SHRI VILE PARLE KELAVANI MANDAL's
USHA PRAVIN GANDHI COLLEGE OF ARTS, SCIENCE AND COMMERCE
Bhakti Vedanta Swami Marg, North-South Road No. 1
Juhu Scheme, Vile Parle (West), Mumbai 400 056.
Accreditation by NAAC A+ Grade with CGPA 3.27
(AUTONOMOUS)

Affiliated to the

UNIVERSITY OF MUMBAI

Program: Bachelor of Science
B. Sc. (Information Technology)

Semester I & II

Choice Based Credit System (CBCS)
under NEP 2020
with effect from the Academic year 2024 - 25

Academic Council No:

Agenda No:

Preamble

The Bachelor of Science in Information Technology (B.Sc-IT) program, is aligned with the visionary National Education Policy (NEP) 2020, which embarks on a holistic and interdisciplinary educational journey. This program is designed to meet the dynamic needs of the digital age, ensuring our graduates are not only proficient in the technical domain but also emerge as adaptable, creative, and ethical contributors to society.

At the core of this program is a curriculum that integrates technical mastery with a broad spectrum of knowledge, embracing the complexity and interconnectivity of today's global challenges. Through a blend of Major subjects, Minor specializations, Open Electives, Vocational and Skill Enhancement Courses, and comprehensive Ability Enhancement Courses, the program offers a rich, diversified learning experience. This approach ensures that students are well-versed in the latest technological advancements while being deeply rooted in ethical values and cross-disciplinary knowledge.

First Year Overview

Semester I and II provide a foundational platform that sets the tone for the intricate learning journey ahead.

Semester I dive into the essentials of Information Technology, covering subjects such as Programming Logic and Techniques, Notion of Operating Systems, and the pivotal role of Electronics & Communication Technology, classified as a Minor. The curriculum is further enriched with Open Electives like Digital Marketing, Principles of Management allowing students to tailor their learning experience. The Vocational and Skill Enhancement Courses, including labs in Computer Programming and Operating Systems, are meticulously designed to bridge the gap between theoretical knowledge and practical application. Ability Enhancement and Indian Knowledge System courses like Communication Skill augment the curriculum, nurturing well-rounded individuals equipped for the professional world.

Semester II continues to build on this foundation with advanced topics such as Object-Oriented Concepts and Web Technologies, reinforcing the Major specialization. The continuation of Electronics & Communication Technology as a Minor and the introduction of new Open Electives and Vocational Courses like Introduction to Public Relation, Financial Literacy, and Fundamentals of Leadership and Team Building further diversify the skill set of our students. The semester is designed to not only deepen technical knowledge but also to enhance practical skills and ethical understanding through courses in Communication Skill and Practical Applications in Green IT.

Across both semesters, the program emphasizes Practical Experience through On-Job Training/Field Projects and Co-curricular Activities, ensuring that students are not just academically prepared but are also industry-ready. These experiences are invaluable in developing hands-on skills, fostering teamwork, and enhancing overall well-being, making our graduates highly sought after in the professional realm.

The B.Sc-IT program under NEP 2020 offers a transformative educational experience that holistically prepares students for the challenges and opportunities of the future. By balancing technical education with ethical, environmental, and cross-disciplinary learning, the program aims to cultivate professionals who are not only skilled in information technology but are also equipped to lead with innovation, integrity, and responsibility in the global digital landscape.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

Upon completing the B.Sc. in Information Technology, learners will be able to:

PSO1: Master theoretical concepts and apply practical IT skills to solve complex problems in real-world scenarios.

PSO2: Demonstrate analytical skills by designing and evaluating IT solutions with modern tools and data-driven approaches.

PSO3: Acquire fieldwork experience, developing essential soft skills for leadership and teamwork within the IT sector.

PSO4: Uphold ethical standards and sustainable practices in IT, exemplifying responsible professional behavior.

PSO5: Embrace lifelong learning, continuously adapting to emerging technologies and trends to stay relevant in the industry.

Pedagogy

At SVKM's Usha Pravin Gandhi College of Arts, Science, and Commerce (Autonomous), the B.Sc. IT program's pedagogical framework is designed to offer students a rich and dynamic educational experience, blending traditional teaching methodologies with cutting-edge technological tools and innovative learning strategies. This approach ensures that students are not only well-versed in fundamental IT principles but are also adept at applying this knowledge in a rapidly evolving technological landscape.

Enhanced Teaching Learning Methods for B.Sc. IT:

- **Classroom Lectures with Smartboards:** Utilize smartboards to make lectures more interactive, facilitating a deeper understanding of IT concepts through dynamic content display and engagement.
- **Experiential Learning:** Enable students to apply theoretical knowledge to real-world IT challenges through hands-on projects and simulations, bridging the gap between theory and practice.
- **Team-Based Learning:** Encourage collaborative learning through group IT projects, fostering teamwork, leadership, and personalized learning experiences.
- **Flipped Classroom:** Leverage online resources for pre-class study, allowing in-class time to focus on discussions and practical applications of IT concepts.
- **Group Discussion:** Promote the exchange of ideas and critical thinking on emerging IT trends and issues, enhancing communication and analytical skills.

Innovative and Technological Methods Tailored for B.Sc. IT:

- **Technology Integration in Learning:** Integrate immersive digital tools like Padlet, Quizlet, Kahoot, and Mindmeister in coursework, making complex IT subjects accessible and engaging.
- **Peer Teaching:** Encourage student-led instruction, where peers share knowledge and insights, fostering a deeper understanding of IT subjects and leadership qualities.
- **Blended Learning Approach:** Combine the benefits of smartboard-enhanced classroom lectures with extensive online resources, offering a flexible and comprehensive learning experience.
- **Community-Based Learning:** Apply IT skills to community service projects, reinforcing the importance of social responsibility and ethical technology use.

By incorporating smartboards in classrooms, we enhance the visual and interactive aspects of teaching, making complex subjects more engaging and understandable. Online resources complement traditional methods, providing students with the flexibility to learn at their own pace and deepen their understanding of information technology.

The college's commitment to innovative teaching and the use of advanced technology in education ensures that our students are not only academically proficient but also equipped with the practical skills and ethical understanding necessary to navigate the challenges of the IT industry. This holistic approach prepares our graduates for excellence in their academic endeavors and their future careers, setting them on the path to becoming leaders in the field of information technology.

Signature	Signature	Signature
HOD	Approved by Vice –Principal	Approved by Principal

Credit Distribution Structure for

First Year (B.Sc. (Information Technology))

SEM I				
Sr. No.	**Name of the Module (Subject)**	**Module Code**	**Module Category (Core, Core Elective, OE,VSC, SEC, AEC,VSC, IKS, CC, FP, OJT, RM, CEP, RP)**	**Total no. of credits**
1	Programming Logic and Techniques	UIPLT101	MAJ	**3**
2	Notion of Operating Systems	UINOS102	MAJ	**3**
3	Electronics And Communication Technology I	UIECT103	MIN	**2**
4	Digital Marketing	UIDMK104	OE	**2**
5	Principles of Management	UIPOM105	OE	**2**
6	Introduction to Computer Programming LAB	UIICP106P	VSEC	**1**
7	Operating System LAB	UIOSL107P	VSEC	**1**
8	Discrete Mathematics	UIDMA108	VSEC	**2**
9	Communication Skills I	UICOM109	AEC	**2**
10	Sustainable Green IT	UISGI110	VAC	**2**
11	Indian Knowledge Systems	UIIKS112	IKS	**2**
12	Cultural	UICUL121	CC	**2**
13	Health And Wellbeing	UIHNW123	CC	**2**
14	Sports	UISPT125	CC	**2**

