, the students will be able to.

- 1. Students should be able to demonstrate a solid understanding of Website and its good features, browsers, HTML tags etc.*
- 2. Students should be able to implement E-commerce websites using HTML.*
- 3. Students should be able to perform Internet Banking, Online publishing, online purchasing and advertising.*

Semester wise list of B. Voc. (Information Technology) SEC Course

Semester	: III
Course Type	: SEC
Course Code	: BVIT-SEC-201
Name of the Course	: Data Structure Laboratory
Learning level	: Intermediate-level course
Credits	: 4
Contact Hours	: 8 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: The course objective is to

- 1. Help students apply the theoretical concepts of data structures in a practical setting. It should provide exercises and programming assignments that require students to implement and manipulate different data structures.*
- 2. Enhancing students' programming skills by providing practical programming exercises.*
- 3. It should encourage students to write code, debug, and test their implementations of data structures and associated algorithms.*

This paper provides practical knowledge of data structure. List of laboratory programming assignments (not limited to these):

1. Write a program in C to implement a Link list and perform addition and deletion of elements.
2. Write a program in C to implement a Stack and perform addition and deletion of elements.
3. Write a program in C to implement a Queue and perform addition and deletion of elements.
4. Write a program in C to implement a Circular Queue and perform addition and deletion of elements.
5. Write a program in C to implement a Stack using linked lists.
6. Write a program in C to implement a Queues using linked lists
7. Write a program in C to implement a tree and perform tree traversal.
8. Write a program in C to perform a Linear search
9. Write a program in C to perform a Binary search
10. Write a program in C to implement a Selection sort
11. Write a program in C to implement a Insertion sort
12. Write a program in C to implement a Bubble sort.
13. Write a program in C to implement a Merge sort
14. Write a program in C to implement a Quick Sort
15. Write a program in C to calculate factorial and to compute the factors of a given no. (i)using recursion, (ii) using iteration

Course Learning Outcomes: After successful completion of the course, the students will be able to.

1. *Students should be able to demonstrate a solid understanding of various data structures such as arrays, linked lists, stacks, queues, trees, graphs, and hash tables. They should be able to explain the characteristics, operations, and applications of these data structures.*
2. *Students should be able to implement data structures and associated algorithms using a programming language.*
3. *Students should be able to analyze the time and space complexity of algorithms associated with different data structures.*

Syllabi of B. Voc. (Information Technology) IDC Courses

Semester	: III
Course Type	: IDC
Course Code	: BVIT-IDC-201
Name of the Course	: Cyber Security
Learning level	: Intermediate-level course
Credits	: 3
Contact Hours	: 3 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: The course objective is to

1. Learn the foundations of Cyber security and the threat landscape.
2. To equip students with the technical knowledge and skills needed to protect and defend against cyber threats.
3. To develop skills in students that can help them plan, implement, and monitor cyber security mechanisms to ensure the protection of information technology assets.
4. To expose students to governance, regulatory, legal, economic, environmental, social and ethical contexts of cyber security.
5. To expose students to responsible use of online social media networks.
6. To systematically educate the necessity to understand the impact of cyber crimes and threats with solutions in a global and societal context.
7. To select suitable ethical principles and commit to professional responsibilities and human values and contribute value and wealth for the benefit of the society.

UNIT I

Introduction to Cyber Security- Defining Cyberspace and Overview of Computer and Web-technology, Architecture of cyberspace, Communication and web technology, Internet, World wide web, Advent of internet, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security.

UNIT II

Cyber Crime and Cyber Law- Classification of cyber crimes, Common cyber crimes- cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus-operandi , Reporting of cyber crimes, Remedial and mitigation measures, Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offenses, Organizations dealing with Cyber crime and Cyber security in India.

UNIT III

Social Media Overview and Security- Introduction to Social networks, Types of Social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media.

UNIT IV

E-Commerce and Digital Payments- Definition of E- Commerce, Main components of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices, Introduction to digital payments, Components of digital payment and stakeholders, Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled payments, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in unauthorized banking transactions. Relevant provisions of Payment Settlement Act-2007

UNIT V

Digital Devices Security, Tools and Technologies for Cyber Security- Endpoint device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third party software, Device security policy, Cyber Security best practices, Significance of host firewall and Ant-virus, Management of host firewall and Antivirus, Wi-Fi security, Configuration of basic security policy and permissions.

Course Learning Outcomes: After successful completion of the course, the students will be able to:

1. *Understand the cyber security threat landscape.*
2. *Develop a deeper understanding and familiarity with various types of cyber-attacks, cyber-crimes, vulnerabilities and remedies thereto.*
3. *Analyze and evaluate existing legal framework and laws on cyber security.*
4. *Analyze and evaluate the digital payment system security and remedial measures against digital payment frauds.*
5. *Analyze and evaluate the importance of personal data, its privacy and security.*
6. *Analyze and evaluate the security aspects of social media platforms and ethical aspects associated with use of social media.*

Text Books:

1. Cyber Crime Impact in the New Millennium, by R. C Mishra , Author Press. Edition 2010.

2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011).
3. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson, 13th November, 2001).
4. 5. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.

Reference Books:

1. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
2. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
3. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
4. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

Assam University, Silchar



Four Year Undergraduate Programme

Implemented under NEP 2020

Effective from the Academic Year 2023-24

Syllabus of Bachelor of Vocation (B. Voc.)

Information Technology

(3rd Year)

Approved in the 99th meeting of the Academic Council on 22.05.2025 vide Resolution No AC:99:05-25:5

Programme Specific Outcome

On successful completion of the FYUG B.Voc. (Information Technology) Programme, students will be able to:

1. Acquire various skills in the field of Information Technology. This includes skills related to various office automation tools like MS Office, PowerPoint, MS Excel, etc., and their applications.
2. Gain knowledge about the fundamentals of computer systems and their working. Further students will be able to develop programming skills with programming languages C, JAVA, Python, etc. by actually designing programs in concerned laboratories.
3. Learn about digital electronics, computer networking, operating systems, and related areas both theoretically and with practice by performing rigorous experiments in the laboratories.
4. Design, develop, and implement data structures and algorithms for problem-solving in various domains by virtue of training in the laboratories.
5. Learn scripting and web development tools like PHP, JavaScript, etc., and apply these to design and develop real-world tools.
6. Equip themselves with the knowledge of financial accountancy and develop expertise in software like Tally.
7. Get exposure to the modern concepts of computing like Artificial Intelligence, Cyber Security, Animation, E-Commerce, and various Internet Technologies as part of this Programme.
8. Get training in soft skills, languages, and management through various allied courses.
9. Get industrial exposure in the field of information technology through an internship with industry.
10. Seek employment in various jobs in the Government sector as well as IT and related industries and perform various roles related to software development, testing, and maintenance.

Table 1: Semester wise list of B. Voc. (Information Technology) DSC Course

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-DSC-101	Fundamentals of Computer Systems	2	2-0-0
	BVIT-DSC-102	Office Tools and Applications	2	2-0-0
II	BVIT-DSC-151	Computer Network	2	2-0-0
	BVIT-DSC-152	(A) Introduction to Digital Electronics	2	2-0-0
		(B) Digital Electronics Laboratory	2	0-0-4
III	BVIT-DSC-201	Data Structure	4	4-0-0
	BVIT-DSC-202	Database Management System	3	3-0-0
IV	BVIT-DSC-251	Java Programming	3	3-0-0
	BVIT-DSC-252	Operating System	3	3-0-0
	BVIT-DSC-253	Operating System Laboratory	4	0-0-8
V	BVIT-DSC-301	Java Script	2	2-0-0
	BVIT-DSC-302	Graphic Design and Applications	2	2-0-0
	BVIT-DSC-303	(A) Java Script Laboratory	2	0-0-4
		(B) Graphic Design and Application Laboratory	2	0-0-4
VI	BVIT-DSC-351	Web Development with PHP	3	3-0-0
	BVIT-DSC-352	Introduction to Artificial Intelligence Frameworks	2	2-0-0
	BVIT-DSC-353	Internet Technologies	3	3-0-0
	BVIT-DSC-354	(A) Web Development with PHP Laboratory	4	0-0-8
		(B) Artificial Intelligence Tools Laboratory	4	0-0-8
		(C) Project Work	4	0-0-8
VII	BVIT-DSC-401	(A) Digital Marketing	2	2-0-0
		(B) Digital Marketing Laboratory	3	0-0-6
	BVIT-DSC-402	(A) Animation and Visual Effects	2	2-0-0
		(B) Animation and Visual Effects Laboratory	3	0-0-6
	BVIT-DSC-403	Cyber Security	2	2-0-0
	BVIT-DSC-404	Mobile Application Development Laboratory	3	0-0-6
VIII	BVIT-DSC-451	Design and Analysis of Computer Algorithms	4	4-0-0

Table 2: Semester wise list of B. Voc. (Information Technology) DSM Course

Semester	Subject	Course Code	Title of The Course	Credits	L-T-P
I	BVOC-DSM-1	BVIT-DSM-101	(A) Programming Skills using C	2	2-0-0
			(B) Programming Skills using C Laboratory	3	0-0-6
II	BVOC-DSM-2	BVIT-DSM-151	Computer Network Laboratory	3	0-0-6
III	BVOC-DSM-1	BVIT-DSM-201	Database Management System Laboratory	4	0-0-8
IV	BVOC-DSM-1	BVIT-DSM-251	Java Programming Laboratory	4	0-0-8
	BVOC-DSM-2	BVIT-DSM-252	(A) E-Commerce	2	2-0-0
			(B) E-Commerce Laboratory	2	0-0-4
V	BVOC-DSM-1	BVIT-DSM-301	(A) Python Programming	2	2-0-0
			(B) Python Programming Laboratory	4	0-0-8
	BVOC-DSM-2	BVIT-DSM-302	(A) Financial Accounting and Tally	2	2-0-0
			(B) Financial Accounting and Tally Laboratory	2	0-0-4
VI	BVOC-DSM-2	BVIT-DSM-351	Internet Technologies Laboratory	4	0-0-8
VII	BVOC-DSM-1	BVIT-DSM-401	(A) Software Engineering	2	2-0-0
			(B) Software Engineering Laboratory	3	0-0-6
VIII	BVOC-DSM-2	BVIT-DSM-451	Multimedia	4	4-0-0

