As per NEP 2020

S. Z. S. P. Mandal's

Shri Pancham Khemraj Mahavidyalaya,
Sawantwadi-416510
(Autonomous)
Affiliated to University of Mumbai

Title of the Programme: Science

B.Sc. (Information Technology)

A: Certificate: 2026-2027

B: Diploma: 2027-2028

C: Degree: 2028-2029

Syllabus for

Sem-I and Sem-II

Reference GR dated 16th May 2023 for Credit structure

Sr. No.	Headings	Particulars
1	Title of the Program	**Bachelor in Science- Information Technology**
2	Eligibility	A pass in Class 12 with Mathematics and Statistics with a minimum of 45% aggregate (40% for reserved category students)
3	Duration of the Program	1- Certificate 2- Diploma 3- Advance Diploma 4- Research Degree
4	Scheme of Examination	60 External: 40 Internal Separate passing in External and Internal examination
5	Standard of Passing	40.00%
6	Program Academic Level	4.5 Certificate 5.0 Diploma 5.5 UG Degree 6.0 UG Honors Degree
7	Pattern	Semester Pattern
8	Status	New
9	To Be Implemented from the academic year	4.5 Certificate **2026-2027** 5.0 Diploma **2027-2028** 5.5 UG Degree **2028-2029** 6.0 UG Honors Degree **2029-2030**

Preamble

1) Introduction

. The B.Sc. Information Technology program was started in 2001 with an aim to make the students employable and impart industry-oriented training. The main objectives of the course are:

2) Aims and Objectives

- To think analytically, creatively and critically in developing robust, extensible and highly maintainable technological solutions to simple and complex problems.
- To apply their knowledge and skills to be employed and excel in IT professional careers and/or to continue their education in IT and/or related post graduate programmers.
- To be capable of managing complex IT projects with consideration of the human, financial and environmental factors.
- To work effectively as a part of a team to achieve a common stated goal.
- To adhere to the highest standards of ethics, including relevant industry and organizational codes of conduct.
- To communicate effectively with a range of audiences both technical and non-technical.
- To develop an aptitude to engage in continuing professional development

3) Learning Outcomes

The new syllabus is aimed to achieve the objectives. The syllabus spanning three years covers the industry relevant courses. The students will be ready for the jobs available in different fields like:

- Data Analytics
- Big Data
- Mongo DB
- Robotics
- Software Development (Programming)
- Website Development
- Mobile app development
- Internet of Things
- Software Testing
- Networking
- Database Administration
- System Administration
- Cyber Law Consultant
- GIS (Geographic Information Systems)
- IT Service Desk
- Computer and network Security
- Communication skills
- Cyber security

Proposed First Year Credit Structure as per NEP 2020

Department of Information Technology

Proposed Structure for Major / Minor/OE/VSE/SEC/VEC/IKS/VEC

Level 4.5					
Semester	**SUBJECT CODE**	**SUBJECT NAME**	**TH/ PRACT**		**CREDIT**
I	**USITT111**	Mastering with C++	TH	**Major**	6
	USITP112	Mastering with C++ Practical	Pract		
	USITT113	Statistical Mathematics	TH	**Minor**	2
	CDITOE111	Google Office Automation	TH	**OE**	4
	CDITOE112	Multimedia	TH		
	ITTVS111	Combinational and Sequential Design	TH	**VSC**	4
	ITPSE111	Web App Development	Pract	**SEC**	
	ITTAE111	Introduction to Soft & Hard Skills	TH	**AEC**	6
	ITPVE111	Computer Fundamentals & System Maintenance	Pract	**VEC**	
		Digital Electronics			
	ITTIK111	Vedic Mathematics	TH	**IKS**	
				Total	**22**
II	**USITT114**	Programming with Python	TH	**Major**	6
	USITP115	Programming with Python Practical	Pract		
	USITT116	Numerical Mathematics	TH	**Minor**	2
	CDITOE113	E-Commerce & Digital Marketing	TH	**OE**	4
	CDITOE114	Data Hiding & Spreadsheet	TH		
	ITTVS112	Fundamentals of Microprocessor and Microcontrollers	TH	**VSC**	4
	ITTSE112	Database Management	TH	**SEC**	

	ITTAE112	Academic & Professional Skills	TH	**AEC**	2
	ITPVE112	Assembly Language Programming and Embedded C++	**Pract**	**VEC**	2
	ITTCC111	CC	**TH**	**CC**	2
				Total	**22**

Letter Grades and Grade points

GPA/Program CGPA/Semester Program	Percentage of Marks	Alpha- sign / letter grade result
9.00-10.00	90.0-100	**O** (Outstanding)
8.00-<9.00	80.0-90.0	**A+** (Excellent)
7.00-<8.00	70.0-80.0	**A** (Very Good)
6.00-<7.00	60.0-70.0	**B+** (Good)
5.50-<6.00	55.0-60.0	**B** (Above Average)
5.00-<5.50	50.0-55.0	**C** (Average)
4.00-<5.00	40.0-50.0	**P** (Pass)
Below <4.00	Below 40.0	**F** (Fail)
AB (absent)		Absent

SEMESTER I

B. Sc. (Information Technology)	Semester – I
Course Name: Mastering with c++	**Course Code: USITT111**
Credits	**4**

Course Objectives:

Understand object-oriented programming and advanced C++ concepts.

- Be able to explain the difference between object-oriented programming and procedural programming.
- Be able to program using more advanced C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, exception handling, etc.
- Be able to build C++ classes using appropriate encapsulation and design principles
- Be able to apply object oriented or non-object-oriented techniques to solve bigger computing problem**s.**

Unit	Details	Lectures
I	**Object-Oriented Paradigm:** Why New Programming Paradigms?, OOPs – a New Paradigm, Evolution of Programming Paradigms, Structured vs. Object-Oriented Development, Elements of Object-Oriented Programming, Objects, Classes, Inheritance, Polymorphism **Moving from C to C++** : Hello World in C++, Streams I/O, Comments, Literals, Scope-Resolution Operator, References, Inline, Overloading, Templates Runtime Memory Management **C++ at a Glance:** Classes and Abstraction, Inheritance, Operator Overloading, Friend Functions, Virtual Functions, Exception Handling, Streams **Data Types, Operators & Expressions:** Tokens and Identifiers, Variables, Data Types and Sizes, Operators (Arithmetic, Logical, Bitwise), Qualifiers, Enumerated Types, Precedence	**15**
II	**Control Flow:** if, if-else, for, while, do…while, break, switch, continue, goto. **Arrays & Strings:** One & Multidimensional Arrays, String Manipulations **Modular Programming with Functions:** Function Basics, Passing Data Inline, Overloading, Function Templates, Recursive Functions, Storage Class.	**15**
III	**Classes & Objects:** Class Design, Specifying Classes, Member Functions, Friend Classes, Static Members, Memory Resource Management **Object Initialization & Cleanup:** Constructors & Destructors, Parameterized & Copy Constructors, Dynamic Initialization, Constant Objects **Dynamic Objects:** Pointers to Objects, Arrays of Objects & Pointers, this Pointer, Self-referential Classes	**15**

IV	**Inheritance:** Types (Single, Multiple, Multilevel, Hybrid), Constructors and Inheritance, Virtual Base Classes, Composition vs Inheritance **Virtual Functions:** Need for Virtual Functions, Base & Derived Pointer Behavior, Pure Virtual Functions, Abstract Classes **Generic Programming with Templates:** Function Templates, Overloaded Templates, Template Nesting	**15**

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Mastering with c++	K.R. Venugopal			
2.	Object Oriented Programming in C++	E Balagurusamy	Tata McGraw-Hill	8 th Edition	2011
3.	Object-oriented Programming C++ Simplified	Hari Mohan Pandey	University Science Press	1st Edition	2017

Course Outcomes:

Learners will be able to,

1. Understand the concept of OOPs, a feature of C++ language.
2. Understand and apply various types of Data types, Operators, Conversions while designing the program.
3. Understand and apply the concepts of Classes & Objects, friend function, constructors & destructors in program design.
4. Design & implement various forms of inheritance, String class, calling base class constructors.
5. Apply & Analyze operator overloading, runtime polymorphism, Generic Programming.
6. Analyze and explore various Stream classes, I/O operations and exception handling.