SEM II				
Sr. No.	**Name of the Module (Subject)**	**Module Code**	**Module Category (Core, Core Elective, OE,VSC, SEC, AEC,VSC, IKS, CC, FP, OJT, RM, CEP, RP)**	**Total no. of credits**
1	Object Oriented Concepts	UIOOC151	Major	**3**
2	Web Technologies	UIWTE152	Major	**3**
3	Electronics And Communication Technology II	UIECT153	Minor	**2**
4	Introduction to Public Relation	UIIPR154	OE	**2**
5	Financial Literacy	UIFLT155	OE	**2**
6	Fundamentals of Leadership and Team Building	UILTB156	OE	**2**
7	Object Oriented Programming LAB	UIOOP157P	VSEC	**1**
8	Web Programming LAB	UIWPR158P	VSEC	**1**
9	Statistical Methods	UISME159	VSEC	**2**
10	Communication Skills II	UICSK160	AEC	**2**
11	Practical Applications in Green IT	UIPAG161	VAC	**2**
12	Cultural	UICUL171	CC	**2**
13	DLLE	UIDLL172	CC	**2**
14	UPG NSS	UINSS174	CC	**2**
15	Sports And Fitness	UISPT175	CC	**2**

Sign of HOD
Prof. Smruti Nanavaty
Dept of Information Technology

Sign of Principal
Prof. Dr. A. Kapoor

Syllabus

B.Sc. (Information Technology)

(Semester I & II)

SEMESTER I

Program: B.Sc. – Information Technology (2024 - 25)		Semester: I	
Course: Programming Logic And Techniques		**Course Code: UIPLT101**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 40)**	**Semester End Examinations (SEE) (Marks- 60 in Question Paper)**
3	3	40	60

Learning Objectives:

1. To understand the principles and practices of breaking down problems into small tasks and analyze them to design effective and efficient solutions.
2. To cultivate logic building skills by acquiring the ability to think and reason logically, computationally, and algorithmically to design solutions to real-world problems.
3. To understand significance of programming, develop strong foundation in programming concepts and basic data structures and incorporate problem-solving abilities.
4. To gain understanding of best practices in programming and logic design and be able to write and execute basic programs in a high-level programming language.

Course Learning Outcomes:

After completion of the course students will be able to

1. Understand and evaluate problems for their complexity and devise computationally well-structured solutions.
2. Apply logical, computational, and structured problem-solving techniques to a variety of real-world problems.
3. Implement programming fundamentals along with critical thinking and creativity for solving complex problems through application of programming principles.
4. Apply best practices of programming and logic design while designing solutions in high-level language.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
1	Introduction to Programming and Problem Solving	11
	Introduction and Importance of Programming Introduction to programming paradigms, Overview of imperative, declarative, and procedural paradigms, Role and applications of programming in different fields, Programming as a tool for problem solving **Foundations of Problem Solving** General problem-solving concepts, Problem solving and decomposition, Using abstractions and patterns, A guided example	
2	Design Principles and Computational Thinking	13

	Introduction to Algorithms and Design Principles What are algorithms?, Defining and designing algorithms, Understanding the way algorithms are written. Introduction to basic data structures, Role of algorithms in computing **Computational Thinking** What is computational thinking?**,** Logic and algorithmic thinking, Logic programming paradigm	
3	Fundamentals of Programming and Its Techniques	21
	Input, Processing, and Output Output, input, and variables, Variable assignment, calculations, declaration, and data types, Named constants, Hand tracing a program, Documenting a program and designing your first program **Decision Structures, Boolean Logic, and Repetition Structures** Introduction to decision structures, Dual alternative decision structures, Comparing strings, Logical operators, Nested decision structures, The case structures, Boolean variables, Introduction to repetition structures, Condition and controlled loops, Count-controlled loops and the for statement, Nested loops **Modules and Functions** Introduction to modules, Defining and calling a module, Local variables, Passing arguments to modules, Global variables and global constants, Introduction to functions, Writing your own functions **Evolution and overview of programming languages**	
Total		**45**

Reference Books:

1. Programming Languages: Principles and Paradigms, Springer, 2023
2. Programming Logic and Design, 10th Edition, Joyce Farrell, Cegage, 2023
3. Introduction to Algorithms, 4th Edition, Thomas Cormen, Charles Leiserson, Ronald Rivest, Clifford Stein, The MIT Press, 2022
4. Computational Thinking, Peter Denning, Matiti Tedre, MIT Press
5. Guide to Competitive Programming - Learning and Improving Algorithms through Contests, 2nd Edition, Springer, 2020

Program: B.Sc. – Information Technology (2024 - 25)		Semester: I	
Course: Notion of Operating Systems		**Course Code: UINOS102**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 40)**	**Semester End Examinations (SEE) (Marks- 60 in Question Paper)**
3	3	40	60

Learning Objectives:

- To learn the basic concepts of operating system
- To learn the concept of process, Threads
- Introduction to the basic commands in Linux

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Students will be able to understand the basic concepts of operating system

CO2: To understand the working of process and threads.

CO3: Students will understand the Linux Command line environment

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1	**Operating System, Process and Threads**	**15**
	Introduction: What is an operating system? History of operating system, computer hardware, different operating systems with examples, operating system concepts, system calls, operating system structure. **Processes and Threads:** Processes, threads, Synchronization and Inter-process Communication, scheduling	
Module 2	**Memory Management, Deadlocks, File System**	**15**
	Memory Management – Paging, Segmentation, File System (Windows), Resources, Introduction to Deadlocks, The Ostrich Algortihm, Deadlock Detection with One Resource of Each Type, Recover from Deadlock	
Module 3	**Linux**	**15**

	Introduction to Linux Shell, Navigation, Exploring the System, Manipulating Files and Directories, Working with Commands, Redirection, Echo, Clear, History, Permissions, Processes	
Total Lectures		**45**

Reference books:

1. Modern Operating System by Andrew S. Tanenbaum, Fifth Edition, Oct 2022, Pearson Publication
2. The Linux Command Line, William Shotts , Fifth Internet Edition, 2019, No Starch Press

Program: B.Sc. – Information Technology (2024 - 25)		**Semester: I**	
Course: Electronics And Communication Technology I		**Course Code: UIECT103**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 20)**	**Semester End Examinations (SEE) (Marks- 30 in Question Paper)**
2	2	20	30

Learning Objectives:

CLO 1. To familiarize with the concepts of Different Number System, Electronics Gates, Electronic Circuits and Boolean Logic
CLO 2. To apply and analyze the Boolean Equations, circuit implementation with minimal number of gates.
CLO 3. To design and construct basic electronics circuits, sequential and combinational circuits.
CLO4. To design and implement code convertors

1. Students will be able to comprehend the concepts of Electronics Gates, Electronic Circuits, Boolean Logic and different number systems with conversions.
2. Students will be able to solve Boolean equations and reduce and realize them.
3. Students will be able to compare different number systems with interconversions, sequential and combinational circuits
4. Students will be able to integrate the knowledge of electronics components and number systems to design and implement electronics circuits

Outline of Syllabus: (per session plan)

Modules	**Topics**	**Duration (Lecture)**
Module 1	**Introduction to Electronics:** Analog Vs Digital Signal	**10**