Table 3: Semester wise list of B. Voc. (Information Technology) SEC Course

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-SEC-101	Office Tools and Applications Laboratory	3	0-0-6
II	BVIT-SEC-151	OS Installation, Internet, hardware Assembling Laboratory	3	0-0-6
III	BVIT-SEC-201	Data Structure Laboratory	4	0-0-8
IV	-	-	-	
V	BVIT-SEC-301	Internship with Industry/Community Engagement/Field Study	2	0-0-4
VI	-	-	-	
VII	-	-	-	
VIII	BVIT-SEC-451	Project	12	0-0-24

Table 4: Semester wise list of B. Voc. (Information Technology) IDC Course

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-IDC-101	Fundamentals of Information Technology	3	3-0-0
II	BVIT-IDC-151	Introduction to Web Technology	3	3-0-0
III	BVIT-IDC-201	Cyber Security	3	3-0-0

* NOTE:

- Mathematics maybe chosen as an IDC paper
- Evaluation method and marks distribution for combined paper i.e. Theory +Practical shall be as follows:

Theory: End Semester Examination - 35 Marks, Internal Test - 15 Marks Practical:

End Semester Examination - 35 Marks, Internal Test - 15 Marks
- For 2 credit paper, marks distribution shall be as follows:

End Semester Examination - 35 Marks, Internal Test - 15 Marks
- For papers of 35 and 50 marks, the end semester examination shall be of 2 hours duration.

Syllabi of B. Voc. (Information Technology) DSC Courses

Semester	: V
Course Type	: DSC
Course Code	: BVIT-DSC-301
Name of the Course	: Java Script
Learning level	: Higher-level Course
Credits	: 2
Contact Hours	: 2 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: *The course objective is to*

1. Introduction of Java Script, jQuery and Ajax.
2. Explain the fundamentals of Java Scripts,
3. Explain the basic properties of JavaScript in html file
4. Explain dynamic web page using JavaScript and jQuery
5. Develop skills in students that can help them to develop dynamic web pages effectively using java script, jQuery and Ajax.

UNIT I

Introduction: Java Script definition, Essential features of java script, Lexical Structure, Data Types and Values- Numbers, Strings, Boolean Values, Objects, Arrays, Functions.

UNIT II

Variables: Variable type, Variable Declaration, Variable Scope, Basic Expression and operators, Conditional Statements- if statement, if-else statement, while statement, for statement, switch statement, break and continue statement.

UNIT III

Creating Objects: object properties, checking property existence, deleting properties, Arrays- reading and writing array elements, adding and deleting array elements, iterating through arrays, Functions- creating functions in Java Script, Declaring a function, designing a simple function.

UNIT IV

Adding Interactivity to a web page: basic event handling, mouse events and keyboard events in java script; Introduction to jQuery- Definition, advantages, adding jQuery to a page, selectors in jQuery, jQuery filters, add content to a page, setting and reading tag attributes, reading and removing html attributes.

Course Outcomes: *Upon successful completion of the course, the students will be able to*

1. Apply the basics of Java Script in Web Designing.
2. Use basic properties of JavaScript in html file
3. Use jQuery in html file
4. Apply the implementation of Java script properties
5. Create dynamic HTML web pages using java script and jQuery
6. Design and develop the web applications using HTML and Java Scripts.

Text Books:

1. **JavaScript & jQuery: The Missing Manual**, by David Sawyer McFarland, O'Reilly Media, Inc. (3rd Edition, 2014).
2. **JavaScript: The Definitive Guide**, by David Flanagan, O'Reilly Media, Inc. (7th Edition, 2020).
3. **Ajax: The Complete Reference**, Paperback by Thomas Powell (Author) McGraw Hill Education (2008)

Reference Books:

1. **Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax, Black Book: HTML, Javascript, PHP, Java, Jsp, XML and Ajax, Black Book** by Kogent Learning Solutions Inc. (Author) Dreamtech Press; 1st edition (1 January 2009)
2. **Mastering HTML, CSS & JavaScript Web Publishing - Covers HTML5, CSS3, jQuery** by Laura Lemay (Author) BPB PUBLICATIONS(2022)
3. **JavaScript and jQuery: Interactive Front-End Web Development** by Jon Duckett, John Wiley & Sons (2014).

Semester	: V
Course Type	: DSC
Course Code	: BVIT-DSC-302
Name of the Course	: Graphic Design and Applications
Learning level	: Higher-level Course
Credits	: 2
Contact Hours	: 2 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: *The course objective is to*

1. *Learn the foundations of Graphic design and its applications.*
2. *Equip students with the technical knowledge and skills about Adobe Photoshop, CorelDraw and Adobe Illustrator.*
3. *Develop skills in students that can help them to convey messages effectively through design.*
4. *Expose students to industry-standard tools like Adobe Photoshop, Illustrator, CorelDraw for digital and print design*
5. *Expose students to solve visual communication challenges effectively through design thinking and creativity.*

UNIT I

Introduction: Graphic design concept, Types of graphics, uses of graphics, software used for graphics designing, Application of Graphics: Presentation Graphics, Computer Art, Entertainment, Education and Training, Visualization, Image Processing, Graphical User Interface, Raster-Scan and Random-Scan graphics.

UNIT II

Introduction: Photoshop Interface, Raster graphics & vector graphics, Image formats, Operations on image. **Manipulation of Image:** The marquee tool, the lasso tool, magic Wand tool, Inverting Selection, Layers, Brush tool, Eraser tool, Fill tool, Blur tool, Smudge tool, Sharpen tool, Dodge tool, Sponge tool, Darken tool.

Transformation & Retouching: Free transform, Scaling, rotation, Skew, perspective, Wrap, Distort, Crop, Image size, Canvas size, Clone stamp tool, Healing brush tool, patch tool, red eye tool, history brush tool.

UNIT III

Colour Correction: Colour swatch, image modes, color adjustments, color selection. **Text:** The text tool, editing text, formatting, line & spacing, wrap text, text effects. **Effects:** Blending modes, styles, filters, liquefy, Vanishing point. **Drawing:** The pen tool, drawing shapes, managing paths, converting path to selection

UNIT IV

CorelDraw Introduction: An overview, interface, menus and tools, working with new document, advanced options, page setup. **Drawing:** Lines, Shapes, objects, tables, templates **Import/Export:** Importing files, Using Corel Connect, Exporting files. **Manipulation:** Viewing options, pick tool, selection, moving, sizing, mirroring, rotating, skewing, undo, redo, staking order. **Text:** Artistic text, Paragraph text.

UNIT V

CorelDraw Duplication & Alignment: understanding duplication, aligning objects, distribution, spacing. **CorelDraw Colour:** colouring objects, uniform fill, fountain fill, understanding colour palette, interactive fill, eyedropper tool, outline, convert to curve, outline properties, advanced outline options.

Introduction to Adobe Illustrator: Workspace basics, Customizing the workspace, Artboard overview, Files and templates, Recovery, Drawing simple lines and shapes, Drawing with the Pen, Pencil, or Flare tool

Course Learning Outcomes: After successful completion of the course, the students will be able to

1. Understand the graphic design and its applications.
2. Develop a deeper understanding and familiarity with various types of graphic design software such as Adobe Photoshop, Illustrator, CorelDraw
3. Gain proficiency in industry-standard tools like Adobe Photoshop, Illustrator, CorelDraw for digital and print design.
4. Develop logos, brand identities, and marketing materials for businesses and organizations.
5. Develop a strong portfolio showcasing various design projects to prepare for careers in graphic design.

Text Books:

1. **Computer Graphics** by Donald Hearn and M. Pauline Baker, Prentice-Hall of India Pvt. Limited (2nd Edition, 2007) .
2. **Mastering Adobe Photoshop Elements** by Robin Nichols, Packt Publishing (Illustrated Edition, 2019)
3. **Adobe Photoshop CC/ CS 6**, Computect Publications Limited, Asian Publisher (3rd Edition, 2021).
4. **Learn Adobe Illustrator CC for Graphic Design and Illustration** by Chad Chelius and Rob Schwartz, Pearson education (2nd Edition, 2020).
5. **Graphic Design the New Basics** by Ellen Lupton and Jennifer Cole Phillips, Princeton Architectural press (2nd Edition, 2015)
6. **Teach Yourself CorelDraw** by Niranjana Jha Showman, Notion Press (2022).

Reference Books:

4. **Adobe after Effects Classroom in a Book 2024 release: the Official Training workbook from Adobe**, Adobe Pr (1st Edition, 2024).
5. **Adobe Photoshop** by Bittu Kumar, V & S Publisher (Revised Edition, 2013).
6. **CorelDraw training Guide** by Prof. Satish Jain and M. Geetha, BPB, (1st Edition, 2018).
7. **CorelDraw 2023- Training book with many Exercises** by Peter Schiessl, Lindemann Group (2023).
8. **Adobe Illustrator CC Classroom in a Book** by Brian Wood, Pearson Education (1st Edition, 2018).

Semester	: V
Course Type	: DSC
Course Code	: BVIT-DSC-303 (A)
Name of the Course	: Java Script Laboratory
Learning level	: Higher-level Course
Credits	: 2
Contact Hours	: 4 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: *The course objective is to*

1. Familiarize students with javascript, jQuery and Ajax
2. Provide the practical knowledge of scripting language
3. Prepare students to develop dynamic web pages using java script, jQuery and Ajax

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

1. Create two variables, a and b, assign them numbers, and print their sum.
2. Write a program to find the length of a string stored in a variable str.
3. Write a program to calculate the area of a rectangle given length and width.
4. Write a program to convert temperature from Celsius to Fahrenheit.
5. Create a function to find the maximum of three numbers.
6. Write a JavaScript program to compare two objects to determine if the first contains equivalent property values to the second one.
7. Write a JavaScript program to convert a specified number into an array of digits.
8. Write a JavaScript program to filter out the specified values from a specified array. Return the original array without filtered values.
9. Write a JavaScript program to remove specified elements from the left of a given array of elements.
10. Write a JavaScript program to remove specified elements from the right of a given array of elements.
11. Write a JavaScript function that checks whether a passed string is a palindrome or not?
12. Write a JavaScript function that returns a string that has letters in alphabetical order.