B. Sc (Information Technology)	Semester – I
Course Name: Mastering with C++ Practical	Course Code: USITP112
Credits	2

Course Objectives:

- The student should be able to explain the important characteristics of the C++ programming language.
- The learner must be able to combine components of the C++ programming language to develop structured programs.
- The student must demonstrate the skills essential to compile, debug, and test C++ programs correctly.

Units	Practical List	Lecture /Hours
Unit I	**1.** Implement a program to understand the basic data types. **2.** Design to implement input output function. **3.** Design Programs on decision statements (IF-Else, Else-if, switch). **4.** Implement Programs on looping. (While, do-while, for). **5.** Design a Programs on nested Structure.	15
Unit II	**1.** Write a program to implement Array (1-D,2-D, Matrix). **2.** Programs on functions (user defined function). **3.** Design a program to implement Type Conversion using C++. **4.** Write a program to use Scope resolution operator (: :) using function	15
Unit III	**6.** Design a program to implement class, object (array of object) **7.** Design program for Constructor and destructor **8.** Create a program to implement operator overloading **9.** Design a program to implement inheritance and its type **10.** implement program for virtual function	15
Unit IV	**11.** Write a program to use file handling. **12.** write a program to use different file opening modes **13.** Implement Exception handling using cpp. **14.** Implement program for string manipulation **15.** Implement a for templet creation.	15

Course Outcomes:

Leaners will able to,

1. Utilize C++ characteristics in software design and development.
2. Explain object-oriented techniques and explain how C++ supports them.
3. Employ C++ to demonstrate practical skill developing object-oriented solutions.
4. Examine a problem statements and design and develop object-oriented software using good coding practices and procedures.
5. In object-oriented design, use common software patterns and recognize their relevance in other software development contexts.

B. Sc. (Information Technology)	Semester – I
Course Name: Statistical Mathematics	**Course Code: USITT113**
Credits	**2**

Course Objectives:

- Course will provide an overview of mathematics used for data science, Machine learning and analytics
- The course will provide students with an overview of discrete mathematics.
- Students will learn about topics such as logic and proofs, sets and functions, recursion, graph theory, trees and other important discrete math concepts.

Unit	Details	Lectures
I	**Complex numbers:** equality of complex number, polar form of complex number, exponential form of complex number, addition and subtraction of complex number, product of complex numbers and its properties **Vector**: space, vector addition, scalar multiplication, convex combination, dot product, linear combination of vector, subspace, linear functions, null space, linear dependence, basis, dimension of vector space, Rank-Nullity theorem, Inner product for vectors its properties, Orthogonally theorems statements	**10**
II	**Set Theory** :Introduction, Sets and Elements, Subsets, Venn Diagrams, Set Operations, Algebra of Sets, Duality, Finite Sets, Counting Principle, Classes of Sets, Power Sets, Partitions, Mathematical Induction Relations Introduction, Product Sets **Relations**: Pictorial Representations of Relations, Composition of Relations, Types of Relations, Closure Properties, Equivalence Relations, Partial Ordering Relations	**10**
III	**Matrix and its types**: equality of matrices, addition and its properties, Multiplication of matrices, inverse and adjoint of a matrix, Eigenvector and Eigenvalues, Similar matrices, Characteristic equations, Cayley-Hamilton theorem, Similarity of matrices, Rank of matrix.	**10**

Course Outcomes:

1. Demonstrate understanding of basic mathematical concepts in data science.
2. Employ methods related to these concepts in a variety of data science applications.
3. Apply logical thinking to problem-solving in context.
4. Use appropriate technology to aid problem-solving and data analysis.
5. Demonstrate skills in writing mathematics.

B. Sc. (Information Technology)	Semester – I
Course Name: Google Office Automation	**Course Code: CDITOE111**
Credits	**2**

Course Objectives:

- Understanding of various Google Workspace applications, including Google Docs, Google Sheets, Google Slides, Google Drive, Google Calendar, Gmail, and other relevant tools.
- Learn to create, format, and edit documents efficiently using Google Docs.
- Understand how to collaborate in real-time with colleagues on documents.
- Develop skills in data analysis, organization, and management using Google Sheets.
- Learn to use formulas, functions, and data visualization techniques to analyze and interpret data effectively.
- Acquire the ability to create engaging and professional presentations using Google Slides.
- Master the art of efficient email communication, organization, and productivity using Gmail,
- Understand how to use Google Workspace applications on mobile devices to stay productive while on the go

Unit	Topics	No of Lectures
I	**Google Docs**: Introduction to Google Docs, Creating and Editing Documents, Organizing and Managing Documents, Advanced Formatting Techniques, Collaboration and Communication, Add-ons and Templates, Working Offline and Synchronization, Advanced Features (Optional, depending on the course level) **Google Sheets:** Introduction to Google Sheets, Data Entry and Formatting, Basic Formulas and Functions, Data Analysis and Manipulation, Data Visualization, Collaboration and Sharing, Importing and Exporting Data **Google Slides:** Introduction to Google Slides, Working with Content, Enhancing Presentations, Collaboration and Sharing, Advanced Features, Final Project and Presentation	**15**
II	**Gmail / Outlook**: Introduction to Microsoft Outlook, Managing Email, Contacts and Address Book, Calendar and Scheduling, Tasks and To-Do List, Notes and Journal, Outlook Data Management, Advanced Outlook Features, Outlook on Mobile Devices, Troubleshooting and Tips **Google Form**: Introduction to Google Form, creating a Form, Adding Questions, Form Customization, Form Settings, Response Collection, Form Sharing, Collaborating on Forms, Advanced Form Features. **Google Keep**: Introduction to Google Keep, Creating and Managing Notes, Note Organization, Collaboration and Sharing, Advanced Features, Integrations, Tips and Tricks, Tips and Tricks, Troubleshooting and Support	**15**

Text Books: Reference Books

1. Google Workspace For Dummies – Paul McFedries, 2024 (approx published year based on latest edition availability)

2. The Google Workspace Bible: [14 in 1] The Ultimate All-in-One Guide – Robert G. Pascall, 2023

3. Google Sheet Functions: A Step-by-Step Guide – Barrie Roberts, 2020 (focus on Sheets but relevant for automation and productivity)

B. Sc. (Information Technology)	Semester – I
Course Name: Multimedia	**Course Code: CDITOE112**
Credits	**2**

Course Objectives:

On completion of the subject, the students will

- Understand the technologies behind multimedia applications and master the skills for developing multimedia projects.
- Summarize the key concepts in current multimedia technology.
- Create quality multimedia software titles.