	Number Systems and Codes Introduction to number system and conversions: Binary, Octal, Decimal and Hexadecimal Number Systems **Codes:** Gray Code, BCD Code, Excess-3 code, ASCII Code **Arithmetic Operations** : Binary arithmetic: addition, subtraction (1‟s and 2‟s complement). Octal and Hexadecimal arithmetic: Addition and Subtraction (7‟s and 8‟s complement method for octal) and (15‟s and 16‟s complement method for Hexadecimal).	
Module 2	**Basic Digital gates:** NOT , AND , OR , NAND , NOR , EXOR , EX-NOR, positive and negative logic, NAND-NOR Realization (Implementation of other gates using universal gates). Theorems and Properties of Boolean Algebra, Boolean functions, Boolean function reduction using Boolean laws, Canonical forms, Standard SOP and POS form. K-map method 2 variable, 3 variable, 4 variable, Don't care condition	**10**
Module 3	Introduction, Half and Full Adder, Half and Full Subtractor, Four Bit Binary Adder, One digit BCD BCD to 7 segment decoder, Decimal to BCD Encoder, BCD to Decimal Decoder **C**ode convertor- Binary to Gray, Gray to Binary, Binary to BCD, Binary to Excess -3 Multiplexers and Demultiplexers	**10**
Total Lectures		**30**

Text Book

R. P. Jain and K. Sarawadekar, *Modern Digital Electronics | 5th Edition,* Standard Edition. McGraw Hill, 2022.

Reference Book/Chapters/Links

1. R. Kories and H. Schmidt-Walter, "Digital Electronics," in Electrical Engineering, Berlin, Heidelberg: Springer Berlin Heidelberg, 2003, pp. 392–468. doi: 10.1007/978-3-642-55629-6_8.
2. A. K. Maini, *Digital electronics: principles, devices and applications*. Chichester, England ; Hoboken, NJ: J. Wiley, 2007.

Program: B.Sc. – Information Technology (2024 - 25)		Semester: I	
Course: Introduction To Computer Programming LAB		Course Code: UIICP106P	
Teaching Scheme		Evaluation Scheme	
Practical (Hours per week)	Credit	Continuous Assessment (CA) (Marks - 20)	Semester End Examinations (SEE) (Marks- 30 in Question Paper)
2	1	20	30

Learning Objectives:

- To provide exposure in developing algorithm, flowchart and to write efficient code.
- To understand loops and decision making in programming.
- To understand the arrays, structures, union.
- To understand the use of function and pointers.

Course Outcomes:

After completion of the course, learners would be able to:

CO1. Students can demonstrate the concepts of datatypes, variables and operators in C.
CO2. Students can implement the concept of control statements and looping in C program.
CO3. Students can demonstrate the use of arrays, strings and structures in C
CO4. Students can implement modular C program using functions and pointers.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1		**10**
	a) To calculate simple interest taking principal, rate of interest and number of years as input from user. Write algorithm & Draw flowchart for the same. b) Write a program to find greatest of three numbers using conditional operator. Write algorithm & Draw flowchart for the same. c) Write a program to check if the year entered is leap year or not. Write algorithm & Draw flowchart for the same. d) Write a program to calculate roots of a quadratic equation.	

	e) Write a menu driven program using switch case to perform add / subtract / multiply / divide based on the users choice.	
Module 2	a) Write a program to print the pattern of asterisks b) Write a program using while loop to reverse the digits of a number. c) Write a program to calculate the factorial of a given number. d) Write a program to print the Fibonacci series. e) Write a program to print area of square using function. f) Write a program using recursive function. g) Write a program to square root, abs() value using function. h) Write a program using goto statement . i) Write a program to print roll no and names of 10 students using array. j) Write a program to sort the elements of array in ascending or descending order.	**10**
Module 3	a) Write a program to extract the portion of a character string and print the extracted part. b) Write a program to find the given string is palindrome or not. c) Write a program to using strlen(), strcmp() function. d) write a program to swap two numbers using a function. Pass the values to be swapped to this function using call-by-value method and call-by-reference method. e) write a program to read a matrix of size m*n. f) Write a program to print the structure using • Title • Author • Subject • Book ID	**10**
Total Lectures		**30**

References:

1. C Programming Language, Brian W. Kernighan, Dennis M. Ritchie , 2017
2. Let Us C , Yashvant Kanetkar ,2008.
3. Mastering in C ,K. R. Venugopal and Sudeep R. Prasad, Tata McGraw-Hill Publications.
4. A Computer Science –Structure Programming Approaches using C, Behrouz Forouzan, Cengage Learning.
5. Schaum's outlines Programming with C, Byron S. Gottfried, Tata McGraw-Hill Publications.
6. Basics of Computer Science, by Behrouz Forouzan , Cengage Learning
7. Programming Techniques through C, by M. G. Venkateshmurthy, Pearson Publication.

Program: B.Sc. – Information Technology (2024 - 25)		**Semester: I**	
Course: Operating System Lab		**Course Code: UIOSL107P**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 20)**	**Semester End Examinations (SEE) (Marks- 30 in Question Paper)**
2	1	20 (Mini Project/Case Studies)	30

Learning Objectives:

Learn Virtual machine installation, Windows OS, Linux OS. Master Windows (DOS) Commands, Linux commands, Linux Desktop and utilities , Linux Shell Scripting , CPU scheduling algorithms

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand the basics of virtualization and install virtual machine software.

CO2: Master essential DOS commands for file and system management.

CO3: Acquire proficiency in basic Linux commands for file and directory manipulation

CO4: Master the use of Linux desktop environment and utilities.

CO5: Simulate various CPU scheduling algorithms

Outline of Syllabus: (per session plan)

Modules	**Topics**	**Duration (Lecture)**
Module 1		**10**
1.	**Installation and Configuration of virtual machine**	
a.	Installation of virtual machine software.	
b.	Installation of Windows OS	
c	Installation of Linux OS	
2.	**Windows (DOS) Commands**	

a.	Date, time, prompt, md, cd, rd, path.	
b.	Chkdsk, copy, xcopy, format, fidsk, cls, defrag, del, move.	
c	Diskcomp, diskcopy, diskpart, doskey, echo	
d	Edit, fc, find, rename, set, type, ver	
Module 2		**10**
3.	**Linux commands:**	
a	pwd, cd, absolute and relative paths, ls, mkdir, rmdir	
b	file, touch, rm, cp. mv, rename, head, tail, cat, tac, more, less, strings, chmod	
c	ps, top, kill, pkill, bg, fg	
c	grep, locate, find, locate	
e.	date, cal, uptime, w, whoami, finger, uname, man, df, du, free, whereis, which	
f.	Compression: tar, gzip	
4.	**Working with Linux Desktop and utilities**	
a	The vi editor	
b.	Graphics User Interface	
c.	Working with Terminal	
d.	Adjusting display resolution	
e	Using the browsers	
f.	Configuring simple networking	
g.	Creating users and shares	
5.	**Introduction to Linux Shell Scripting**	
a	Basic operators	
b.	Decision Making	
c.	Looping	
d	Regular Expression	
e	Special variables and command Line arguments	
Module 3		**10**
5	Write a C Program to simulate following CPU scheduling algorithms: 1. FCFS 2. SJF 3. RR **4.** PRIORITY	

Total Lectures		**30**

Essential readings:

- https://onlinecourses.nptel.ac.in/noc20_cs04/preview
- https://free.aicte-india.org/
- https://www.javatpoint.com/best-courses-for-the-operating-system

References

1. Operating Systems – Internals and Design Principles ,Willaim Stallings , Pearson , 9th edition,2009
2. Operating System Concepts ,Abraham Silberschatz, Peter B. Galvineg Gagne Wiley, 8th edition
3. Operating Systems, Godbole and Kahate ,McGraw Hill ,3rd edition

Program: B.Sc. – Information Technology (2024 - 25)		**Semester: I**	
Course: Discrete Mathematics		**Course Code: UIDMA108**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 20)**	**Semester End Examinations (SEE) (Marks- 30 in Question Paper)**
2	2	20	30

Learning Objectives:

1 To introduce the concepts of mathematical logic
2 To perform the operations associated with sets, functions, and relations.
3To introduce generating functions and recurrence relations.
4 To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.