Example string : 'webmaster'

Expected Output : 'abeemrstw'

Assume punctuation and numbers symbols are not included in the passed string.

13. Write a JavaScript program that computes the average marks of the following students. Then, this average is used to determine the corresponding grade.

Student Name	Marks
David	80
Vinoth	77
Divya	88
Ishitha	95
Thomas	68

The grades are computed as follows:

Range	Grade
<60	F
<70	D
<80	C
<90	B
<100	A

14. Write a JavaScript program that creates a button and add a click event listener to log a message when it's clicked.
15. Write a JavaScript function that changes the background color of an element when a mouse enters it.
16. HTML form that accepts a student name and roll no Use JavaScript function to perform following validation
 - (a) JavaScript program to validate a date
 - (b) Create a paragraph element with some text and append it to the end of the document body using jQuery.
 - (c) Using jQuery count every element (including head, body, etc.) in the document.
 - (d) Creating personal website using html, css, jQuery and javascript

Course Outcomes: Upon successful completion of the course, the students will be able to:

1. Create dynamic HTML web pages using java script and jQuery
2. Use jQuery in html file and
3. Design and develop the web applications using HTML and Java Scripts.

Semester	: V
Course Type	: DSC
Course Code	: BVIT-DSC-303 (B)
Name of the Course	: Graphic Design and Applications Laboratory
Learning level	: Higher-level Course
Credits	: 2
Contact Hours	: 4 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: The course objective is to

1. Equip students with the technical knowledge and skills about Adobe Photoshop, CorelDraw and Adobe Illustrator.
2. Expose students to industry-standard tools like Adobe Photoshop, Illustrator, CorelDraw for digital and print design
3. Expose students to solve visual communication challenges effectively through design thinking and creativity.

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

1. Perform the following in Adobe Photoshop
 - a. Crop a image
 - b. Background removal
 - c. Export and save the design
2. Combine image with layer mask
3. Include vector graphics
4. Add text and effects to an image
5. Create an image for Social media using Adobe Photoshop
6. Create a web banner using Adobe Photoshop
7. Photo editing and retouching
8. Digital painting in Photoshop
9. Crafting a cartoon effect
10. Building a graphic design portfolio
11. Create graphics using various tools like shapes, text, effects, and clip art using coralDraw and save the completed files.
12. Insert special characters within text using CorelDraw
13. Design a title page for a book using CorelDraw
14. Design a business card using CorelDraw
15. Use the Pen tool to create a vector image based on a bitmap image in Adobe Illustrator.
16. Create Pen tool curves as well as straight lines to mimic the shapes in the original image in Adobe Illustrator
17. Creating A Document & Understanding Artboards
18. Drawing shapes with different angle in Adobe Illustrator
19. Convert hand drawn sketch on paper to an editable shape in illustrator
20. Saving and exporting in Adobe Illustrator

Course Learning Outcomes: After successful completion of the course, the students will be able to:

1. Develop brand identities, and marketing materials for businesses and organizations
2. Gain proficiency in industry-standard tools like Adobe Photoshop, Illustrator, CorelDraw for digital and print design.
3. Develop a strong portfolio showcasing various design projects to prepare for careers in graphic design.

Semester	: VI
Course Type	: DSC
Course Code	: BVIT-DSC-351
Name of the Course	: Web Development with PHP
Learning level	: Higher-level Course
Credits	: 3
Contact Hours	: 3 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: The course objective is to

1. Equip student with fundamentals knowledge of PHP, including operators, control structures, and data handling.
2. Expose students to Object-Oriented Programming concepts in PHP.
3. Learn database connectivity in PHP to solve real world problems

UNIT-I

PHP Introduction, PHP Install, Syntax, Variables and Data Types, Strings, Constants, Operators, Loops and Switch, Handling Html Form with PHP

UNIT-II

Function: Call by value and Call by reference, Recursive function, Creating and accessing String. Searching& Replacing String, Formatting String, String Related Library function.

UNIT-III

Array: Creating index based and Associative array, Looping with Index based array, Looping with associative array, Library function for Array, Handling Html Form with Php

UNIT-IV

Cookies and Session: Setting Cookies with PHP, Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Destroying the variables and Session.

Understanding file& directory- Opening and closing, a file, Copying, renaming and deleting a file, working with directories, Creating and deleting folder,

UNIT-V

Introduction to RDBMS: Connection with MySQL Database, Performing basic database operation (Insert, delete, update, select) State Management- Using query string (URL rewriting). Exception Handling Understanding Exception and error, Try, catch, throw. Error tracking and debugging.

Course Learning Outcomes: After successful completion of the course, the students will be able to

1. Gain proficiency in using MySQL to build dynamic, data-driven web applications.
2. Handle HTML forms and validate user data before storing it in a database using PHP.
3. Develop a real world application programs based on Database.

Text Books:

1. VIKRAM VASWANI, "PHP and MySQL", Tata McGraw-Hill, 2005
2. BEN FORTA, "MySQL Crash course" SAMS, 2006.
3. C.J. DATE, "An introduction to Database Systems", Addison Wesley, 6th Edition.
4. Ramesh Elmasri and Shamkant B Navathe, " Fundamentals of DataBase Systems", Pearson Education, 3rd Edition.

Reference Books:

1. Tim Converse, Joyce Park and Clark Morgan, "PHP 5 and MySQL", Wiley India reprint, 2008.
2. Robert Sheldon, Geoff Moes, "Beginning MySQL", Wrox, 2005.
3. Alexis Leon and Mathews Leon, "Database Management Systems", Vikas, 2008.

Semester	: VI
Course Type	: DSC
Course Code	: BVIT-DSC-352
Name of the Course	: Introduction to Artificial Intelligence Frameworks
Learning level	: Higher-level Course
Credits	: 2
Contact Hours	: 2 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: *The course objective is to*

1. *Introduce classical AI, problem formulation and intelligent agents.*
2. *Introduce techniques for problem solving by search, knowledge-representation and reasoning.*
3. *Introduce AI Applications, planning, and multi-agent systems.*

UNIT-I

Introduction–Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents–Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.

UNIT-II

Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems -Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search.

UNIT-III

Knowledge Representation First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering-Categories and Objects.

UNIT-IV

Software Agents Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems.

UNIT-V

Applications AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware –Perception – Planning – Moving

Course Learning Outcomes: *After successful completion of the course, the students will be able to*

1. *Understand the foundations of AI systems, intelligent agents, problems solving strategies and Ethics in AI.*
2. *Apply elementary principles of AI like search and game playing for problem solving.*
3. *Analyse real world problems under uncertainty and solve them using knowledge representation and reasoning.*
4. *Understand planning and decision making in intelligent systems.*

Text Books:

1. S. Russell and P. Norvig, “**Artificial Intelligence: A Modern Approach**”, Prentice Hall, 3rd Edition, 2009.

2. Stuart Russell, Peter Norvig, “**Artificial Intelligence: A Modern Approach**”, 4th Edition, Pearson Education, 2020.
3. I. Bratko, “**Prolog: Programming for Artificial Intelligence**”, 4th Edition, Addison-Wesley Educational Publishers Inc., 2011.

Reference Books:

1. M. Tim Jones, “**Artificial Intelligence: A Systems Approach (Computer Science)**”, Jones and Bartlett Publishers, Inc.; First Edition, 2008.
2. Nils J. Nilsson, “**The Quest for Artificial Intelligence**”, Cambridge University Press, 2009.
3. William F. Clocksin and Christopher S. Mellish, “**Programming in Prolog: Using the ISO Standard**”, 5th Edition, Springer, 2003
4. Gerhard Weiss, “**Multi Agent Systems**”, 2nd Edition, MIT Press, 2013
5. David L. Poole and Alan K. Mackworth, “**Artificial Intelligence: Foundations of Computational Agents**”, Cambridge University Press, 2010.

Semester	: VI
Course Type	: DSC
Course Code	: BVIT-DSC-353
Name of the Course	: Internet Technologies
Learning level	: Higher-level Course
Credits	: 3
Contact Hours	: 3 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: The course objective is to

1. Provide conceptual and technological developments in the field of Internet and web designing
2. Provide comprehensive knowledge of Internet, its applications and the TCP/IP protocols.
3. Introduce basic concepts of web design.

UNIT-I

Introduction to internet: Internet- Growth of Internet and ARPANet - Owners of the Internet -Anatomy of Internet – History of WWW - Basic Internet Terminologies – Net etiquette - Internet Applications - Commerce on the Internet Governance on the Internet - Impact of Internet on Society.TCP/IP Internet Technology and Protocols: Packet Switching Technology - Internet Protocols - TCP/IP – Router - Internet Addressing Scheme- Machine Addressing - E-mail Addresses – Resource Addresses

UNIT-II

Interconnectivity: Connectivity types - Setting up a connection - Hardware requirements- Selection of a modem - Software requirements – Internet accounts by ISP-ISDN-Protocol options-Service options. Internet Network: Network DefinitionCommon terminologies – Node - Host- Workstation -Network Administrator - Network security - Network Components – Servers-client Server- Communication Media - Types of Networks - Addressing in Internet – DNS - Network topologies – Ethernet – FDDI - ATM.

UNIT-III

Browsers and Search engines: Browsers - What is a browser? – Parts of a browser window-Running a browser - working with a Browser. Search engines: What is search engine? - Types of search engines - Search and meta search engines.

UNIT-IV

E-mail: E-mail - E-mail Networks and Servers - E-mail Protocols - Structure of Email - Attachments – E-mail Clients - E-mail Clients - web based E-mail- Address book – Signature File.

UNIT-IV

HTML Programming Basics: Introduction to HTML – HTML browsers - Different versions of HTML-HTML tags - Document overview - Header elements - Section headings - Block headings - Lists-Inline elements – Images - working with Tables, Forms, Frames.