Unit	Topics	No of Lectures
I	**Introduction to Multimedia:** What is multimedia, Components of multimedia, Web and Internet multimedia applications, Transition from conventional media to digital media. **Computer Fonts and Hypertext:** Usage of text in Multimedia, Families and faces of fonts, outline fonts, bitmap fonts International character sets and hypertext, Digital font's techniques.	10
II	**Audio fundamentals and representations** Digitization of sound, frequency and bandwidth, decibel system, data rate, audio file format, Sound synthesis, MIDI, wavetable, Compression and transmission of audio on Internet, Adding sound to your multimedia project, Audio software and hardware. **Image fundamentals and representations** Colour Science, Colour, Colour Models, Colour palettes, Dithering, 2D Graphics, Image Compression and File Formats: GIF, JPEG, JPEG 2000, PNG, TIFF, EXIF, PS, PDF, Basic Image Processing [Can Use Photoshop], Use of image editing software, White balance correction, Dynamic range correction, Gamma correction, Photo Retouching	10
III	**Video and Animation** Video Basics, How Video Works, Broadcast Video Standards, Analog video, Digital video, Video Recording and Tape formats, Shooting and Editing Video (Use Adobe Premier for editing). **Video Compression and File Formats**. Video compression based on motion compensation, MPEG-1, MPEG-2, MPEG-4, MPEG-7, MPEG-21, Animation: Cell Animation, Computer Animation, Morphing. **Multimedia Authoring** Multimedia Authoring Basics, Some Authoring Tools, Macromedia Director & Flash	10

B. Sc. (Information Technology)	Semester – I
Course Name: Combinational and Sequential Design	**Course Code: ITTVS111**
Credits	**2**

Course Objectives:

- To introduce the basics of logic in digital electronics as an entry level course.
- To interpret and assess number systems and the conversions of number systems
- To analyse the Boolean expressions and reduce the expression to the minimum.
- To design simple logic circuits using tools such as Boolean algebra and Karnaugh Mapping.
- To understand the state of a memory cell and its types using flip-flops.
- To create simple digital systems using counters, registers etc.

Unit	Details	Lectures
I	**Digital Systems and Binary numbers** Introduction to Number systems, Positional Number systems, Conversions (converting between bases), Non positional number systems, Unsigned and Signed binary numbers, Binary Codes, Number representation and storage in computer systems. **Logic gates and Logic Circuits** Basic and Universal Gates	**10**
II	**Boolean algebra and Gate level minimization** Introduction, Postulates of Boolean Algebra, Two Valued Boolean Algebra, Principle of Duality, Basic Theorems of Boolean Algebra, Boolean Functions and their representation, Gate-Level Minimization (Simplification of Boolean Function), **Bit Arithmetic and Logic unit, K-Map**	**10**
III	**Sequential circuits** Introduction, Latch, Flip-Flops, Registers, Counters, Review Questions	**10**

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Digital Logic Design	Sonali Singh	BPB publications	1st	2015
2.	Fundamentals of Digital Electronics and Logic Design	Subir Kumar Sarkar, Asish Kumar De, Souvil Sarkar	Pan Stanford Publishing	1st	2014

3.	Digital Electronics Principles, Design and Applications	Anil K Maini	Wiley	1st	2007
4.	Fundamentals of Logic Design	Charles H Roth, Larry L Kinney	Cengage Learning	7th	2014
5.	Digital Principles and Applications	Donald P Leach Albert Malvino Goutam Saha	TMH	8th	2015

Course Outcomes:

Learners will be able to,

1. Apply number conversion techniques in real digital systems
2. Solve Boolean algebra expressions
3. Derive and design logic circuits by applying minimization in SOP and POS forms
4. Design and develop Combinational and Sequential circuits
5. Understand and develop digital applications

B. Sc (Information Technology)	Semester – I
Course Name: Web App Development	**Course Code: ITPSE111**
Credits	**2**

Course Objectives:

- Understand how to effectively implement HTML.
- Write CSS effectively to create well organized, styled web pages.
- Add versatility to a web page with client-side scripting.
- Deploy a local web server and run a simple web application.
- Read and process data in MySQL using PHP.

Units	Practical List	Lecture /Hours
Unit 1	1. **Use of Basic Tags** a. Design a web page using different text formatting tags. b. Design a web page with links to different pages and allow navigation between web pages. c. Design a web page that automatically redirects the user to another page. **2. Use of CSS** d. Design a web page demonstrating different style sheet types. e. Design a web page demonstrating grouping selectors. **3. Layout and Media** f. Design a web page demonstrating different semantics. g. Design a web page embedding image, audio and video. h. Design a web page with Image maps. **4. Tables** i. Design a web page with different tables. **5. Forms** j. Design a web page with a form that uses all types of controls.	20
	6. JavaScript- I a. Using JavaScript, design a web page to accept a number from the user and print its Factorial. b. Using JavaScript, a web page that prints Fibonacci series/any given series. **7. JavaScript**- II	20

	c. Write a JavaScript program to display all the prime numbers between 1 and 100. d. Write a JavaScript program to accept a number from the user and display the sum of its digits. **8. JavaScript Objects** e. Using JavaScript, design a web page demonstrating different native objects of JavaScript. f. Write a program in JavaScript to accept a sentence from the user and display the number of words in it. (Do not use split () function). **9. JavaScript Events** g. Write a JavaScript program to design simple calculator. h. Design a form and validate all the controls placed on the form using JavaScript. **10. Use Arithmetic Operator and Logical Operator in PHP**	
Unit III	**11. Use Conditional Statement in PHP.** **12. Use Looping in PHP.** **13. Basic PHP - I** a. Write a PHP code to find the greater of 2 numbers. Accept the no. from the user. b. Write a PHP Program to accept a number from the user and print it factorial. c. Write a PHP program to accept a number from the user and print whether it is prime or not. **14. Basic PHP - II** d. Write a PHP program to display the following Binary Pyramid: 1 1 0 1 1 0 1 0 1 0 1 e. Write a PHP program to demonstrate different string functions. f. Write a PHP program to demonstrate different array functions. **15. PHP and MySQL** g. Write a PHP program to create: ● Create a database College ● Create a table Department (Dname, Dno, Number_of_faculty)	20

	• Write a PHP program to create a database named "College". Create a table named "Student" with following fields (sno, sname, percentage). Insert 3 records of your choice. Display the names of the students whose percentage is between 35 to 75 in a tabular format.	

Course Outcomes:

Learners will be able to,

1. Design static web pages using HyperText Markup Language (HTML).
2. Enhance the look of web pages by implementing CSS.
3. Collect information from the user with HTML Forms.
4. Design interactive web pages using client-side script (JavaScript).
5. Implement Document Object Model and events in web pages using JavaScript.
6. Write and deploy basic PHP code to simplify web development.
7. Store and retrieve data from a server using PHP.