Course Outcomes:

After completion of the course, learners would be able to:
CO1: Understand the basic concepts of Mathematical reasoning and basic counting techniques. Also understand the different types of proves like mathematical induction.
CO2: Understand the concepts of various types of relations, partial ordering and equivalence relations.
CO3: Apply the concepts of generating functions to solve the recurrence relations.
CO4: Understand various definitions in graph theory and study their properties. Also, understand the shortest path problem and apply to a network.

Outline of Syllabus: (per session plan)

Modules	**Topics**	**Duration (Lecture)**

Module 1	**Logic, Mathematical Reasoning and Counting**	**10**
	Logic, Prepositional Equivalence, Predicate and Quantifiers, Theorem Proving, Functions, Mathematical Induction. Recursive Definitions, Recursive Algorithms, Basics of Counting, Pigeonhole Principle, Permutation and Combinations.	
Module 2	**Relations and Their Properties**	**10**
	Representing Relations, Closure of Relations, Partial Ordering, Equivalence Relations and partitions.	
Module 3	**Number Theory**	**10**
	Divisibility and Factorization. Congruences. Simultaneous linear congruences, Chinese Remainder Theorem. Wilson's Theorem, Fermat's Theorem, pseudoprimes and Carmichael numbers, Euler's Theorem.	
Total Lectures		**30**

Essential readings:

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", Tata McGraw- Hill Publishing Company Limited, New Delhi, Sixth Edition, 2007.
2. James Strayer, Elementary Number Theory, Waveland Press, 2002.

Reference books:

1. R. P. Grimaldi, "Discrete and Combinatorial Mathematics", Pearson Education, Fifth Edition, 2007.
2. Thomas Koshy, "Discrete Mathematics with Applications", Academic Press, 2005.
3. Liu, "Elements of Discrete Mathematics", Tata McGraw- Hill Publishing Company Limited , 2004.

Program: B.Sc. – Information Technology (2024 - 25)		**Semester: I**	
Course: Communication Skills I		**Course Code: UICOM109**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 20)**	**Semester End Examinations (SEE) (Marks- 30 in Question Paper)**
2	2	20	30
Learning Objectives:			

1. To familiarize the learner with the methods of communication for effective functioning in an organization.
2.To help the learner understand the significance of effective communication in the corporate world
3.To acquaint the learner with rapidly changing communication technology
4.To facilitate development of the learner's soft skills required for successful professional life

Course Outcomes:

After completion of the course, Learners would be able to:

CO1: Enhance his/her communication skills to meet the challenges of the professional world and achieve success in his / her professional goals and contribute to the growth of the organization he /she is employed with

CO2: Demonstrate effective presentation skills effective for employability.

CO3: Analyze the different scenarios where communication is made between individuals or group of people and identify the barriers in communication and how to overcome them

CO4: Develop effective thinking skills suitable for corporate communication.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
1	Nature of Communication and Methods of Communication	10
	Theory of Communication: Concept of Communication, communication cycle ,Meaning, Definition, Process, Need, Feedback; Emergence of Communication as a key concept in the Corporate and Global world **Methods of Communication:** Verbal and Non-Verbal Oral and written form, advantages and disadvantages. Kinesics and Proxemics	
2	Barriers to Communication & Listening skills	10
	Problems in Communication/ Barriers to Communication: Physical or Environmental, Semantic or Language, Socio-Cultural and Psychological Barriers; Ways to Overcome these Barriers **Listening**: Importance of Listening Skills; Obstacles to Listening; profile of a good listener.	
3	Thinking and presentation skills	10
	Process, Types of thinking-Creative thinking, Rational thinking. **Errors in Thinking-Partial Thinking Extremes.**	
	PowerPoint presentations, preparation, effective delivery of presentations. **Language and Writing Skills:** Email etiquette, importance of Emails.	

	Activity based learning Presentations	
	Total	**30**

Suggested Reading:

- A Handbook Of Commercial Correspondence. (1992). *Ashley,A.* Oxford University Press. .
- Alien, R. (1970). *Organisational Management through Communication.* .
- Balan, K. a. (1996). *Effective Communication.* New Delhi: Beacon .
- Benjamin, J. (1993). *Business and Professional Communication Concepts and Practices.* New York: Harper Collins College Publishers.
- Bovee Courtland, L. a. (1989). *Business Communication.* New York, Taxman: McGraw Hill Publication.
- Frailley, L. (1982). *Handbook of Business Letters, Revised Edn.* Prentice Hall Inc.
- French, A. (1993). *Interpersonal Skills.* New Delhi: Sterling Publishers.
- H., W. F. (2012). *Soft Skills Training: A Workbook to Develop Skills for Employment.* London: Create Independent Pub.
- Hamilton, C. (2011, 2008, 2005). *Communicating for Results: A Guide for Business and the Professions, Ninth Edition.* Wadsworth: Cengage Learning, Lyn Uhl.
- Lesikar, R. V. (1994). *Business Communication: Theory and Application.* Ilinois.
- Locker, K. O., & Kaczmarek, S. K. (2014). *Business Communication: Building Critical Skills, Sixth Edition.* New York, NY: McGraw-Hill/Irwin
- Monarth, H. (2014). *Breakthrough Communication.* McGraw-Hill Education.
- Mukerjee, H. S. (2012). *Business Communication: Connecting at Work.* Oxford University Press.
- P. D. Chaturvedi, M. C. (2013). *Business Communication, Skills, Concepts, and Applications Third Edition.* Dorling Kindersley (India) Pvt. Ltd.
- Quintanilla, K. M., & Wahl, S. T. (2017). *Business and Professional Communication, Third Edition.* Los Angeles: Sage.

Program: B.Sc. – Information Technology (2024 - 25)		**Semester: I**	
Course: Sustainable Green IT		**Course Code: UISGI110**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 20)**	**Semester End Examinations (SEE) (Marks- 30 in Question Paper)**
2	2	20	30
Learning Objectives: This course empowers students to reduce the energy use, waste, and other environmental impacts of IT systems while reducing life cycle costs, thereby improving competitive advantage.			

Students learn how to measure computer power usage, minimize power usage, procure sustainable hardware, design green data centers, recycle computer equipment, configure computers to minimize power, use virtualization to reduce the number of servers, and other green

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand the concept of Green IT and the problems related to it.

CO2: Know different standards for Green IT.

CO3: Understand how power usage can be minimized in Technology.

CO4: Learn about how the way of work is changing.

CO5: Understand the concept of recycling.