Course Learning Outcomes: After successful completion of the course, the students will be able to

1. Describe the basic concepts of Web and Internet technologies
2. Learn the basic working scheme of the Internet and World Wide Web.
3. Understand fundamental tools and technologies for web design.
4. Comprehend the technologies for Hypertext Mark-up Language (HTML).
5. Design a web pages and sites using HTML
6. Effectively deal with programming issues relating to HTML

Text book:

1. **Internet Technology and Web design**, Ramesh Bangia, Firewall Media, (An imprint of Lakshmi Publications Pvt. Ltd.), 3rd Edition, 2011.

Reference Books:

1. **The Internet Book**, Douglas E. Comer, Fourth Edition, PHI Learning Pvt. Ltd. , New Delhi, 2009.
2. **Using the Internet the Easy Way**, Young Kai Seng, Minerva Publications, First Edition, 2000.
3. **Fundamentals of Information Technology** by Alexis Leon and Mathews sLeon, Vikas Publishing House Pvt. Ltd., Revised Edition.

Semester	: VI
Course Type	: DSC
Course Code	: BVIT-DSC-354 (A)
Name of the Course	: Web Development with PHP Laboratory
Learning level	: Higher-level Course
Credits	: 4
Contact Hours	: 8 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: The course objective is to

1. Equip student with practical knowledge of PHP, including operators, control structures, and data handling.
2. Understand the features like functions, forms in PHP
3. Understand Cookies, Sessions and Data base.

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

1. Get name of the user from a form and show greeting text.
2. Write a php program to check whether given number is palindrome or not.
3. Write a php program to check whether given number is Armstrong or not.
4. Write a php program to find largest values of two numbers using nesting of function.
5. Write a Mathematical calculator program.
6. Write a Age calculator program.
7. Write a PHP program to check whether given number is String palindrome or not.
8. Write a PHP program using function.

9. Create a PHP page for login page without sql connection.
10. Write a PHP program to Array manipulation.
11. Write a PHP program to design personal information
12. Create a PHP page for login page with sql connection.
13. Write a PHP program to Read from existing file.
14. Write a PHP program to Write a file
15. Write a PHP program to calculate Date and Time function.
16. Write a PHP program to design Curriculum Vitae.
17. Write a PHP program hit counter using cookies.
18. Create a web page to advertise a product of the company using images and audio.
19. Create a web page for software company websites.
20. Create a PHP page for login system using session.

Course Learning Outcomes: After successful completion of the course, the students will be able to

1. Utilize the basic concept of statements and arrays.
2. Implement functions and browser handling power of PHP.
3. Impart Database applications, File Handling, Cookies in the webpage.
4. Design and Implement Interactive Web Site using Forms

Semester	: VI
Course Type	: DSC
Course Code	: BVIT-DSC-354 (B)
Name of the Course	: Artificial Intelligence Tools Laboratory
Learning level	: Higher-level Course
Credits	: 4
Contact Hours	: 8 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: The course objective is to

1. Apply artificial intelligence theory and concepts to analyze the requirements, realize technical specifications, and design engineering solutions.
2. Design solutions for complex engineering problems

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

1. Introduction of various python libraries used for machine learning.
2. Write a Program to implement Uninformed Search Technique: Breadth First Search.
3. Write a Program to implement Uninformed Search Technique: Depth First Search.
4. Write a Program to implement Informed Search Technique: A* Algorithm.
5. Write a Program to implement Informed Search Technique: AO* Algorithm.
6. Write a Program to implement Local Search Technique: Hill Climbing Algorithm.
7. Write a Program to implement Game Playing Algorithms: Minimax and Alpha Beta Pruning.
8. Write a Program to create a Chatbot in Python.
9. Program to Implement N-Queens Problem using Python.
10. Program to Implement Missionaries Cannibals Problems using Python.

Course Learning Outcomes: After successful completion of the course, the students will be able to

1. Apply the knowledge gained pertaining to data storage, data analytics and AI concepts to solve real world business problems.

2. *Able to evaluate and apply knowledge of data engineering, artificial intelligence, machine learning, and human cognition to real-world issues in order to solve potential challenges.*
3. *Able to acquire computational knowledge and project development abilities using novel tools and methodologies to tackle challenges in the fields related to Machine learning and Artificial Intelligence.*

Semester	: VI
Course Type	: DSC
Course Code	: BVIT-DSC-354 (C)
Name of the Course	: Project Work
Learning level	: Higher-level Course
Credits	: 4
Contact Hours	: 8 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

The Department will offer a “Project Work” for the students under allocated Project Supervisors as per the existing rules of Assam University, Silchar. (AC Resolution: 99: 05-25:26.8)

Syllabi of B. Voc. (Information Technology) DSM Courses

Semester	: V
Course Type	: DSM
Course Code	: BVIT-DSM-301 (A)
Name of the Course	: Python Programming
Learning level	: Higher-level Course
Credits	: 2
Contact Hours	: 2 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: *The course objective is to*

1. *Familiarize students with the basics of Python programming language, including syntax, variables, data types, and control structures syntax, variables, data types, and control structures.*
2. *Introduce students to fundamental programming concepts such as variables, data types, operators, conditional statements, loops, and functions, within the context of Python.*
3. *Explore various data structures in Python, such as lists, tuples, dictionaries, and sets, and develop the skills to manipulate, access, and organize data using these structures.*
4. *Develop skills in handling errors and exceptions in Python programs, allowing for graceful error handling and robustness.*

UNIT-I

Introduction: Basic Elements of Python, Python character set, Python tokens (keyword, identifier, literal, operator, punctuator), variables, concept of l-value and r-value, use of comments, Data types: Number(integer,

floating point, complex), Operators: arithmetic operators, relational operators, logical operators, assignment operators, augmented assignment operators, identity operators (is, is not), membership operators (in not in)

UNIT-II

Expressions, statement, type conversion, and input/output: precedence of operators, expression, and evaluation of an expression, type-conversion (explicit and implicit conversion), accepting data as input from the console and displaying output.

Flow of Control: introduction, use of indentation, sequential flow, conditional and iterative flow; Conditional statements: if, if-else, if-elif-else, flowcharts, simple programs: e.g.: absolute value, sort 3 numbers and divisibility of a number.

UNIT-III

Iterative Statement: for loop, range(), while loop, flowcharts, break and continue statements, nested loops, suggested programs: generating pattern, summation of series, finding the factorial of a positive number. Strings: introduction, string operations (concatenation, repetition, membership and slicing), traversing a string using loops, built-in functions/methods.

UNIT-IV

Python functions: types of functions, function definition, function call, types of function arguments, pass by value and pass by reference/object reference, recursion, advantages and disadvantages of recursion, scope and lifetime variables.

UNIT-V

Python Files: Python File Operation, Python Directory, Python Exception Handling, python built-in exception, Try, Except and Finally, Python user defined exception, Python graph plotting using Matplotlib.

Course Learning Outcomes: After successful completion of the course, the students will be able to

1. Demonstrate a solid understanding of Python syntax, including variables, data types, control structures, functions, classes, and modules.
2. Develop problem-solving skills and the ability to design, implement, and debug Python programs to solve a variety of computational problems.
3. Demonstrate the ability to read from and write to files, process data from external sources, and handle input/output operations using Python.

Text Books

1. John V. Guttag, “Introduction to Computation and Programming Using Python”, 2nd Edition, PHI 2 Core, 2016
2. R. Nageswara Rao, “Python Programming”, dreamtech Press, 2nd Edition, 2018.

Reference Books

1. Ramsey Hamilton, **Python: Programming: A Beginner’s Guide**, Create space Independent Pub, 2nd Edition, 2016
2. Yashavant Kanetkar, “Let Us Python”, BPB Publications, 5th Edition, 2022
3. R.S. Salaria, “**Programming in Python**”, Khanna Publishing House, 2nd Edition, 2019.
4. P. Sharma, “**Programming in Python**”, BPB, 2nd Edition, 2014
5. T. Budd, “**Exploring Python**”, TMH, 1st Edition, 2011

Semester	: V
Course Type	: DSM
Course Code	: BVIT-DSM-301 (B)
Name of the Course	: Python Programming Laboratory
Learning level	: Higher-level Course

Credits	: 4
Contact Hours	: 8 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: *The course objective is to*

1. *Provide students with hands-on experience in writing Python code.*
2. *Allows practicing programming concepts, syntax, and techniques in a real-world coding environment.*
3. *Help students understand and apply fundamental programming concepts such as variables, data types, control structures (loops and conditionals), functions, and input/output operations in Python.*

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

1. Using a loop, print a table of Celsius/Fahrenheit equivalences. Let c be the Celsius temperatures ranging from 0 to 100, for each value of c, print the corresponding Fahrenheit temperature.
2. Using a while loop, produce a table of sines, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x).
3. Write a program that reads an integer value and prints “leap year” or “not a leap year”.
4. Write a function that takes an integer ‘n’ as input and calculates the value of

$$1 + 1/1! + 1/2! + 1/3! + \dots + 1/n$$
5. Write a function that takes an integer input and calculates the factorial of that number.
6. Write a function that takes a string input and checks if it’s a palindrome or not.
7. Write a list function to convert a string into a list, as in list (‘abc’) gives [a, b, c].
8. Write a program to generate Fibonacci series.
9. Write a program to check whether the input number is even or odd.
10. Write a program to compare three numbers and print the largest one.
11. Write a program to print factors of a given number.
12. Write a method to calculate GCD of two numbers.
13. Write a program to sort a list using insertion sort and bubble sort and selection sort.
14. Problems related to File handling, exception handling in python, usage of user defined exceptions and assertions.
15. Problems related to string manipulations, basic operations, slicing.