B. Sc (Information Technology)	Semester – I
Course Name: Introduction to Soft & Hard Skills	**Course Code: ITTAE111**
Credits	**2**

Course Objectives:

1. Understand the significance and essence of a wide range of soft skills.
2. Learn how to apply soft skills in a wide range of routine social and professional settings
3. Learn how to employ soft skills to improve interpersonal relationships
4. Learn how to employ soft skills to enhance employability and ensure workplace and career success

Unit	Details	Lectures
I	**Soft Skills**: An Introduction – Definition and Significance of Soft Skills; Process, Soft Skill Development. **Personality Development**: Knowing Yourself, Positive Thinking, Johari‟s Window, Physical Fitness **Emotional Intelligence**: Meaning and Definition, Need for Emotional Intelligence, Intelligence Quotient versus Emotional Intelligence Quotient, Skills to Develop Emotional Intelligence.	10
II	**Positivity and Motivation:** Developing Positive Thinking and Attitude; Driving out Negativity Enhancing Motivation Levels **Etiquette and Mannerism**: Introduction, Professional Etiquette, Technology Etiquette **Ethical Values**: Ethics and Society, Correlation between Values and Behavior, Nurturing Ethics, Importance of Work Ethics, Problems in the Absence of Work Ethics.	10
III	**Communication Today**: Significance of Communication, GSC's 3M Model of Communication, Virtues of Listening, Fundamentals of Good Listening, Nature of Non-Verbal Communication, Need for Intercultural Communication, Communicating Digital World	10

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Managing Soft Skills for Personality Development	B.N.Ghosh	McGraw Hill India		2017
2.	Soft Skills, An Integrated Approach to Maximise Personality	Gajendra S.Chauhan, Sangeeta Sharma,	Wiley India		

Course Outcome:

Learners will be able to,

1. Analyse, synthesize and utilize the process and strategies from delivery to solving communication problems.
2. Learn the communication methodologies at the workplace and learn about the importance of team collaboration.
3. Learn about different technical communication such as presentations and interviews.
4. Understand and apply the art of written communication in writing reports, proposals.
5. Ground rules of ethical communication and MIS.
6. Understand the functions of graphs, maps, charts.

B. Sc (Information Technology)	Semester – I
Course Name: Computer Fundamentals & System Maintenance	**Course Code: ITPVE111**
Credits	**1**

Course Objectives:

- To familiarize students with computer fundamentals and operating systems
- To develop basic skills in Microsoft Office applications
- To provide hands-on experience in system and network maintenance

To introduce safe computing and troubleshooting techniques

Unit	Details	Lectures
I	**Practical 1: Assembling a Computer System** • Identification of internal hardware components (motherboard, CPU, RAM, storage, SMPS) • Step-by-step assembly of a desktop computer (demonstration-based) • Connecting peripheral devices • Basic safety precautions **Practical 2: Operating System Basics** • Desktop elements and system navigation • Window management and keyboard shortcuts • User account overview **Practical 3: File and Folder Management** • Creating, renaming, moving, copying, and deleting files/folders • File extensions and attributes • Search operations	10
II	**Practical 4: Basics of Microsoft Word** • Creating and saving documents • Text formatting (font, paragraph, alignment) • Inserting tables and images **Practical 5: Basics of Microsoft Excel** • Creating worksheets and workbooks • Data entry and formatting • Using basic formulas and functions (SUM, AVERAGE) **Practical 6: Basics of Microsoft PowerPoint** • Creating presentations	10

	• Adding slides, text, images, and animations • Running slide shows	
III	**Practical 7: System Configuration and Performance Monitoring** • Viewing system properties • Using Task Manager • Monitoring CPU, memory, and disk usage **Practical 8: Disk and Software Management** • Software installation and uninstallation • Disk cleanup utility • Understanding storage management **Practical 9: Basic Networking and Network Troubleshooting** • Understanding basic networking concepts (LAN, WAN) • Viewing IP configuration • Using basic network commands (ping, ipconfig/ifconfig) • Troubleshooting common connectivity issues **Practical 10: Security, Backup, and Recovery** • Antivirus installation and system scanning • Data backup and restore • Safe computing and basic network security practices	10

Laboratory Requirements

- Desktop computer components for assembly (demonstration kit)
- Computers with Windows OS and Microsoft Office
- LAN/Wi-Fi connectivity
- Antivirus and system utilities

Course Outcome:

Learners will be able to,

1. Assemble and identify basic computer hardware components
2. Use operating systems and office tools efficiently
3. Perform basic system and software maintenance
4. Troubleshoot common system and network issues
5. Apply data security, backup, and safe computing practices

B. Sc (Information Technology)	Semester – I
Course Name: Digital Electronics	**Course Code: ITPVE111**
Credits	1

Course Objectives:

1. To apply and test the gates learnt using various ICs.
2. To evaluate the Boolean expression to reduce and minimize the gates used

Units	Practical List	Lecture /Hours
Unit 1	**1. Study of Basic gates** To verify the truth tables of OR, AND, NOR, NAND, EX-OR, EX-NOR gates **2. Study of Universal gates** To implement and verify NAND and NOR as Universal gates **3. Study of Boolean expressions** To verify De Morgan's laws **4.Design and implement code converters** Design the circuit and implement Binary to gray code converter Design the circuit and implement Gray to Binary code converter **5.Implement Subtractor circuits** \Design the circuit and implement Half Subtractor	10
Unit II	**2. Implement Subtractor circuits** Design the circuit and implement Full Subtractor **2. Implement Adder circuits** Design the circuit and implement Half Adder **3. Implement Adder circuits** Design the circuit and implement Full Adder **4. Design and implement Arithmetic circuits** Design and implement 2-by-2 bit multiplier **5. Implement Encoders and Decoders** Design and implement 8: 3 encoder Design and implement 3:8 decoder	10

Unit III	1. **Multiplexers and Demultiplexers** Design and Implement 4:1 multiplexer Design and Implement 1:4 demultiplexer **2. Study of Flip-flops - I** Study of D-Flip Flop **3. Study of Flip-flops-II** Study of JK-Flip Flop **4. Design of Shift Registers - I** Design of Shift registers using IC 7474 **5. Design of Shift Registers-II** Design and implement 7 Segment Digit Display	10

Course Outcomes:

Learners will be able to,

1. Construct basic and universal logic circuits.
2. Verify the functionalities of various ICs.
3. Design circuits using K-maps minimization technique
4. Design and test Encoders, Decoders, Multiplexers and Demultiplexers
5. Design and develop logic for Registers, Counters and its applications.

B. Sc (Information Technology)	Semester – I
Course Name: Vedic Mathematics	**Course Code: ITTIK111**
Credits	**2**

Course Objectives:

- To express thoughts, feelings and ideas of learners by using features of MS Word.
- To articulate formal and informal reports.
- To analyse and interpret data and learn visualization of data.
- To learn effective tools of presentation.

Unit	Topics	No of Lectures
I	**Introduction** to Vedas, History of Vedas History and Evolution of Vedic Mathematics Introduction of Basic Vedic Mathematics Techniques in Multiplication (Special Case, Series of 9, Series of 1 etc.), Tables etc., Various techniques to carry out basic operations covering Addition, Subtraction, Multiplication, Division, Complements and Bases, Vinculum number. Comparison of Standard Methods with Vedic Methods.	**10**
II	**Maths Operations:** Multiplication (Vertically Cross- wise), Multiplications by numbers near base. Verifying answers by use of digital roots, Divisibility tests, Division of numbers near base, Comparison of fractions.	**10**
III	**Different method:** Squares (General method, Base method, Duplex method etc.) Cubes, Cube roots, Square Roots, General division. Quadratic Equations, Simultaneous Equations, Use of various Vedic **Techniques**: for answering numerical aptitude questions from Competitive Examinations	**10**

Additional References:

1. Bhatia Dhaval, Vedic Mathematics Made Easy, Jaico Publishing House
2. Thakur Rajesh Kumar, Vedic Mathematics for students taking Competitive Examinations. Unicorn Books 2015 or Later Edition
3. Gupta Atul, Power of Vedic Mathematics with Trigonometry, JaicoBooks
4. V. G. Unkalkar, Magical World of Mathematics (Vedic Mathematics), Vandana Publishers, Bangalore

Course Outcome:

1. Use different forms of digital mediums for effective communication.
2. Create technical documents and format existing documents for effective Commu.
3. Learn to use graphical tools for better visualization.
4. Create business presentation effectively.
5. Visualize the data from pictorial representations.