CO6: Know how information systems can stay Green Information system.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1	**Fundamentals of Green IT**	**10**
	Overview to Green IT: Problems: Toxins, Power Consumption, Equipment Disposal, Company's Carbon Footprint: Measuring, Details, reasons to bother, Plan for the Future, Cost Savings: Hardware, Power. **Regulating Green IT:** Laws, Standards and Protocols Introduction, The Regulatory Environment and IT Manufacturers RoHS, REACh, WEEE, Legislating for GHG Emissions and Energy Use of IT Equipment. Nonregulatory Government Initiatives, Industry Associations and Standards Bodies, Green Building Standards, Green Data Centres, Social Movements and Greenpeace.	
Module 2	**Sustainable Green IT**	**10**
	Minimizing Power Usage: Power Problems, Monitoring Power Usage, Servers, Low-Cost Options, Reducing Power Use, Data De-Duplication, Virtualization, Management, Bigger Drives, Involving the Utility Company, Low Power Computers, PCs, Linux, Components, Servers, Computer Settings, Storage, Monitors, Power Supplies, Wireless Devices, Software. **Cooling**: Cooling Costs, Power Cost, Causes of Cost, Calculating Cooling Needs, Reducing Cooling Costs, Economizers, On-Demand Cooling, HP's Solution, Optimizing Airflow, Hot Aisle/Cold Aisle, Raised, Floors, Cable Management, Vapour Seal, preventing recirculation of Equipment Exhaust, Supply Air Directly to Heat Sources, Fans, Humidity, Adding Cooling, Fluid Considerations, System Design, Data centre Design, Centralized Control, Design for Your Needs, Put Everything Together.	
Module 3	**Making Green IT**	**10**
	Going Paperless: Paper Problems, The Environment, Costs: Paper and Office, Practicality, Storage, Destruction, Going Paperless, Organizational	

	Realities, Changing Over, Paperless Billing, Handheld Computers vs. the Clipboard, Unified Communications, Intranets, What to Include, Building an Intranet, Microsoft Office SharePoint Server 2007, Electronic Data Interchange (EDI), Nuts and Bolts, Value Added Networks, Advantages, Obstacles **Greening Your Information Systems**: Initial Improvement Calculations, Selecting Metrics, Tracking Progress, Change Business Processes, Customer Interaction, Paper Reduction, Green Supply Chain, Improve Technology Infrastructure, Reduce PCs and Servers, Shared Services, Hardware Costs, Cooling. **Staying Green**: Organizational Check-ups, Chief Green Officer, Evolution, Sell the CEO, SMART Goals, Equipment Check-ups, Gather Data, Tracking the data, Baseline Data, Benchmarking, Analyse Data, Conduct Audits, Certifications, Benefits, Realities, Helpful Organizations.	
Total Lectures		**30**

Essential readings:

1. Green IT Toby Velte, Anthony Velte, Robert Elsenpeter, McGraw Hill ,2008
2. Harnessing Green IT: Principles and Practices San Murugesan, G. R. Ganadharan, Wiley & IEEE.
3. Green Data Center: Steps for the Journey Alvin Galea, Michael Schaefer, Mike Ebbers Shroff Publishers and Distributers, 2011

Reference books:

1. Green IT, Deepak Shikarpur Vishwkarma Publications, 2014
2. Green Computing Tools and Techniques for Saving Energy, Money and Resources, Bud E. Smith, CRC Press, 2014
3. Green Computing and Green IT Best Practice, Jason Harris Emereo

Program: Bachelor of Science BSC IT (2024-25)		**Semester: I**	
Course: Indian Knowledge Systems		**Code:** UIIKS112	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credits**	**Continuous Assessment (CA) (Marks – 20)**	**Semester End Examinations (SEE) (Marks- 30 in Question Paper)**
2	**2**	20	**30**

Learning Objectives:

- To spread knowledge about rich heritage of our country and traditional knowledge in various fields.
- To acquaint students about developments in the field of mathematics, technology, and architecture.
- To bring comprehensive understanding about Yoga as a way of Healthy lifestyle.
- Application of these concepts in today's scenario for quality life and social development.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Students will enable to expand knowledge about the rich culture and knowledge systems of India.
CO2: Students get acquainted about the traditional methods of calculations and developments in the field of mathematics, technology, and architecture.
CO3: Students will enhance the understanding of Yogic lifestyle and its benefits for physical and mental health.
CO4: Analyse and apply the relevance and the contribution of Indian thinkers in the field of Mathematics, technology, yogic lifestyle for Sound Health.

Pedagogy:

1. Techniques such as Reviews, Analysis of Cases to promote critical thinking & to create motivated and independent learners.
2. Group activities such as Role plays, group assignments to enable learners to work together in a social environment and learn through sharing of individual information & experience.
3. Discussion of real-life problem active learning.
4. Flipped Classroom approach to enhance learner engagement.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1	**Overview of Indian Knowledge Systems**	**10**
	• Importance of Ancient Knowledge • Defining Indian knowledge system • IKS corpus- A classification • Unique aspects of IKS • Nuances of an Oral Tradition • Typical presentation Style: Sutras, Encryptions	
Module 2	**Science, Engineering and Technology**	**10**
	• Salient features of Indian Numerical system • The concept of Zero and its importance • Measurement of Time, Distance and Weight • Pingala and the Binary System • Science of Indian Architecture (Vastu-Shastra) • Eight limbs of Vastu • Town planning • Temple Architecture	
Module 3	**Health Wellness and Psychology**	**10**
	• Yoga way of life (Relevance to Health and Wellness) • Indian approach to Psychology • The Triguna system • The body-mind-intellect-consciousness Complex • Disease Management and Diagnostic techniques • Sleep and Food – importance to health • Drugs and Physical Therapy	
Total Lectures		**30**

Essential readings:

1. Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavana R.N. (2022), "Introduction to Indian Knowledge System: Concepts and Applications", PHI Learning Private Ltd. Delhi.
2. Kapoor Kapil, Singh Avadhesh (2021). "Indian Knowledge Systems Vol – I & II", Indian Institute of Advanced Study, Shimla, H.P.

Program: B.Sc. – Information Technology (2024 - 25)				Semester: I	
Course: Health And Wellbeing (CC)				Course Code: HNW123	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Continuous Assessment (CA) (Marks - 50)	
-	2	-	2		

Learning Objectives:

- **To define health, wellness, and wellbeing, and articulate their relevance in everyday life.**
- **To identify and expound upon the various dimensions of health, wellness, and wellbeing, encompassing physical, mental, emotional, social, and spiritual facets.**
- **To analyze the multifaceted factors influencing health, wellness, and wellbeing, including but not limited to physical fitness, nutrition, habits, age, gender, and lifestyle choices.**
- **To assess the significance of physical activities such as sports, games, yoga, and recreation in fostering health, wellness, and wellbeing.**
- **To demonstrate proficiency in executing appropriate techniques for warm-up, cool-down, stretching, strengthening, cardiovascular exercises, and relaxation methods to optimize overall wellbeing.**

Course Outcomes:

After completion of the course, learners would be able to:

CO1: To define health, wellness & Wellbeing and recognize their significance in daily life.

CO2:To identify and describe the different dimensions of health wellness & Wellbeing, including physical, mental, emotional, social, and spiritual aspects.

CO3:To analyze the various factors that influence health, wellness & Wellbeing, such as physical fitness, nutrition, habits, age, gender, and lifestyle choices.

CO4:To evaluate the role of physical activities like sports, games, yoga, and recreation in promoting health, wellness & Wellbeing.