Course outcomes: *After successful completion of the course, the students will be able to*

1. *Develop a strong foundation in Python programming language, including syntax, data types, control structures, functions, and file handling.*
2. *Analyze problems, design algorithms, and implement efficient solutions using Python.*
3. *Capable of developing small-scale applications using Python.*
4. *Develop skills in identifying and resolving errors in Python code. They should be proficient in using debugging tools and techniques to identify and fix issues, ensuring the correctness and reliability of their programs.*

Semester	: V
Course Type	: DSM
Course Code	: BVIT-DSM-302 (A)
Name of the Course	: Financial Accounting and Tally
Learning level	: Higher-level Course
Credits	: 2

Contact Hours	: 2 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: *The course objective is to*

1. *Help students to acquire conceptual knowledge of the financial accounting*
2. *Impart skills for recording various kinds of business transactions*
3. *Help students to acquire theoretical knowledge about tally software*

UNIT I

Introduction: Financial Accounting, Importance of financial Accounting, Accounting principles, concept and conventions, Introduction to accounting standards, Indian Accounting Standards (AS), International Financial Reporting Standards (IFRS)

UNIT II

Forms of business Organization, Types of Accounts, Role of Accounting, Double entry system of book keeping, **Mode of accounting, Financial Statements:** Trading Account, Profit and Loss Account and Balance sheet. **Computerization of accounts:** Role of Computers in Accounting, Advantages and limitations.

UNIT III

Journal –Steps in Journalizing, Advantages and limitations of Journalizing, Ledger - Posting into ledger – Balancing of accounts – Preparation of trial balance (Problems), Accounting Vouchers, types of Accounting Vouchers.

UNIT IV

Basic Accounting Ratios: Profitability, liquidity, turnover and solvency ratios, preparation of fund flow statement, cash flow statement and Bank Reconciliation statement.

UNIT V

Introduction to Tally: Company information, create, display alter, backup, restore, recovery of data, quit, gateway of tally, ledgers, ledger alteration, ledger display, budgets, groups, cost centers, voucher entry, voucher types.

Course outcomes: *After successful completion of the course, the students will be able to*

1. *Gain sound theoretical knowledge and apply the same in practice*
2. *Perform the ledger and voucher entries in Tally.*

Text Books

1. **Introduction to Financial Accounting**, by T. Horngren Charles (Author), L. Sundern Gary (Author), A. Elliott John (Author), R. Philbrick Danna (Author), Pearson Education (11th Edition, 2017).
2. **Financial Accounting- Concept and Applications** by J.R. MONGA (Author), Raj Bahadur (Author), Scholar tech press (2024)
3. **Tally Erp 9** by SHRADDHA SINGH (Author), V&S Publishers (2014)
4. **Comdex Tally.ERP 9 Course Kit** by Dr. Namrata Agrawal (Author), Dreamtech Press (2019)

Reference Books

1. **Financial and Management Accounting** by Maheshwari SN (Author), Maheshwari Suneel K (Author), Maheshwari Sharad K (Author), Sultan Chand and Sons (2022).
2. **Financial Accounting: Fundamentals, Analysis and Reporting** by R. K. Arora (Author), Wiley (2nd Edition, 2018).

3. **Tally Workbook** by Rakesh Sangwan (Author), Astha Publications (2nd Edition, 2020)

Semester	: V
Course Type	: DSM
Course Code	: BVIT-DSM-302 (B)
Name of the Course	: Financial Accounting and Tally Laboratory
Learning level	: Higher-level Course
Credits	: 2
Contact Hours	: 4 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: The course objective is to

1. Help students to acquire conceptual knowledge of the financial accounting
2. Impart skills for recording various kinds of business transactions
3. Help students to acquire theoretical knowledge about tally software

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

1. Create a new company called Universal Business Solutions, Consultation Sole Proprietorship firm (Accounts Only)
2. Create a new company called Smart Agency, Mobile dealer of Mobile phones (Accounts with Inventory)
3. Open earlier company Universal Business Solutions and create following Ledgers in above Company

Ledger Name	Under
Nandini's Capital	Capital
Fixed deposit with HDFC	Investment in Fixed Deposit
Fixed deposit with ICICI	Investment in Fixed Deposit
Salary to staff	Indirect expenses
ICICI Bank	Bank Account
Computer	Fixed Assest

4. Open earlier company Smart Agency, Create following Groups in above Company

Group Name	under
Administrative Exp	Indirect Expenses
Selling and Distribution Exp	Indirect Expenses
Financial Exp	Indirect Expenses
Mumbai Customer	Sundry Debtors
Other customer	Sundry Debtors

5. Open earlier company Smart Agency, Create following in above Company

Stock Groups

Name	Under
Simple Phones	Primary

Smart Phones	Primary
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Stock Categories

Name	Under
Nokia	Primary
Samsung	Primary
Sony	Primary

Units of Measurement

Type	Symbol	Formal Name	Number of Decimal Places
Simple	Pcs	Pieces	0
Simple	Nos.	Numbers	0

Stock Items

Name	Under	Unit of Measure	Stock Categories
Samsung Grand 2	Smart Phones	Nos.	Samsung
Nokia 1210	Simple Phones	Pcs	Nokia
Sony Galaxy	Smart Phones	Nos.	Sony

6. Open company Universal Business Solutions, and Enter the following transactions:

Sl. No.	Date	Particulars
1	01/04/2024	Nandini Kapur started business by bringing cash of Rs. 5,00,000
2.	03/04/2024	Ms. Kapur opened a bank a/c with ICICI Bank for the firm by depositing cash Rs. 1,00,000
3	10/04/2024	Ms. Kapur opened Fixed deposit of Rs. 10,000 with ICICI bank by chq
4	15/04/2024	Ms. Kapur opened Fixed deposit of Rs. 15,000 with HDFC bank by chq
5.	21/04/2024	Purchased computer of Rs. 20,000 from Mr. Shree Enterprise on credit
6.	30/04/2024	Ms. Kapur paid salary for the month of April 2024 Rs. 12,000 in cash

- Show the trial balance and balance sheet of the company
- Show the profit and loss account of the company
- Show the day book of the company

Course outcomes: After successful completion of the course, the students will be able to

- Gain sound theoretical knowledge and apply the same in practice
- Perform the ledger and voucher entries in Tally.

Semester	: VI
Course Type	: DSM
Course Code	: BVIT-DSM-351
Name of the Course	: Internet Technologies Laboratory
Learning level	: Higher-level Course
Credits	: 4
Contact Hours	: 8 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)

End Semester Exam Time : 3 hours

Course Objectives: *The course objective is to*

1. *Introduce working principle of email*
2. *Provide conceptual knowledge about GoogleMeet, ZOOM*
3. *Provide practical knowledge of web pages and sites development using HTML*

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

1. Demonstrate E-Mail working (Sending ,Receiving, forward).
2. How to create, organize meeting in Zoom/ GoogleMeet.
3. Create a form by using various attributes of the input tags (text box, multiline textbox, option button, check box).
4. Create a simple HTML page by using some of the basic tags (hyperlink, marquee, image).
5. Create a web page with multiple types of style sheet used in a single page.
5. Write a CGI sample program to send output back to the user.
6. Create Time-Table using table tag.
7. Creation of Frames in browser window using HTML.
8. Write a java script program to create dialogue boxes using alert, confirm and prompt methods.
9. Write a java script program on Form Validations.
10. Write a java script program to perform four arithmetic operations: Addition, Subtraction, Multiplication and Division on two numbers.
12. Create a web site of our College.

Course outcomes: *After successful completion of the course, the students will be able to*

1. *Learn the basic working scheme of the Email, GoogleMeet, Zoom etc.*
2. *Understand fundamental tools and technologies for web design.*
3. *Design static web pages and sites using HTML.*

Syllabi of B. Voc. (Information Technology) SEC Courses

Semester	: V
Course Type	: SEC
Course Code	: BVIT-SEC-301
Name of the Course	: Internship with Industry/ Community Engagement/Field Study
Learning level	: Higher-level Course
Credits	: 2
Contact Hours	: 4 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Implemented under NEP 2020

**Syllabus of Bachelor of Vocation (B. Voc.)Information Technology
(4th Year)**

1

Programme Specific Outcome

On successful completion of the FYUG B.Voc. (Information Technology) Programme, students will be able to:

1. Acquire various skills in the field of Information Technology. This includes skills related to various office automation tools like MS Office, PowerPoint, MS Excel, etc., and their applications.
2. Gain knowledge about the fundamentals of computer systems and their working. Further students will be able to develop programming skills with programming languages C, JAVA, Python, etc. by actually designing programs in concerned laboratories.
3. Learn about digital electronics, computer networking, operating systems, and related areas both theoretically and with practice by performing rigorous experiments in the laboratories.
4. Design, develop, and implement data structures and algorithms for problem-solving in various domains by virtue of training in the laboratories.
5. Learn scripting and web development tools like PHP, JavaScript, etc., and apply these to design and develop real-world tools.
6. Equip themselves with the knowledge of financial accountancy and develop expertise in software like Tally.
7. Get exposure to the modern concepts of computing like Artificial Intelligence, Cyber Security, Animation, E-Commerce, and various Internet Technologies as part of this Programme.
8. Get training in soft skills, languages, and management through various allied courses.
9. Get industrial exposure in the field of information technology through an internship with industry.
10. Seek employment in various jobs in the Government sector as well as IT and related industries and perform various roles related to software development, testing, and maintenance.