SEMESTER II

B. Sc. (Information Technology)	Semester – II
Course Name: Programming with Python	**Course Code: USITT114**
Credits	**4**

Course Objectives

1. To introduce students to fundamental programming concepts including variables, data types, expressions, operators, and control structures in Python.
2. To develop logical thinking and algorithmic problem-solving skills through conditional statements, loops, and function design.
3. To familiarize students with Python data structures such as strings, lists, tuples, dictionaries, and file handling for efficient data manipulation.
4. To build object-oriented programming skills using classes, objects, inheritance, encapsulation, and modular programming.
5. To provide a foundation in data analysis using Python libraries such as NumPy and Pandas for numerical computation and data handling.

Unit	Details	Lectures
I	Variables and Expressions Values and Types, Variables, Variable Names and Keywords, Type conversion, Operators and Operands, Expressions, Interactive Mode and Script Mode, Order of Operations. Conditional **Statements**: if, if-else, nested if –else Looping: for, while, nested loops **Control statements**: Terminating loops, skipping specific conditions **Functions**: Basics of functions. User defined and Library functions, Function parameters, Return values, Recursion	**15**
II	**Strings**: Traversal with for Loop, String Slices, Searching, String Methods, String Operations. **Lists**: Values and Accessing Elements, traversing a List, Deleting elements from List, Built-in List Operations, Built-in List functions and methods. **Tuples and Dictionaries**: Accessing values in Tuples, Tuple Assignment, Tuples as return values, Basic tuples operations, Built-in Tuple Functions, creating a Dictionary, Accessing Values in a dictionary, Properties of Dictionary keys, Operations in Dictionary, Built-In Dictionary Functions, Built-in Dictionary Methods **Files**: Text Files, The File Object Attributes, Directories	**15**
III	**Classes and Objects**: Class Definition, Creating Objects, Instances as Arguments, Instances as return values, Inheritance, Method Overriding, Data Encapsulation **Modules**: Creating and exploring modules, Math module, Random module, Time module, calendar module	**15**

IV	**1. Introduction to NumPy**: Understanding Data Types in Python, The Basics of NumPy Arrays, Computation on NumPy Arrays: Universal Functions, Aggregations: Min, Max, and Everything In Between, Computation on Arrays: Broadcasting, Comparisons, Masks, and Boolean Logic, Fancy Indexing, Sorting Arrays, Structured Data: NumPy's Structured Arrays. 2. **Data Manipulation with Pandas**: Introducing Pandas Objects, Data Indexing and Selection, Operating on Data in Pandas, Handling Missing Data, Hierarchical Indexing, Combining Datasets: Concat and Append. 3. **Combining Datasets**: Merge and Join, Aggregation and Grouping, Pivot Tables, Vectorized String Operations, Working with Time Series. High-Performance Pandas: eval () and query ()	**15**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Think Python	Allen Downey	O'Reilly	1st	2012
2.	Object-oriented Programming in Python	Michael H. Goldwasser, David Letscher	Pearson Prentice Hall	1st	2008
3.	Introduction to Problem Solving with Python	E. Balagurusamy	TMH	1st	2016

Course Outcomes:

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

CO1: Understand and apply fundamental Python concepts such as variables, data types, operators, expressions, and order of operations for basic problem solving & implement decision-making algorithms using conditional statements.

CO2: Develop reusable and efficient code using user-defined functions, built-in library functions, parameter passing, return values, and recursion.

CO3: Manipulate and process textual data using string operations, slicing, traversal, searching, and built-in string methods.

CO4: Apply object-oriented programming principles including class creation, object manipulation, inheritance, method overriding, and data encapsulation to build modular programs.

CO5: Use NumPy and Pandas libraries to perform numerical computing, data manipulation, indexing, aggregation, merging, grouping, time-series analysis, and high-performance data processing tasks.

B. Sc. (Information Technology)	Semester – II
Course Name: Programming with Python Practical	**Course Code: USITP115**
Credits	**2**

Unit	Details	Lectures
I	1. Implement a program to study Conditional statements 2. Implement a program to study Looping Statements 3. Implement a program to study Control Statements 4. Implement a program to study Basic python functions 5. Implement a program to study User Defined Functions	**15**
II	1. Implement a program to study String data types and its operation 2. Implement a program to study List data types and its operation 3. Implement a program to study Built-in methods of data types 4. Implement a program to study Tuple data type and its operations. 5. Implement a program to study Dictionary data type and its operations. 6. Implement the concept of File Handling	**15**
III	1. Write a Python program to implement concepts of OOP such as a. Instance methods b. Class methods c. Static methods 2. Implement the concept of Multilevel inheritance using python 3. Implement the concept of Multiple inheritance using python 4. Implement the concept of Exception Handling using Python 5. Implement and study Modules in Python	**15**
IV	1. Write a python code to create Numpy Array. 2. Write a Python code to find the mean of every Numpy array in the given list. 3. Write a Python code to add rows and columns in a Numpy array. 4. Write a python code to demonstrate importing pandas libraries and create data frame objects. 5. Write a Python code to perform arithmetic operations on two pandas series. 6. Write a python code to demonstrate filter pandas series with Boolean arrays. 7. Write a code to import and export data between pandas and csv files. 8. Read employee.csv file to create dataframe and perform following operations: i) Display Name, Gender and department of employee. ii) Display first 5 and last 5 records from employee.csv	**15**

B. Sc (Information Technology)	Semester – II
Course Name: Numerical Mathematics	**Course Code: USITT116**
Credits	**2**

Course Objectives:

- Course will provide an overview of math's used for data science
- Course will provide students with an overview of discrete mathematics.
- Students will learn about topics such as logic and proofs, derivatives, integration partial derivatives and its applications and other important discrete math concepts

Unit	Details	Lectures
I	**Solutions of Algebraic and Transcendental Equations**: The Bisection Method, The Newton-Raphson Method, The Regula-falsi method, The Secant Method. **Interpolation:** Forward Difference, Backward Difference, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Lagrange's Interpolation	10
II	**Solution of simultaneous algebraic equations (linear) using iterative methods:** Gauss-Jordan Method, Gauss-Seidel Method. **Numerical differentiation and Integration**: Numberical differentiation, Numerical integration using Trapezoidal Rule,Simpson's 1/3rd and 3/8th rules	10
III	**Numerical solution of 1st and 2nd order differential equations:** Taylor series, Euler's Method, Modified Euler's Method, Runge-Kutta Method for 1st and 2nd Order Differential Equations	10

Course Outcomes:

Learners will be able to,

1. Understand numerical techniques to find the roots of non-linear equations and solution of system of linear equations.
2. Understand the difference operators and the use of interpolation.
3. Understand numerical differentiation and integration and numerical solutions of ordinary and partial differential equations.