CO5:To demonstrate proper techniques for warm-up, cool-down, stretching, strengthening, cardiovascular exercises, and relaxation techniques to enhance overall well-being.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1	THEORY	15

	a. What is Health and wellbeing – (WHO OVERVIEW): Difference between Health, Wellness and Wellbeing (Physical, Mental, Emotional, Social, and Spiritual aspects?). Meaning, Definition, Dimensions and Importance of Health, Wellness and Wellbeing. b. Health, Resilience and Wellbeing: Personal cost, Professional cost, Economical cost and Social cost of ill health (Physical and mental.) c. Effects of health and Wellbeing on: Children and Adolescents, Adults, Geriatric Population (Elderly) and Community. d. Health and Wellbeing: Its purpose, Sustainability and Future outcomes. Health investments and covering Risks	
Module 2	**(Exercises for Health and Wellbeing)**	**15**
	a. Warm-Up and Cool Down - General & Specific Exercises b. Physical Fitness Activities c. Stretching Exercises d. Strengthening Exercises e. Cardiovascular Exercises f. Flexibility and Agility Exercises g. Assessment of BMI h. Relaxation techniques.	
Module 3	**FIELD WORK** : Organizing health awareness program in community. (Corporate houses, neighborhood, society, public parks, schools, colleges, any other community place) Preparation of health profile. Preparation of a chart on balance diet (age group 6-14) learners can go to.	**30**
Total Lectures		**60**

SEMESTER II

Program: B.Sc. – Information Technology (2024 - 25)		Semester: II	
Course: Object Oriented Concepts		Course Code: UIOOC151	
Teaching Scheme		Evaluation Scheme	
Lecture (Hours per week)	Credit	Continuous Assessment (CA) (Marks - 40)	Semester End Examinations (SEE) (Marks- 60 in Question Paper)
3	3	40	60

Learning Objectives:

- To understand basic concepts of Object Oriented Designing
- Applying Object Oriented concepts to real world and map real system to classes, objects and methods..
- Analysing and evaluating the Relationships between classes
- Creating different design structures in Object Oriented Design

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand the Basic Concepts of Object Oriented Designing.

CO2: Gain an insight into designing Classes and UML Diagrams.

CO3: Analyze and implement different types of associations.

CO4: Design and Create different structures of Object Oriented Design.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1	**Introduction to Object Oriented Concepts**	**15**
	Introduction: What is Object-Oriented Development?, Key Concepts of Object-Oriented Design , Other Related Concepts , Modular Design and Encapsulation , Cohesion and Coupling , Modifiability and Testability, Benefits and Drawbacks of the Paradigm **.** A Notation for Describing Object-Oriented Systems : Class Diagrams ,Use Cases and Use Case Diagrams.	
Module 2	**Basics of Object Oriented Design and Relationship between Classes**	**15**

	The Basics of Implementing Classes : (i)Constructors , (ii) Printing an Object , (iii) Static Members , Working with Multiple Classes, Interfaces , Abstract Classes , Comparing Objects for Equality. Relationships Between Classes :Association, Characteristics of Associations , Inheritance, ,An Example of a Hierarchy, Inheriting from an Interface, Polymorphism and Dynamic Binding, Protected Fields and Methods, Genericity	
Module 3	**Elementary Design Patterns and Analysis of a System**	**15**
	Elementary Design Patterns: Iterator , brief understanding of Singleton, Adapter. **Analyzing a System**: Overview of the Analysis Phase, Stage 1: Gathering the Requirements, Functional Requirements Specification, Defining Conceptual Classes and Relationships, Using the Knowledge of the Domain **Design** : Major Subsystems, Creating the Software Classes, Class Diagrams , User Interface , Data Storage .	
Total Lectures		**45**

Reference books:

1. Object-Oriented Analysis, Design and Implementation An Integrated Approach by Brahma Dathan and Sarnath Ramnath , Second Edition,2015, Springer Nature publication.

2. Object-Oriented Thought Process, The (Developer's Library) 5th Edition by Matt Weisfeld Addison-Wesley Professional (April 30, 2019)

Program: B.Sc. – Information Technology (2024 - 25)		Semester: II	
Course: Web Technologies		Course Code: UIWTE152	
Teaching Scheme		Evaluation Scheme	
Lecture (Hours per week)	Credit	Continuous Assessment (CA) (Marks - 40)	Semester End Examinations (SEE) (Marks- 60 in Question Paper)
3	3	40	60

Learning Objectives:

- Understand basic concepts of Internet, World Wide Web, HTML and static/dynamic web design.
- Become familiar with concept of stylesheets, various CSS effects, JavaScript and PHP Design a website static and dynamic for a given topic

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand working of Internet.

CO2: Gain an insight into designing web pages with HTML.

CO3: Use different ways of styling web pages using CSS.

CO4: Implement basic and complex functionalities of JavaScript in a web page.

CO5: Employ PHP Scripts to execute dynamic tasks in a web page.

CO6: Perform various database tasks using PHP.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1	**Internet and the World Wide Web, HTML5, CSS, HTML Page Layout, HTML Media, Tables and Forms**	**15**
	Internet and the World Wide Web: What is Internet? Applications of Internet, E-mail, Telnet, FTP, E-commerce and E-business. Internet Service Providers, Domain Name Server, Internet Address, World Wide Web (www), Uniform Resource Locator (URL), Common Features of Browsers, Search Engine, Web Server, HTTP Protocol. **HTML5:** Introduction, Formatting Text by using Tags, Using Lists, Creating Hyperlinks and Bookmarks, Metadata about an HTML Document, Redirecting to another URL. **CSS:**	

	Implementing Styles using CSS – Stylesheets for Formatting Text and Links using CSS, CSS Selectors, Changing Background, Adding Border, Margin and Padding. **HTML Page Layout:** Using Layout Elements, Semantic Elements, Creating, Positioning and Formatting Divisions, Floating Divisions, Inline Frames. **HTML Media:** Embedding Images, Creating Client-side and Server-side Image Map, Embedding audio and video on web page. **HTML Tables:** Creating Simple Table, Table Dimension, Merging Table Cells, Formatting Applying Borders, Background and Foreground fills, Changing Cell Padding, Spacing and Alignment **HTML Forms:** Collecting user input with HTML Forms, Additional Input Types in HTML5.	
Module 2	**JavaScript, Operators, Statements, JavaScript Objects, DOM, Browser BOM, Events and Event Handlers**	**15**
	JavaScript: Introduction, Difference between Client-side and Server-side Scripting, JavaScript Variables and Constants, Data Types, Statements, Comments, Functions, Variable Scope, JavaScript Objects, Dialog Boxes **Operators**: Arithmetic Operators, Assignment Operators, Comparison Operators, Logical Operators **Statements:** Conditional Statements – if else, switch, Loops – while, do while, for, for in, for of, Loop Control – break, continue, labels **JavaScript Objects**: User-defined Objects, with Keyword, Native Objects – Array, String, Date, Math, Number, RegExp **Events and Event Handlers:** HTML Events, DOM Events and Listener, onAbort, onBlur, onChange, onClick, onDblClick, onError, onFocus, onKeyDown, onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onReset, onResize, onSelect, onSubmit, onUnload	
Module 3	**PHP, Advanced PHP, PHP and MySQL**	**15**
	PHP: Introduction, Server-side Scripting, PHP Syntax and Comments, Variables and Constants, Data Types, Control Structures, Looping, Loop Termination, Functions, PHP Form Handling, Superglobals, PHP Arrays, PHP Strings, PHP RegEx, PHP Numbers, PHP Math, Basic PHP Errors **Advanced PHP and MySQL:** PHP Date and Time, PHP Include, PHP Cookies, PHP Sessions Why PHP and MySQL? Connect to MySQL, Creating Database and Tables, Addition and Manipulation of Data in Tables.	
Total Lectures		**45**