Table 1: Semester wise list of B. Voc. (Information Technology) DSC Course

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-DSC-101	Fundamentals of Computer Systems	2	2-0-0
	BVIT-DSC-102	Office Tools and Applications	2	2-0-0
II	BVIT-DSC-151	Computer Network	2	2-0-0
	BVIT-DSC-152	(A) Introduction to Digital Electronics	2	2-0-0
		(B) Digital Electronics Laboratory	2	0-0-4
III	BVIT-DSC-201	Data Structure	4	4-0-0
	BVIT-DSC-202	Database Management System	3	3-0-0
IV	BVIT-DSC-251	Java Programming	3	3-0-0
	BVIT-DSC-252	Operating System	3	3-0-0
	BVIT-DSC-253	Operating System Laboratory	4	0-0-8
V	BVIT-DSC-301	Java Script	2	2-0-0
	BVIT-DSC-302	Graphic Design and Applications	2	2-0-0
	BVIT-DSC-303	(A) Java Script Laboratory	2	0-0-4
		(B) Graphic Design and Application Laboratory	2	0-0-4
VI	BVIT-DSC-351	Web Development with PHP	3	3-0-0
	BVIT-DSC-352	Introduction to Artificial Intelligence Frameworks	2	2-0-0
	BVIT-DSC-353	Internet Technologies	3	3-0-0
	BVIT-DSC-354	(A) Web Development with PHP Laboratory	4	0-0-8
		(B) Artificial Intelligence Tools Laboratory	4	0-0-8
VII	BVIT-DSC-401	(A) Digital Marketing	2	2-0-0
		(B) Digital Marketing Laboratory	3	0-0-6
	BVIT-DSC-402	(A) Animation and Visual Effects	2	2-0-0
		(B) Animation and Visual Effects Laboratory	3	0-0-6
	BVIT-DSC-403	Cyber Security	2	2-0-0
	BVIT-DSC-404	Mobile Application Development Laboratory	3	0-0-6
VIII	BVIT-DSC-451	Design and Analysis of Computer Algorithms	4	4-0-0

Table 2: Semester wise list of B. Voc. (Information Technology) DSM Course

Semester	Subject	Course Code	Title of The Course	Credits	L-T-P
I	BVOC-DSM-1	BVIT-DSM-101	(A) Programming Skills using C	2	2-0-0
			(B) Programming Skills using C Laboratory	3	0-0-6
II	BVOC-DSM-2	BVIT-DSM-151	Computer Network Laboratory	3	0-0-6
III	BVOC-DSM-1	BVIT-DSM-201	Database Management System Laboratory	4	0-0-8
IV	BVOC-DSM-1	BVIT-DSM-251	Java Programming Laboratory	4	0-0-8
	BVOC-DSM-2	BVIT-DSM-252	(A) E-Commerce	2	2-0-0
			(B) E-Commerce Laboratory	2	0-0-4
V	BVOC-DSM-1	BVIT-DSM-301	(A) Python Programming	2	2-0-0
			(B) Python Programming Laboratory	4	0-0-8
	BVOC-DSM-2	BVIT-DSM-302	(A) Financial Accounting and Tally	2	2-0-0
			(B) Financial Accounting and Tally Laboratory	2	0-0-4
VI	BVOC-DSM-2	BVIT-DSM-351	Internet Technologies Laboratory	4	0-0-8
VII	BVOC-DSM-1	BVIT-DSM-401	(A) Software Engineering	2	2-0-0
			(B) Software Engineering Laboratory	3	0-0-6
VIII	BVOC-DSM-2	BVIT-DSM-451	Multimedia	4	4-0-0

Table 3: Semester wise list of B. Voc. (Information Technology) SEC Course

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-SEC-101	Office Tools and Applications Laboratory	3	0-0-6
II	BVIT-SEC-151	OS Installation, Internet, hardware Assembling Laboratory	3	0-0-6
III	BVIT-SEC-201	Data Structure Laboratory	4	0-0-8
IV	-	-	-	
V	BVIT-SEC-301	Internship with Industry/Community Engagement/Field Study	2	0-0-4
VI	-	-	-	
VII	-	-	-	
VIII	BVIT-SEC-451	Project	12	0-0-24

Table 4: Semester wise list of B. Voc. (Information Technology) IDC Course

Semester	Course Code	Title of The Course	Credits	L-T-P
I	BVIT-IDC-101	Fundamentals of Information Technology	3	3-0-0
II	BVIT-IDC-151	Introduction to Web Technology	3	3-0-0
III	BVIT-IDC-201	Cyber Security	3	3-0-0

* NOTE:

- Mathematics maybe chosen as an IDC paper
- Evaluation method and marks distribution for combined paper i.e. Theory +Practical shall be as follows:

Theory: End Semester Examination - 35 Marks, Internal Test - 15 Marks Practical:
End Semester Examination - 35 Marks, Internal Test - 15 Marks
- For 2 credit paper, marks distribution shall be as follows:

End Semester Examination - 35 Marks, Internal Test - 15 Marks
- For papers of 35 and 50 marks, the end semester examination shall be of 2 hours duration.

Syllabi of B. Voc. (Information Technology) DSC Courses

Semester	: VII
Course Type	: DSC
Course Code	: BVIT-DSC-401 (A)
Name of the Course	: Digital Marketing

Learning level	: Advanced Course
Credits	: 2
Contact Hours	: 2 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: *The course objective is to*

1. Provide a solid foundation in the basics of digital marketing
2. Teach learners how to develop and execute a comprehensive digital marketing strategy.
3. Foster creativity and innovation, encouraging students to create compelling visuals, videos, and written content and developing unique marketing campaigns that stand out in a crowded digital landscape.
4. Keep learners updated with the latest trends and best practices, ensuring they remain competitive in the field.
5. Enhance career prospects

UNIT-I

Introduction to Digital Marketing: Overview of digital marketing, Evolution of digital marketing, Importance and benefits of digital marketing, Digital marketing channels and platforms. **Digital Marketing Strategy and Planning:** Developing a digital marketing strategy, Setting goals and objectives, Budgeting and resource allocation

UNIT-II

Campaign planning and execution, Monitoring and adjusting digital marketing campaigns **Social Media Marketing:** Overview of social media marketing, social media platforms and their features, Creating and optimizing social media profiles, Social media content strategy, Social media advertising and analytics

UNIT-III

Email Marketing: Introduction to email marketing, Building an email list, Creating effective email campaigns, Email automation and segmentation, Email marketing metrics and analytics **Content Marketing:** Understanding content marketing, Content strategy and planning.

UNIT-IV

Content creation and distribution, Content promotion and amplification, Content marketing metrics and analytics. **Mobile Marketing:** Mobile marketing overview, Mobile advertising strategies, Mobile app marketing, Location-based marketing, Mobile marketing analytics

UNIT-V

Analytics and Reporting: Importance of analytics in digital marketing, setting up web analytics tools (e.g., Google Analytics), Tracking and measuring key performance indicators (KPIs), Conversion tracking and optimization, Reporting and data visualization.

Course Outcomes: *Upon successful completion of the course, the students will be able to*

1. Understand the fundamental concepts and principles of digital marketing.
2. Develop practical skills to implement various digital marketing strategies and techniques.
3. Analyze and evaluate the effectiveness of digital marketing campaigns.
4. Apply critical thinking and problem-solving skills to real-world digital marketing scenarios.
5. Create comprehensive digital marketing plans and strategies.

Text Books:

1. **Digital Marketing** by S.Gupta, McGraw-Hill (3rd Edition, 2022).
2. **Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation** by Damian Ryan, Kogan Page (4th illustrated edition, 2017)

Reference books:

1. **Digital Marketing Strategy: An Integrated Approach to Online Marketing** by Simon Kingsnorth, Kogan Page (3rd illustrated Edition, 2022).
2. **Mobile Marketing: How Mobile Technology is Revolutionizing Marketing, Communications and Advertising** by Daniel Rowles, Kogan page(2nd Edition, 2017)
3. **Email Marketing Rules: How to Wear a White Hat, Shoot Straight, and Win Hearts** by Chad White and Jay Baer, Createspace Independent Pub (2013)
4. **Web Analytics 2.0: The Art of Online Accountability and Science of Customer Centricity** by Avinash Kaushik, Sybex (1st Edition, 2009)

Semester	: VII
Course Type	: DSC
Course Code	: BVIT-DSC-401 (B)
Name of the Course	: Digital Marketing Laboratory
Learning level	: Advanced Course
Credits	: 3
Contact Hours	: 6 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: *The course objective is to*

1. Enhance creativity and innovation in the field of digital marketing.
2. Education that combines theoretical knowledge with practical skills, strategic thinking, creativity, and up-to-date industry insights.

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

- 1 Digital Marketing Implementation in Business Scenario.
- 2 Create the Digital Marketing Webpage.
- 3 Conducting the Search Engine Optimization and Search Engine Marketing.
- 4 Using Google Analytics to analyze website performance.
- 5 Creating Promotional banners through Canva.
- 6 Facebook Promotion using banners.
- 7 Creating YouTube Channel for Marketing.
- 8 Twitter Marketing.
- 9 Instagram Marketing.
- 10 Email Marketing.
- 11 Digital Marketing Final Analysis and Report.

Course Outcomes: *Upon successful completion of the course, the students will be able to*

1. Create digital marketing webpage.
2. Develop practical skills to implement various digital marketing strategies and techniques.
3. Use facebook promotion using banners

4. Apply critical thinking and problem-solving skills to real-world digital marketing scenarios.
5. Use and implement Instagram and email marketing strategies.

Semester	: VII
Course Type	: DSC
Course Code	: BVIT-DSC-402 (A)
Name of the Course	: Animation and Visual Effects
Learning level	: Advanced Course
Credits	: 2
Contact Hours	: 2 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: The course objective is to

1. Provides students with a comprehensive understanding of animation and its techniques.
2. Provides students an in-depth exploration of the foundational principles and techniques used in digital compositing.
3. Provides students with a solid knowledge about 2D animation.
4. Provides students a theoretical knowledge about media ethics and copy right law

UNIT I

Introduction: Animation, uses of animation: Cartoons, simulations, scientific visualization, analysis, understanding, teaching, Techniques of animation, Different types of animation: 2D animation, 3D animation, Stop Motion animation, sand animation, pixilation, paint on glass animation, clay animation, puppet animation, object animation, Cut out animation, Digital Painting, Different painting styles: Landscape, portrait, still-life - Creating depth in digital paintings. Introduction of painting software (Tools and techniques).

UNIT II

Principles of Animation: Squash and stretch, anticipation, staging, straight ahead and pose to pose, follow through and overlapping action, slow in and slow out, arc, secondary action, timing, exaggeration, solid drawing. Character development: Model sheet, Composition and drawing, Traditional 2D production workbook, editorial, Layout, scene planning and scanning, Scene planning checklist, blue sketch and clean up layout, clean up animation, visual effects, BG painting, animation checking, Ink and paint, final checking, compositing/ film output.