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Introductory Methods of Numerical Methods	S. S. Sastry	PHI	5th	2012
2.	Numerical Methods for Engineers	Steven C. Chapra, Raymond P. Canale	Tata Mc Graw Hill	6th	2010
3.	Numerical Analysis	Richard L. Burden, J. Douglas Faires	Cengage Learning	9th	2011

4.	Numerical Methods	T Veerarajan T Ramachandran	Tata Mc Graw Hill	7th	2011

B. Sc (Information Technology)	**Semester – II**
Course Name: E-Commerce & Digital Marketing	**Course Code: CDITOE113**
Credits	**2**

Course Objectives:

- To understand increasing significance of E-Commerce and its applications in Business and Various Sectors
- To provide an insight on Digital Marketing activities on various Social Media platforms and its
- emerging significance in Business
- To understand Latest Trends and Practices in E-Commerce and Digital Marketing, along with its Challenges and Opportunities for an Organization

Unit	Topics	lecture
I	**Introduction to E-Commerce and E- Business**: Definition and competing in the digital economy, Impact of E-Commerce on Business Models, Factors Driving e-commerce and e-Business Models, Economics and social impact of e-Business, opportunities and Challenges, e-Commerce vs m-Commerce, Different e-Commerce Models (B2B, B2C, C2B, C2C, B2E), e-Commerce Applications: e-Trading, e-Learning, e-Shopping, Virtual Reality & Consumer Experience, Legal and Ethical issues in e-Commerce. **Overview of Electronic Payment systems:** Types of Electronic payment schemes (Credit cards, Debit cards, Smartcards, Internet banking), E- checks, E-Cash Concepts and applications of EDI and Limitation **Introduction & origin of Digital Marketing:** Traditional v/s Digital Marketing. Digital Marketing Strategy, The P-O-E-M Framework, Segmenting & Customizing Messages, The Digital landscape, Digital Advertising Market in India. Skills required in Digital Marketing. Digital Marketing Plan.	**10**
II	**Social Media Marketing**: Meaning, Purpose, types of social media websites, Social Media Engagement, Target audience, Facebook Marketing: Business through Facebook Marketing, Creating Advertising Campaigns, Adverts, Facebook Marketing Tools, LinkedIn Marketing: Importance of LinkedIn Marketing, Framing LinkedIn Strategy, Lead Generation through LinkedIn, Content Strategy, Analytics and Targeting, Twitter Marketing: Framing content strategy, Twitter Advertising Campaigns, YouTube Marketing: Video optimization, Promoting on YouTube, Monetization, YouTube	10

	Analytics **Email Marketing**: Types of Emails, Mailing List, Email Marketing tools, Email Deliverability & Email Marketing automation **Mobile Marketing:** Introduction, Mobile Usage, Mobile Advertising, Mobile Marketing Types, Mobile Marketing Features, Mobile Campaign Development, Mobile Advertising Analytics **Content Marketing**: Introduction, Content marketing statistics, Types of Content, Types of Blog posts, Content Creation, Content optimization, Content Management & Distribution, Content Marketing Strategy, Content Creation tools and apps, Challenges of Content Marketing.	
III	**Search Engine Optimization**: Meaning, Common SEO techniques, Understanding Search Engines, basics of Keyword search, Google rankings, Link Building, Steps to optimize website, On-page and off-page optimization **Search Engine Marketing**: Introduction to SEM, Introduction to Ad Words - Google Ad Words, Ad Words fundamentals, Ad Placement, Ad Ranks, Creating Ad Campaigns, Campaign Report Generation, Display marketing, Buying Models: Cost per Click (CPC), Cost per Milli (CPM), Cost per Lead (CPL), Cost per Acquisition (CPA). **Web Analytics**: Purpose, History, Goals & objectives, Web Analytic tools & Methods. Web Analytics Mistakes and Pitfalls. Google Analytics: Basics of Google Analytics, Installing Google Analytics in website, Parameters of Google Analytics, Reporting and Analysis	10

Textbooks:

1. "E-Commerce Strategy, Technologies and Applications", Whitley, David, Tata McGraw Hill, 2017
2. Digital Marketing, Seema Gupta, McGraw Hill Education, 2nd Edition

Additional References:

1. E-Commerce by S. Pankaj, A.P.H. Publication, New Delhi
2. Fundamentals of Digital Marketing, Punit Singh Bhatia, Pearson, 2nd Edition
3. "Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation",
Damian Ryan, Calvin Jone. Kogan Page, 4th Edition

Learning Outcomes:

1. After successful completion of this course, students would be able to
2. Understand the core concepts of E-Commerce.
3. Understand the various online payment techniques
4. Understand the core concepts of digital marketing and the role of digital marketing in business.
5. Apply digital marketing strategies to increase sales and growth of business
6. Apply digital marketing through different channels and platforms
7. Understand the significance of Web Analytics and Google Analytics and apply the same

B. Sc (Information Technology)	Semester – II
Course Name: Data Hiding & Spreadsheet	**Course Code: CDITOE114**
Credits	**2**

Course Objectives:

In order to evidence success in this course, the students will be able to:

- Students will be able to identify the essential components of a computer;
- Students will be able to describe the function of the essential components of a computer;
- Students will be able to recommend hardware;
- Students will be able to develop a computer system proposal/presentation for a client;
- Students will be able to troubleshoot hardware components;
- Students will be able to assemble a computer with essential components

Unit	Topics	No of Lectures
I	**Introduction to Data:** Definition of data,Definition of information,Difference between data and information,Characteristics of data,Importance of data in everyday life and decision making **Types of Data:** Numeric data,Text (alphanumeric) data,Date and time data,Logical / Boolean data,Examples of each type Concept of Data Handling: Meaning and definition of data handling,Need and objectives of data handling,Scope of data handling **Data Handling Process:** Data collection,Data recording,Data organization,Data processing,Data interpretation,Data presentation **Data Collection Methods:** Primary data collection,Secondary data collection,Advantages and disadvantages of data collection methods **Manual and Computerized Data Handling:** Manual data handling,Computerized data handling,Comparison between manual and computerized data handling,Advantages of computerized data handling	**10**
II	**Concept of Spreadsheet:** Meaning and definition of spreadsheet,Evolution of spreadsheet software,Importance of spreadsheets in data handling **Spreadsheet Software:** Overview of popular spreadsheet software (MSExcel,LibreOffice Calc,Google Sheets),General features of spreadsheet software **Applications of Spreadsheets:** Use of spreadsheets in education,Use of spreadsheets in business and accounting,Use of spreadsheets in banking,Use of spreadsheets in research and statistics **Spreadsheet Components(Conceptual Understanding) :** Workbook and worksheet,Rows, columns, and cells,Cell address and cell range,Active cell **Spreadsheet Features (Theory) :** Data entry and storage,Calculation capability,Data analysis support,Data presentation and reporting,Advantages of using spreadsheets **Limitations of Spreadsheets:** Data size limitations,Error possibilities,Security issues,Dependency on user accuracy	**10**

References:

1. Upgrading and Repairing PCs by Scott Mueller. PC Hardware: The Complete Reference by Craig Zacker

B.Sc (Information Technology)	Semester – II
Course Name: Fundamentals of Microprocessor and Microcontrollers	**Course Code: ITTVS112**
Credits	**2**

Course Objectives:

- To understand the basic concept of Micro Computer Systems
- To develop background knowledge in 8085 Microprocessor
- To write Assembly language Programs of 8085
- To understand the peripheral devices and interfacing to 8051 Micro Controller and design aspects of Micro Controller