Reference books:

1. Wilson, K. (2023). The absolute Beginner's guide to HTML and CSS: A Step-by-Step Guide with Examples and Lab Exercises. Apress.
2. PHP & MySQL Novice to Ninja by Tom Butler, SPD, 7th Edition (2022)

Program: B.Sc. – Information Technology (2024 - 25)		**Semester: II**	
Course: Electronics And Communication Technology II		**Course Code: UIECT153**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 40)**	**Semester End Examinations (SEE) (Marks- 30 in Question Paper)**
2	2	20	30

Learning Objectives

1. To understand advanced concepts in Electronic circuits
2. To equip students with the fundamental knowledge and basic technical competence in the field of Microprocessors.
3. To prepare students for higher processor architectures and embedded systems

Learning Outcomes

1. Understanding applications of code convertors
2. Describe core concepts of 8086 microprocessor.
3. Appraise the architecture of advanced processors

Outline of Syllabus: (per session plan)

Modules	**Topics**	**Duration (Lecture)**
Module 1	**Sequential Logic Design :** **Flip Flops :** Concept of Flipflop, Types of flipflop , Designing a flipflop circuit, SR, JK, D, T, master slave flip flop, Truth Table, excitation table and conversion **Register:** Shift register, SISO, SIPO, PISO, PIPO, Bi- directional and universal shift register. **Counters:** Design of synchronous and asynchronous, Modulo Counter, Up Down counter IC 74193, Ring and Johnson Counter.	**10**

Module 2	8086CPU Architecture, Programmer's Model, Functional Pin Diagram, Memory Segmentation, Banking in 8086, Demultiplexing of Address/Data bus, Functioning of 8086 in Minimum mode and Maximum mode, Timing diagrams for Read and Write operations in minimum and maximum mode, Interrupt structure and its servicing	**12**
Module 3	Pentium Architecture, Superscalar Operation, Integer &Floating-Point Pipeline Stages, Branch Prediction Logic, Cache Organization Comparative study of 8085, 80385, Pentium I, Pentium II and Pentium III, Pentium 4: Net burst micro architecture. Instruction translation look aside buffer and branch prediction	**8**
Total Lectures		**30**

Reference books:

R. P. Jain and K. Sarawadekar, *Modern Digital Electronics | 5th Edition,* Standard Edition. McGraw Hill, 2022.

Barry B. Brey, "Intel Microprocessors", 8thEdition, Pearson Education India

Program: B.Sc. – Information Technology (2024 - 25)		Semester: II	
Course: Object Oriented Programming LAB		Course Code: UIOOP157P	
Teaching Scheme		Evaluation Scheme	
Lecture (Hours per week)	Credit	Continuous Assessment (CA) (Marks)	Machine Test
2	1	20	30

Learning Objectives:

- To understand basic concepts of Object Oriented Designing
- Applying OO concepts to real world and map real system to classes, objects and methods..
- Analysing and evaluating the Relationships between classes Creating different design structures in Object Oriented Design

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand the use of software for developing programs in C++

CO2: Apply and implement the concept classes and objects

CO3: Analyze and implement different types of associations

CO4: Design and Develop complex programs using Object Oriented Concepts.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1	**Introduction and Use of Software**	10
	• Introduce the learners to the Software in which they will be writing the code. • Simple programs to identify and implement operators in C++. • Simple programs to illustrate the different control structures in C ++. • Write a C++ program to display the following Binary Pyramid and different variations: 1 01 1 0 1 0 1 0 1 1 0 1 0 1 • Write programs to demonstrate the use of functions in C++.	

Module 2	**Implementing Basic Concepts of Object Oriented Programming**	**10**
	Write a C++ programs to create classes and objects	
	• Write programs in C++ to implement the concept of friend functions Write programs in C++ to implement the concepts of Constructors and its type • Write programs in C++ to implement the concept of destructors in C++ Write programs in C++ to implement the concept of method overloading • Write programs in C++ to implement the concept of operator overloading	
Module 3	Advanced Concepts in C++	
	1. Write programs to implement different types of inheritance. 2. Write programs to illustrate the concept of Exception Handling 3. Write programs to illustrate the concept of Run time polymorphism using virtual functions	**10**
Total Lectures		**30**

Reference books:

1. Object Oriented Programming with C++ | 8th Edition, E.Balagurusamy September 2020 Tata McGraw Hill publications
2. C++ Programming Language, 4th edition –May 2022 by Bjarne Stroustrup, Pearson publications.
3. C++ Programming:An Object-Oriented Approach, May 2022,by Behrouz A. Forouzan, Richard F. Gilberg

Program: B.Sc. – Information Technology (2024 - 25)		Semester: II	
Course: Web Programming Lab		Course Code: UIWPR158P	
Teaching Scheme		Evaluation Scheme	
Lecture (Hours per week)	Credit	Continuous Assessment (CA) (Marks)	Machine Test
2	1	20	30

Learning 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.
- To emphasize on instruction set and logic to build assembly language programs.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Design static web pages using Hyper Text Markup Language (HTML).
CO2: Enhance the look of web pages by implementing CSS.
CO3: Collect information from the user with HTML Forms.
CO4: Design interactive webpages using client-side script (JavaScript).
CO5: Implement Document Object Model and events in web pages using JavaScript.
CO6: Write and deploy basic PHP code to simplify web development. **CO7:**
Store and retrieve data from a server using PHP.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1	**Use of Basic Tags, Use of CSS, Layout and Media, Tables and Forms, JavaScript**	**15**
	• Design a web page using different formatting tags and link different pages allowing navigation between web pages. • Design a web page that automatically redirects the user to another page. • Design a web page demonstrating different stylesheet types. • Design a web page demonstrating grouping selectors • Design a web page demonstrating different semantics. • Design a web page embedding image, audio and video.	

	• Design a web page with Imagemaps. • Design a web page with different tables. • Design a web page with a form that uses all types of controls. • Using JavaScript, design a web page to accept a number from the user and print its Factorial. • Using JavaScript, a web page that prints Fibonacci series/any given series. • Write a JavaScript program to display all the prime numbers between 1 and 100. • Write a JavaScript program to accept a number from the user and display the sum of its digits.	
Module 2	**JavaScript Objects and Events, Basic PHP, Advanced PHP, PHP and MySQL**	**15**
	• Using JavaScript, design a web page demonstrating different native objects of JavaScript. • 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). • Write a JavaScript program to design simple calculator. • Design a form and validate all the controls placed on the form using JavaScript. • Write a PHP code to find the greater of 2 numbers. Accept the no. from the user. • Write a PHP Program to accept a number from the user and print it factorial. • Write a PHP program to accept a number from the user and print whether it is prime or not. • Write a PHP program to display the following Binary Pyramid: 1 0 1 1 0 1 0 1 0 1 1 0 1 0 1 • Write a PHP program to demonstrate different string functions. • Write a PHP program to demonstrate different array functions. • Write a PHP program to demonstrate use of sessions and cookies. • Write a PHP program to create: o Create a database College o Create a table Department (Dname, Dno, Number_of_faculty) • 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. • Write a PHP program to o Update rows in a table o Delete rows from a table	
Total Lectures		**30**

Reference books:

1. Wilson, K. (2023). The absolute Beginner's guide to HTML and CSS: A Step-by-Step Guide with Examples and Lab Exercises. Apress.
2. PHP & MySQL Novice to Ninja by Tom Butler, SPD, 7th Edition (2022)

Program: B.Sc. – Information Technology (2024 - 25)		**Semester: II**	
Course: Statistical Methods		**Course Code: UISME159**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 20)**	**Semester End Examinations (SEE) (Marks- 30 in Question Paper)**
2	2	20	30

Learning Objectives:

1 To give the students a good practice in presentation and the format most applicable to their own data.
2 To provide an understanding for the graduate student on statistical concepts like measures of central tendency, dispersion and moments along with their applications.
3 To provide a clear conceptual idea about Regression and correlation analysis for business / economic forecasting.
4 To deal with qualitative data.