UNIT III

2D animation: Use of light boards for animation, use of peg bars for registration, Use of key frames in animation, in-betweens, working on details with line strokes for smooth flow of animation. Introduction to compositing: Overview of compositing in film and animation, Importance of compositing in visual storytelling, Difference between visual effects and special effects, Depth and perspective in compositing, Compositing software

UNIT IV

Introduction to Storyboard, Types of Storyboard, Storyboard in Pre- Production, Benefits of Production, Artist and the Storyboard, Components and Principles of Storyboard, Drawing Thumbnail Storyboard, Sketching Perspective, Adding reality with Perspective, Final Storyboard art and theme, Storyboard Coloring.

UNIT V

Media Ethics and Copyright Law: Media ethics, Role and importance of Business Ethics and Values in Business, Ethics Impact on Business Policy and Business strategy, Role of bodies like Competition Commission of India, Media Law, Copyright and Intellectual Property IPR & copyright laws, Copyright Agreements: Short-Term vs. Long-Term Agreements, Media Law and Infringements: Menace of piracy and remedies to counter piracy, Statutory and non-statutory bodies formed to fight piracy.

Course Outcomes: Upon successful completion of the course, the students will be able to

1. Develop the skill of using Animation Equipments and tools
2. Develop Basics of Animation Principles
3. Build Skill of creating Animation
4. Create Character Animation

Text Books:

1. **Animation for Beginners** by Morr Meroz (Author), Bloop Animation Studios LLC; 2nd ed. edition (20 October 2021)
2. **The Encyclopaedia of Animation Techniques:** Richard Taylor 1999 2.
3. **How to Write for Animation:** Jeffrey Scott 2003

Reference Books:

1. **Writing for Animation, Comics and Games:** Christy Marx 2003
2. **How to Draw Animation - Learn the Art of Animation from Character Design to Storyboards and Layouts:** Christopher Hart 1997
3. **The Art of the Storyboard - Storyboarding for Film, TV, and Animation:** John Hart 2007
4. **Acting Using a Pencil: How To Plan an Animation Film:** Vineeth V 2022
5. **Don Bluth's Art of Storyboard:** Don Bluth 2004

Semester	: VII
Course Type	: DSC
Course Code	: BVIT-DSC-402 (B)
Name of the Course	: Animation and Visual Effects Laboratory
Learning level	: Advanced Course
Credits	: 3
Contact Hours	: 6 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: *The course objective is to*

1. Provides students with a practical knowledge of animation and its techniques.
2. Provides students an in-depth exploration of the techniques used in digital compositing.
3. Provides students with a practical knowledge about 2D animation.

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

1. Working with camera for the shoot
2. Applying camera for frame to frame shoot
3. Use of color scheme for characters and sets
4. Application of cut out character creation
5. Animation using cut out character
6. Use of software for compositing the frames
7. Use of Key Frames in animation
8. Application of adding up extra details and poses
9. Application Pencil test for animation check
10. Editing of Animation after pencil test
11. Importing scanned images into the software through layers
12. Checking timing in software to achieve smooth animation
13. Creating a Basic animation using effects and Pre-sets
14. Animating text
15. Working with shape Layers

Course Outcomes: *Upon successful completion of the course, the students will be able to*

1. *Apply camera for frame to frame shoot*

2. Use color scheme for characters and sets
3. Create animation using cut out character
4. Use key frames in animation
5. Develop the skill of using Animation Equipments and tools
6. Create Character Animation

Semester	: VII
Course Type	: DSC
Course Code	: BVIT-DSC-403
Name of the Course	: Cyber Security
Learning level	: Advanced Course
Credits	: 2
Contact Hours	: 2 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: *The course objective is to*

1. Learn the foundations of Cyber security and threat landscape.
2. To equip students with the technical knowledge and skills needed to protect and defend against cyber threats.
3. To develop skills in students that can help them plan, implement, and monitor cyber security mechanisms to ensure the protection of information technology assets.
4. To expose students to governance, regulatory, legal, economic, environmental, social and ethical contexts of cyber security.
5. To expose students to responsible use of online social media networks.
6. To systematically educate the necessity to understand the impact of cyber crimes and threats with solutions in a global and societal context.
7. To select suitable ethical principles and commit to professional responsibilities and human values and contribute value and wealth for the benefit of the society.

UNIT I

Introduction to Cyber Security– Defining Cyberspace, Architecture of cyberspace, Communication and web technology, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security.

UNIT II

Cyber Crime and Cyber Law- Classification of cyber crimes, Common cyber crimes- cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus-operandi , Reporting of cyber crimes, Remedial and mitigation measures, Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offences, Organisations dealing with Cyber crime and Cyber security in India.

UNIT III

Social Media Overview and Security- Introduction to Social networks, Types of Social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media.

UNIT IV

E-Commerce and Digital Payments- Definition of E- Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices, Introduction to digital payments, Components of digital payment and stake holders, Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e- Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled payments, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in unauthorised banking transactions. Relevant provisions of Payment Settlement Act-2007

UNIT V

Digital Devices Security, Tools and Technologies for Cyber Security- End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third party software, Device security policy, Cyber Security best practices, Significance of host firewall and Ant-virus, Management of host firewall and Anti-virus, Wi-Fi security, Configuration of basic security policy and permissions.

Course Learning Outcomes: *After successful completion of the course, the students will be able to*

1. *Understand the cyber security threat landscape.*
2. *Develop a deeper understanding and familiarity with various types of cyber attacks, cyber crimes, vulnerabilities and remedies thereto.*
3. *Analyse and evaluate existing legal framework and laws on cyber security.*
4. *Analyse and evaluate the digital payment system security and remedial measures against digital payment frauds.*
5. *Analyse and evaluate the importance of personal data its privacy and security.*
6. *Analyse and evaluate the security aspects of social media platforms and ethical aspects associated with use of social media.*

Text Books:

1. **Cyber Crime Impact in the New Millennium**, by R. C Mishra , Auther Press. Edition 2010.
2. **Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives** by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (1st Edition, 2011).
3. **Security in the Digital Age: Social Media Security Threats and Vulnerabilities** by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson, 13th November, 2001).
4. **Cyber Laws: Intellectual Property & E-Commerce Security** by Kumar K, Dominant Publishers.

Reference Books:

1. **Electronic Commerce** by Elias M. Awad, Prentice Hall of India Pvt Ltd.
2. **Cyber Laws: Intellectual Property & E-Commerce Security** by Kumar K, Dominant Publishers.
3. **Network Security Bible**, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
4. **Fundamentals of Network Security** by E. Maiwald, McGraw Hill.

Semester	: VII
Course Type	: DSC
Course Code	: BVIT-DSC-404
Name of the Course	: Mobile Application Development Laboratory
Learning level	: Advanced Course
Credits	: 3
Contact Hours	: 6 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: *The course objective is to*

1. Provides students with a practical knowledge development of mobile application.
2. Provides students an exploration of the Flutter Software and Dart program

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

1. Flutter Introduction: Knowing Flutter Architecture and Lifecycle
2. Basic Dart Program
3. Create your First functional App. Build your own Tip Calculator App
4. Creating your own E-commerce and Wallpaper App UI
5. Creating your own Whatsapp and Facebook App UI
6. Creating your own complete To Do App managing data in app local DB
7. Create a complete Quiz App managing Category wise and Difficulty wise Ques, Options with Correct Answer and Markings and presenting the same with UI managing High scores
8. Build your First Responsive and Adaptive App UI which can run on different sizes of all platforms.(ex. make WhatsApp app responsive and adaptive)
9. Manage Dark theme and light theme in your Apps using Provider(ex. make netflix app handle Light and Dark theme)
10. Build Complete News and Weather app handling API endpoints and their response with API exception handling
11. Build a complete Chat app Managing Users, Chat, read status, unread count, new message, bookmarks, profile picture
12. Complete your own OTT Netflix App managing videos on Firebase and Handling the videos with video player.
13. Integrating Ads in all the above Applications

Course Learning Outcomes: After successful completion of the course, the students will be able to:

1. Develop functional mobile application
2. Create E-commerce Mobile application based User Interface
3. Create responsive and adaptive mobile App User Interface
4. Integrate ads in mobile application

Semester	: VIII
Course Type	: DSC
Course Code	: BVIT-DSC-451
Name of the Course	: Design and Analysis of Computer Algorithms
Learning level	: Advanced Course
Credits	: 4
Contact Hours	: 4 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: The course objective is to

1. Learn fundamental techniques for designing efficient algorithms, including divide and conquer, greedy methods, dynamic programming, and backtracking
2. Analyzing Algorithm Efficiency using asymptotic notation (Big O, Omega, Theta)
3. Study graph algorithms such as BFS, DFS, shortest path and minimum spanning tree (Kruskal, Prim).
4. Understand P vs NP problems, reducibility, and heuristic approaches for solving complex problems.

UNIT-I

Introduction: Writing Structured programs, Analyzing Algorithms, Stacks and Queues, Trees, Heaps and Heap sort, Graphs, Hashing.

UNIT-II

Divide and Conquer: The general concept, Binary Search, Finding the maximum and minimum, Merge sort, Quick sort, Selection sort, Strassen's matrix manipulation, Greedy methods, Minimum spanning trees.

UNIT-III

Dynamic Programming: The General method, Multi stage graphs, All pairs shortest paths, Optimal binary search trees, Reliability design, The Travelling sales person Problem, Flow shop scheduling.

UNIT-IV

Basic search and traversal techniques: The techniques, Code generation, AND/OR graphs, Game trees, Biconnected components, Depth first search and Breadth first search

UNIT-V

Backtracking: the Queens problems, Introduction to NP- Hard and NP- Complete problems.

Course Learning Outcomes: After successful completion of the course, the students will be able to

1. *Analyze Algorithm Efficiency i.e. evaluate the time and space complexity of algorithms using asymptotic notations (Big O, Ω , Θ) and differentiate between worst-case, best-case, and average-case complexities.*
2. *Apply Algorithmic Design Techniques*
3. *Develop algorithms using techniques such as divide and conquer, greedy algorithms, dynamic programming, backtracking, and branch & bound.*
4. *Identify the appropriate algorithmic approach for solving different types of problems.*
5. *Understand NP-Completeness and Computational Complexity i.e. distinguishes between P, NP, NP-complete, and NP-hard problems.*

Text Books:

1. S. Sahni, and Horowitz, Rajasekaran, **Computer Algorithm**, 7th Edition, Galgotia Publications, 2010
2. Horowitz and Sahni, **Fundamentals of Computer Algorithm**, 6th Edition, Galgotia Publications, 2012
3. Aho, Hopcroft and Ullman, **Design and Analysis of Computer Algorithm**, 3rd Edition, Addison-Wesley, 2014.
4. S. E Goodman and S. T Hedet, **Introduction to the Design and Analysis of Algorithm**, 4th Edition, 2009.