Unit	Details	Lectures
I	**Microprocessor, microcomputers, and Assembly Language:** Microprocessor, Microprocessor Instruction Set and Computer Languages, From Large Computers to Single-Chip Microcontrollers, Applications. . **8085 Microprocessor Architecture and Memory Interface:** Introduction, 8085 Microprocessor unit, 8085-Based Microcomputer	**10**
II	**Introduction to 8085 Assembly Language Programming:** The 8085 Programming Model, Instruction Classification, Instruction, Data and Storage, Writing assembling and Execution of a simple program, Overview of 8085 Instruction Set, Writing and Assembling Program. **Introduction to 8085 Instructions:** Data Transfer Operations, Arithmetic Operations, Logic Operation, Branch Operation, Writing Assembly Languages Programs, Debugging a Program, Programming Techniques	10
III	**Micro Controllers:** Embedded Systems and general purpose computer systems, history, classifications, applications and purpose of embedded systems. **Embedded Hardware:** Memory map, i/o map, interrupt map, processor family, external peripherals, memory – RAM , ROM, types of RAM and ROM, memory testing, CRC ,Flash memory. **The 8051 Microcontrollers:** Microcontrollers and Embedded processors, Overview of 8051 family.8051 Microcontroller hardware, Input/output pins, Ports, and Circuits, External Memory.	**10**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Microprocessors Architecture, Programming and Applications with the 8085.	Ramesh Gaonkar	PENRAM	5th	2012
2.	8080A/8085 Assembly Language Programming	Lance A. Leventhel	Osborne		1978
3	Embedded Systems	Rajkamal	Tata Mcgraw-Hill		
4	Introduction to embedded systems	Shibu K V	Tata Mcgraw-Hill	1st	2012

Course Outcomes:

Learners will be able to,

1. Understand the basic concepts of Micro Computer Systems
2. Understand the architecture and hardware aspects of 8085
3. Write assembly language programs in 8085
4. Design elementary aspects of Micro Controller based systems
5. Interfacing peripherals using Micro Controller

B. Sc. (Information Technology)	Semester – II
Course Name: Databases Management System	**Course Code: ITTSE112**
Credits	**2**

Course Objective:

- Design Conceptual and Logical Data Models
- Implement and Manipulate Databases using SQL
- Apply Data Integrity and Security Controls
- Manage Concurrent Transactions and Recovery
- Analyze and Optimize Database Performance

Unit	Details	Lectures
I	**Introduction to Databases and Transactions** What is database system, purpose of database system, view of data, relational databases, database architecture, transaction management **Data Models** The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction. **Database Design, ER Diagram and Unified Modeling Language** Database design and ER Model: overview, ER Model, Constraints, ER Diagrams, ERD Issues, weak entity sets, Codd's rules, Relational Schemas, Introduction to UML **Relational database model**: Logical view of data, keys, integrity rules, Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF).	**10**
II	**Constraints, Views and SQL** Constraints, types of constrains, Integrity constraints, Views: Introduction to views, data independence, security, updates on views, comparison between tables and views SQL: data definition, aggregate function, Null Values, nested sub queries, Joined relations. Triggers **Transaction management and Concurrency** Control Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL,Deadlocks), Time stamping methods, optimistic methods, database recovery management	**10**
III	PL-SQL: Beginning with PL / SQL, Identifiers and Keywords, Operators, Expressions, Sequences, Control Structures, Cursors and Transaction, Collections and composite data types, Procedures and Functions, Exceptions Handling, Packages, With Clause and Hierarchical Retrieval, Triggers	**10**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Database System and Concepts	A Silberschatz, H Korth, S Sudarshan	McGraw-Hill	5th	
2.	Database Systems	Rob Corone	Cengage Learning	Twelfth Edition	
3.	Programming with PL/SQL for Beginners	H. Dand, R. Patil and T. Sambare	X –Team		

Course Outcomes:
After completing the course, the learner will be able to:

CO1: Understand the fundamental concepts of database systems, data models, and database architecture.
CO2: Design database schemas using Entity–Relationship (ER) diagrams and convert them into relational models.
CO3: Apply normalization techniques to organize data efficiently and eliminate redundancy.
CO4: Write and execute SQL queries for data definition, manipulation, and retrieval.
CO5: Implement constraints, views, indexes, and transactions to maintain data integrity and consistency.
CO6: Understand database storage structures, indexing methods, and query processing techniques.
CO7: Explain concepts of concurrency control, recovery, and security in database systems.
CO8: Use a DBMS tool to create, manage, and maintain a real-world database application

B. Sc. (Information Technology)	Semester – II
Course Name: Academic & Professional Skills	Course Code: ITTAE112
Credits	2

Course Objectives:

- To help learners develop their soft skills and develop their personality together with their technical skills.
- Developing professional, social and academic skills to harness hidden strengths, capabilities and knowledge equip them to excel in real work environment and corporate life.
- Understand various issues in personal and profession communication and learn to overcome them

Unit	Topics	No of Lectures
I	**Employment Communication**: Introduction, Resume, Curriculum Vitae, Scannable Resume, Developing an Impressive Resume, Formats of Resume, Job Application or Cover Letter **Job Interviews**: Introduction, Importance of Resume, Definition of Interview, Background Information, Types of Interviews, Preparatory Steps for Job Interviews, Interview Skill Tips, Changes in the Interview Process,FAQ During Interviews **Group Discussion**: Introduction, Ambience/Seating Arrangement for Group Discussion, Importance of Group Discussions, Difference between Group Discussion, Panel Discussion and Debate, Traits, Types of Group Discussions, topic based and Case based Group Discussion, Individual Traits	10
II	**Academic and Professional Skills:** Professional Presentation: Nature of Oral Presentation, planning a Presentation, Preparing the Presentation, Delivering the Presentation **Creativity at Workplace:** Introduction, Current Workplaces, Creativity, Motivation, Nurturing Hobbies at Work, The Six Thinking Hat Method. **Capacity Building**: Learn, Unlearn and Relearn: Capacity Building, Elements of Capacity Building, Zones of Learning, Ideas for Learning, Strategies for Capacity Building	10

III	**Leadership and Team Building:** Leader and Leadership, Leadership Traits, Culture and Leadership, Leadership Styles and Trends, Team Building, Types of Teams. **Decision Making and Negotiation:** Introduction to Decision Making, Steps for Decision-Making, Decision-Making Techniques, Negotiation Fundamentals, Negotiation Styles, Major Negotiation Concepts **Stress and Time Management:** Stress, Sources of Stress, Ways to Cope with Stress	**10**

Text book:

1. Soft Skills: an Integrated Approach to Maximize Personality, Gajendra S. Chauhan, Sangeeta Sharma,Wiley India

Additional References:

1. Personality Development and Soft Skills, Barun K. Mitra, Oxford Press
2. Business Communication, Shalini Kalia, Shailja Agrawal, Wiley India
3. Soft Skills - Enhancing Employability, M. S. Rao, I. K. International
4. Cornerstone: Developing Soft Skills, Sherfield, Pearson India

B. Sc (Information Technology)	Semester – II
Course Name: Assembly language Programming and Embedded C++	**Course Code: ITPVE112**
Credits	**2**

Course Objectives: The course aims to learn

- Operations related to single & Multiple memory locations
- Simple assembly language programs
- How to perform register operations, packing and unpacking
- Embedding computer using 8051 microcontrollers
- Interfacing I/O Ports

