

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: Classfull 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 Invin. 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 cdition. ELSEVIER
4. Computer Networking: A Top-Down Appranch Featuring the Internet, James F. Kurosc. K. W Ross. 3rd Edition, Pearson Eduction

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 train 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 Font 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 Gradc-I, II and III

- i. Find max, min and average salary of employees in respective Grade
 - ii. Count no. of people where VA>HRA
 - iii. Find out most frequently occurring grade
 - iv. Extract records where employee name starts with "A " has HRA> 10000
 - v. Print Grade wise report of all employees with subtotals of net salary and also grand totals.
 - vi. 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 sell of more of more items and getting the profit of R\$40,000/ 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.*