Reference Books:

1. S.K Basu, **Design Methods and Analysis of Algorithms**, 2nd Edition, PHI, 2005.
2. Gilles Brassard and Paul Brantley, **Algorithmic theory and Practices**, 3rd Edition, PHI, 2007.
3. Knuth, **Fundamental Algorithms, The Art of Computer Programming**, Vol-1, 3rd Edition, Addison-Wesley, 1997.
4. S. Sahni, **Analysis of Algorithms through C++**, 4th Edition, Tata McGraw Hill, 2009.

Syllabi of B. Voc. (Information Technology) DSM Courses

Semester	: VII
Course Type	: DSM
Course Code	: BVIT-DSM-401 (A)
Name of the Course	: Software Engineering
Learning level	: Advanced Course
Credits	: 2
Contact Hours	: 2 Hours per week
Total Marks	: 50
End Semester Marks	: 35 (Pass Marks: 14)
Internal Marks	: 15 (Pass Marks: 6)
End Semester Exam Time	: 2 hours

Course Objectives: *The course objective is to*

1. *Learn fundamental techniques for designing efficient algorithms, including divide and conquer, greedy methods, dynamic programming, and backtracking*
2. *Provide knowledge of basic SW engineering methods and practices.*
3. *Provide a general understanding of software process models such as the waterfall and evolutionary models.*
4. *Understanding of software requirements and the SRS documents.*
5. *Understanding of approaches to verification and validation including static analysis, and reviews.*
6. *Understanding of software testing approaches such as unit testing and integration testing.*
7. *Understanding of software evolution and related issues such as version management.*
8. *Understanding on quality control and how to ensure good quality software.*

UNIT I

Introduction : Characteristics of Software, Product and Process, Need for Software Process, Characteristics of a Software Process, Software Development Life Cycle Model: Waterfall Model, Prototyping, iterative development, Spiral Model, time-boxing model; Comparison of different Life Cycle Models, Project Estimation Techniques,

UNIT II

Software Requirements Analysis and Definition: Software Requirements, Overview of SA/SD Methodology, Requirements Specification: Need for SRS, Characteristics of an SRS, Components of an SRS, Planning a project, effort estimation, COCOMO model, risk management-assessment, control

UNIT III

Function oriented design: Problem partitioning, abstraction, modularity, Top down and Bottom-up Strategies, coupling, cohesion, design notations-structure charts, structured design, Data Flow Diagrams, Developing the DFD Model of a system, Transform and Transaction flow. Object-oriented design concepts, Object Oriented Design using UML, design walkthroughs, critical design review, consistency checkers..

Unit IV

Testing and Strategies: Software Testing fundamentals, Test Case Design, White box, Black Box testing, Control Structure testing, approaches to testing, Unit Testing, integration testing, Validation testing, system testing

UNIT V

Quality Assurance and Reliability: SQA- software Quality Assurance, Software Reliability, SQA Plan, ISO9000 and SEI standards for software, Software Configuration Management (SCM), Baselines, scan process, Version control, change control, SCM audits.

Course Learning Outcomes: *After successful completion of the course, the students will be able to*

1. Apply software engineering principles and techniques.
2. Develop, maintain and evaluate large-scale software systems.
3. Produce efficient, reliable, robust and cost-effective software solutions.
4. Perform independent research and analysis.
5. Manage time, processes and resources effectively by prioritising competing demands to achieve personal and team goals
6. understand and meet ethical standards and legal responsibilities.

Text Books:

1. **Fundamentals of Software Engineering** by Rajib mall (author), PHI Learning (5th Edition, 2018)
2. **Software Engineering: A Practitioner's Approach** By Roger Pressman (Author), Bruce Maxim (Author), Mcgraw Hill (9th Edition, 2023)
3. **Integrated Approach to Software Engineering** by Pankaj Jalote, Narosa Publishing (3rd Edition, 2019).

Reference Books:

1. **Software Engineering at Google: Lessons Learned from Programming Over Time** (Grayscale Indian Edition), by Titus Winters (Author), Hyrum Wright (Author), Tom Manshreck (Author), Shroff/O'Reill, (2020)
2. **Modern Software Engineering: An Engineering Discipline for Software in the Age of Agile Development and Continuous Delivery** by David Farley (Author), Addison-Wesley Professional (2021)

Semester	: VII
Course Type	: DSM
Course Code	: BVIT-DSM-401 (B)
Name of the Course	: Software Engineering Laboratory

Learning level	: Advanced Course
Credits	: 3
Contact Hours	: 6 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: *The course objective is to*

1. Provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
2. Provide an idea of using various process models in the software industry according to given circumstances.
3. Gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

Following are some programming tasks for laboratory programming assignments but the assignments are not limited to these only.

1. Write programs in C Language to demonstrate the working of the do...while constructs and to understand the working of do while with different range of values and test cases.
2. Write programs in C Language to demonstrate the working of the while....do constructs and to understand the working of while--do with different range of values and test cases
3. Write programs in C Language to demonstrate the working of the if...else constructs and to understand the working of if...else with different range of values and test cases
4. Write programs in C Language to demonstrate the working of the switch constructs and to understand the working of switch with different range of values and test cases
5. Write programs in C Language to demonstrate the working of the for constructs and to understand the working of for with different range of values and test cases
6. A program written in c language for matrix multiplication fails —Introspect the causes for its failure and write down the possible reasons for its failure. Objective: Understand the failures of matrix Multiplication.
7. Design, develop, code and run the program in any suitable language to implement the Quick sort algorithm. Determine the basis paths and using them derive different test cases, execute these test cases and discuss the test results.
8. Design, develop a code and run the program in any suitable language to implement the binary search algorithm. Determine the basis paths and using them derive different test cases execute these test cases and discuss the test results.
9. Design and develop a program in a language of your choice to solve the triangle problem defined as follows :
 - Accept three integers which are supposed to be the three sides of triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all.
 - Derive test cases for your program based on equivalence class partitioning , execute the test cases and discuss the results. (Equivalence class partitioning program)

Course Learning Outcomes: *After successful completion of the course, the students will be able to*

1. Decompose the given project in various phases of a lifecycle.
2. Choose appropriate process model depending on the user requirements.
3. Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
4. Apply the knowledge, techniques, and skills in the development of a software product.

Semester	: VII
Course Type	: DSM

Course Code	: BVIT-DSM-451
Name of the Course	: Multimedia
Learning level	: Advanced Course
Credits	: 4
Contact Hours	: 4 Hours per week
Total Marks	: 100
End Semester Marks	: 70 (Pass Marks: 28)
Internal Marks	: 30 (Pass Marks: 12)
End Semester Exam Time	: 3 hours

Course Objectives: *The course objective is to*

1. Understand fundamental principles of multimedia.
2. Learn about image, graphics and image compression techniques.
3. Understand the basics animation, graphics, and interactive media applications.
4. Learn techniques for recording, editing, and enhancing audio and video content.

UNIT I

Introduction: Multimedia definition, Main properties of Multimedia, traditional data stream characteristics, data stream characteristics for continuous media; Sound/ Audio: Basic sound concepts, MIDI, elements of speech, Speech generation, speech analysis, speech transmission.

UNIT II

Images and Graphics: Digital Image Representation, Image format, Image Synthesis, Image Transmission; Video and Animation: basic concepts, Television: Conventional System, High definition system, Computer based animation, Animation languages, method of controlling animation, display of animation, Transmission of Animation

UNIT III

Data Compression: storage space, coding requirements, source, Entropy and hybrid encoding, basic compression techniques, Lossy sequential DCT-based Mode, expanded Lossy DCT-based Mode, Lossless Mode, H.261, MPEG; Computer Technology: Communication Architecture, Hybrid system, digital System

UNIT IV

Multimedia Operating System: Real time and Multimedia, Resource management, Real time process management in conventional Operating system, Real time processing requirements, Real time scheduling, Earliest deadline First Algorithm, Rate Monotonic Algorithm, Pre-emptive vs non-preemptive task scheduling, scheduling of continuous media task

UNIT V

Synchronization: Basic synchronization issues, Intra and inter-object synchronization, Live and synthetic Synchronization, Lip Synchronization requirements, Pointer Synchronization requirements, Elementary media synchronization, Multimedia synchronization specification methods, interval-based specification, Axes-based specification, control flow-based specification.

Course Learning Outcomes: *After successful completion of the course, the students will be able to*

1. Demonstrate an understanding of multimedia principles, concepts, and applications.
2. Identify and explain different multimedia elements (text, images, audio, video, animation, and interactivity).
3. Understand the impact of multimedia in various industries such as advertising, education, entertainment, and web development.

Text Books:

1. **Multimedia: Computing Communications & Applications** by Steinmetz (Author), Pearson Education India (2002)
2. **Principles of Multimedia** by Ranjan Parekh (Author), McGraw Hill Education (2017)

Reference Books:

1. **Multimedia Systems(Siggraph Series)** by John Buford (Author), Addison-Wesley (1994)
2. **Virtual Reality Systems** by John Vince, Pearson Education India (1995)

Syllabi of B. Voc. (Information Technology) SEC Courses

Semester	: VIII
Course Type	: SEC
Course Code	: BVIT-SEC-451
Name of the Course	: Project
Learning level	: Advanced Course
Credits	: 12
Contact Hours	: 24 Hours per week
Total Marks	: 300
End Semester Marks	: 210 (Pass Marks: 84)
Internal Marks	: 90 (Pass Marks: 36)

- ✓ The project in the final semester shall be done on a topic relevant to industry / application development etc. and shall be demonstrated through seminar presentation, preparation and submission of project report for final evaluation and assessment through external examiner(s).