Units	Practical List	Lecture /Hours
Unit I	**1.Perform the following Operations related to memory locations.** a. Store the data byte 32H into memory location 4000H. b. Exchange the contents of memory locations 2000H and 4000H **2.Simple assembly language programs.** c. Subtract two 8-bit numbers. d. Subtract the 16-bit number in memory locations 4002H and 4003H from the 16-bit number in memory locations 4000H and 4001H. The most significant eight bits of the two numbers are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H. **3.Simple assembly language programs.** e. Find the l's complement of the number stored at memory location 4400H and store the complemented number at memory location 4300H. f. Find the 2's complement of the number stored at memory location 4200H and store the complemented number at memory location 4300H. **4.Packing and unpacking operations.** g. Pack the two unpacked BCD numbers stored in memory locations 4200H and 4201H and store the result in memory location 4300H. Assume the least significant digit is stored at 4200H.	**20**

	h. Two digit BCD number is stored in memory location 4200H. Unpack the BCD number and store the two digits in memory locations 4300H and 4301H such that memory location 4300H will have lower BCD digit. **5. Register Operations.** i. Write a program to shift an eight-bit data four bits right. Assume that data is in register C.	
Unit II	**6.Register Operations.** a. Write a set of instructions to alter the contents of flag register in 8085. b. Write a program to count number of l's in the contents of D register and store the count in the B register. **7.Multiple memory locations.** c. Calculate the sum of series of numbers. The length of the series is in memory location 4200H and the series begins from memory location 4201H. a. Consider the sum to be 8 bit number. So, ignore carries. Store the sum at memory location 4300H.Consider the sum to be 16 bit number. Store the sum at memory locations 4300H and 4301H d. Multiply two 8-bit numbers stored in memory locations 2200H and 2201H by repetitive addition and store the result in memory locations 2300H and 2301H. **8.Multiple memory locations.** e. Divide 16 bit number stored in memory locations 2200H and 2201H by the 8 bit number stored at memory location 2202H. Store the quotient in memory locations 2300H and 2301H and remainder in memory locations 2302H and 2303H. **9. Calculations with respect to memory locations.** f. Write a program to sort given 10 numbers from memory location 2200H in the ascending order. g. Calculate the sum of series of even numbers from the list of numbers. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H. Assume the sum to be 8 bit number so you can ignore carries and store the sum at memory location **10.Assembly programs on memory locations** h. A list of 50 numbers is stored in memory, starting at 6000H. Find number of negative, zero and positive numbers from this list and store these results in memory locations 7000H, 7001H, and 7002H respectively i. Write an assembly language program to generate Fibonacci number. **j.** Program to calculate the factorial of a number between 0 to 8.	**20**

Unit III	**11.**Port I / O: Use one of the four ports of 8051 for O/P interfaced to eight LEDs. Simulate binary counter (8 bit) on LED's **12.**To interface 8 LEDs at Input-output port and create different patterns. **13.**To demonstrate timer working in timer mode and blink LED without using any loop delay routine. **14.**Interface 8051 with D/A converter and generate Triangular wave of a given frequency on a oscilloscope. **15.**Interface 8051 with D/A converter and generate Triangular wave of a given frequency on a oscilloscope.	**20**

Course Outcomes:

Learners will be able to,

1. Apply concepts of 8085 to single & Multiple Memory Locations
2. Apply concepts of microprocessor register operations
3. Can implement assembly language programs
4. Use of Shift registers 8 & 16 bits
5. Apply the knowledge of Flash Magic in embedded Controllers
6. Learns to simulate and configure different timer controls

B. Sc. (Information Technology)	Semester – I
Course Name: CC	**Course Code: ITTCC111**
Periods per week (1 Period is 60 minutes)	**2**
Credits	**2**

Letter Grades and Grade points

Semester GPA/Program CGPA/Semester Program	Percentage of Marks	Alpha- sign / letter grade result
9.00-10.00	90.0-100	**O** (Outstanding)
8.00-<9.00	80.0-90.0	**A+** (Excellent)
7.00-<8.00	70.0-80.0	**A** (Very Good)
6.00-<7.00	60.0-70.0	**B+** (Good)
5.50-<6.00	55.0-60.0	**B** (Above Average)
5.00-<5.50	50.0-55.0	**C** (Average)
4.00-<5.00	40.0-50.0	**P** (Pass)
Below <4.00	Below 40.0	**F** (Fail)
AB (absent)		Absent

Evaluation pattern:
Examination Pattern: 50 marks (2 credit)
Internal Assessment 20 mark + External 30 marks

A) Internal Assessment: 20 Marks (2 credit)

Sr No.	Particulars	Marks
1	Mid-Term Class Test MCQ based	20

B) External Examination for Theory Courses – 30 Marks (2 credit)

- Duration: 1 Hours
- All questions shall be compulsory with internal choice within the questions.
- Each Question may be subdivided into sub questions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.

Theory question paper pattern:

All questions are compulsory.			
Question No	Based on	Options	Marks
Q.1	Unit - I	Any 3 out of 6	10
Q.2	Unit - II	Any 3 out of 6	10
Q.3	Unit - III	Any 3 out of 6	10

C) Practical Examination: 25 Marks (1 credit each)

- 20 marks + 5 marks (journal+ viva)
- Duration: 1 Hours for 1 credit practical course.
- Certified Journal is compulsory for appearing at the time of Practical Exam
- The Marking Scheme for each of the Level is given below:

Practical Examination Pattern

All questions are compulsory.

Question No	Title	marks
1	Question 1	20
2	Journal + Viva	5

Examination Pattern: 60 marks (4 credit)
Internal Assessment 40 mark + External 60 marks

A) Internal Assessment: 40 Marks (4 credit)

Sr No.	Particulars	Marks
1	Mid-Term Class Test MCQ based	20
2	Workshop/certificate courses	20

a. **SWAYAM (Advanced Course)** of minimum 20 hours and certification exam completed

OR

b**.NPTEL (Advanced Course)** of minimum 20 hours and certification exam completed

OR

c. **Valid International Certifications** (Prometric, Pearson, Certiport, Coursera, Udemy, tutorialspoint,etc)

d. **Certification marks of one completed exam shall be awarded to one course only.**

For four courses, the students will have to complete four certifications. (Note: Only those certification/courses suggested by the department shall be deemed valid, Student cannot do any certification on their own)

B) External Examination for Theory Courses – 60 Marks (4 credit)

- Duration: 2 Hours
- All questions shall be compulsory with internal choice within the questions.
- Each Question may be subdivided into sub questions as a, b, c, d, etc. & the allocation of Marks

depends on the weightage of the topic.

Theory question paper pattern:

All questions are compulsory.			
Question No	Based on	Options	Marks
Q.1	Unit - I	Any 3 out of 6	15
Q.2	Unit - II	Any 3 out of 6	15
Q.3	Unit - III	Any 3 out of 6	15
Q.4	Unit - IV	Any 3 out of 6	15

C) Practical Examination: 50 Marks (2 credit each)

- 20 marks + 5 marks (journal+ viva)
- Duration: 2 Hours for 2 credit practical courses.
- Certified Journal is compulsory for appearing at the time of Practical Exam
- The Marking Scheme for each of the Level is given below:

Practical Examination Pattern

All questions are compulsory.		
Question No	Title	marks
1	Question 1	20
2	Question 2	20
3	Journal + Viva	10