Course Outcomes:

After completion of the course, learners would be able to:
CO1: Interpret diagrammatic data presentation for common understanding
CO2: Determine the reliability of an average and compare variability of two or more series and solve problems using moments.
CO3: Interpret bivariate data and apply curve fitting , correlation and regression methods to forecast business data.
CO4: Differentiate between quantitative and qualitative data and apply association and contingency techniques using attributes.

Outline of Syllabus: (per session plan)		
Modules	**Topics**	**Duration (Lecture)**
Module 1	**Introduction to Statistics**	**10**
	Importance of Statistics. Scope of Statistics in different fields. Concepts of primary and secondary data. Diagrammatic and graphical representation of data: Histogram, frequency polygon, Ogives, Pie. Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean.	
Module 2	**Measures of Dispersion**	**10**
	Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance. Central and Non -Central moments and their interrelationship. Sheppard's correction for moments. Skewness and kurtosis.	
Module 3	**Curve fitting & Correlation**	**10**
	Curve fitting: Bi- variate data, Principle of least squares, fitting of degree polynomial. Fitting of straight line, Fitting of Second degree polynomial or parabola. Correlation: Meaning, Types of Correlation, Measures of Correlation: Scatter diagram, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient (with and without ties)	
Total Lectures		**30**

Essential readings:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.

2. BA/BSc I year statistics - descriptive statistics, probability distribution -Telugu Academy - Dr M.Jaganmohan Rao,Dr N.Srinivasa Rao,Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi.

3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI

Reference books:

1. Willam Feller: Introduction to Probability theory and its applications, Vol –I, Wiley

2. Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics, Vol-I, the World Press Pvt.Ltd., Kolakota.

3. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.

Course: Communication Skills II	**Course Code: UICSK160**

Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 20)**	**Semester End Examinations (SEE)(Marks- 30 in Question Paper)**
2	2		

Outline of Syllabus: (per session plan)

Course Outcomes:

After completion of the course, learners would be able to:

CO1: **D**evelop the oral and thinking skills such as Group Discussion scenarios suitable for corporate settings.

CO2: Demonstrate effective business communication skill like letter writing.

CO3: **E**nhance the reading skills of the students.

CO4: **D**evelop effective interview preparation skills.

Modules	**Topics**	**Duration (Lecture)**
1	**Interviews and Group Discussions , office meetings**	**10**
	Planning and Preparing for a Selection Interview **Group Discussions:** Types of GD, Process, Evaluation, Mistakes to avoid in a Group Discussion.	
	Meetings	
	Need and Importance of Meetings, Conduct of Meeting. Drafting of Notice and Agenda	
2	**Business Correspondence**	**10**
	Letter writing: Letters of Inquiry, Letters of Complaints, Claims,Adjustments, Consumer Grievance Letters	
3	**E-mail and corporate etiquettes**	**10**
	Importance of E-mails Netiquettes Dining etiquettes, attires, mannerisms for corporate scenarios.	
	<u>Activity based learning</u> **Group discussions** **Mock interviews**	
	Total	**30 Hours**
	The course will be taught through theory and case studies	

Suggested Reading:

- A Handbook Of Commercial Correspondence. (1992). *Ashley,A.* Oxford University Press. .
- Alien, R. (1970). *Organisational Management through Communication.* .
- Balan, K. a. (1996). *Effective Communication.* New Delhi: Beacon .
- Benjamin, J. (1993). *Business and Professional Communication Concepts and Practices.* New York: Harper Collins College Publishers.
- Bovee Courtland, L. a. (1989). *Business Communication.* New York, Taxman: McGraw Hill Publication.
- Frailley, L. (1982). *Handbook of Business Letters, Revised Edn.* Prentice Hall Inc.
- French, A. (1993). *Interpersonal Skills.* New Delhi: Sterling Publishers.
- H., W. F. (2012). *Soft Skills Training: A Workbook to Develop Skills for Employment.* London: Create Independent Pub.
- Hamilton, C. (2011, 2008, 2005). *Communicating for Results: A Guide for Business and the Professions, Ninth Edition.* Wadsworth: Cengage Learning, Lyn Uhl.
- Lesikar, R. V. (1994). *Business Communication: Theory and Application.* Ilinois.
- Locker, K. O., & Kaczmarek, S. K. (2014). *Business Communication: Building Critical Skills, Sixth Edition.* New York, NY: McGraw-Hill/Irwin
- Monarth, H. (2014). *Breakthrough Communication.* McGraw-Hill Education.
- Mukerjee, H. S. (2012). *Business Communication: Connecting at Work.* Oxford University Press.
- P. D. Chaturvedi, M. C. (2013). *Business Communication, Skills, Concepts, and Applications Third Edition.* Dorling Kindersley (India) Pvt. Ltd.
- Quintanilla, K. M., & Wahl, S. T. (2017). *Business and Professional Communication, Third Edition.* Los Angeles: Sage.

External Component Paper Pattern (FY BSC IT Minor, Vocational (if applicable) 30 Marks)

Question No.	**Description**	**Marks**	**Total marks**
Que 1	Answer the following Questions Any 2/3	05x2	10
Que 2	Answer the following Questions: (CLO 2) Any 2/3	05x2	10
Que 3	Answer the following Questions: (CLO 3) Any 2/3	05x2	10
		Total Marks	**30**

Program: B.Sc. – Information Technology (2024 - 25)		Semester: II	
Course: Practical Applications in Green IT		**Course Code: UIPAG161**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 20)**	**Semester End Examinations (SEE) (Marks- 30 in Question Paper)**
2	2	20	30

Learning Objectives:

Students will able to understand thoroughly what exactly Green I.T means and how to identify the causes of it.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand the concept of Green IT and the problems related to it.
CO2: Know different standards for Green IT.
CO3: Understand how power usage can be minimized in Technology.
CO4: Learn about how the way of work is changing.
CO5: Understand the concept of recycling.
CO6: Know how information systems can stay Green Information system.

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1	**Fundamentals of Green IT**	**15**
	1. Conducting energy audits to assess the power consumption of computer systems and peripherals. 2. Implementing power management settings on computers to minimize energy usage during idle periods. 3. Analyzing the environmental impact of different hardware components and selecting the most sustainable options for procurement.	**15**
Module 2	**Sustainable Green IT**	**15**
	4. Designing and simulating green data center layouts using specialized software to optimize cooling and power distribution. a. Survey of best energy-efficient practices in data centers around the world b. Designing a datacentre with use of green technology. c. Design considerations of datacentres for efficient cooling d. Impact of Datacenters on the environment 5. Setting up and testing recycling programs for outdated computer equipment, including proper disposal of electronic waste. a. Recycling of IT waste in Colleges	**15**

	b. Recycling vs Reuse c. Study damage caused by improper recycling of e-waste in developing countries like India or China	
Total Lectures		**30**

Essential readings:

1. Green IT Toby Velte, Anthony Velte, Robert Elsenpeter, McGraw Hill ,2008
2. Harnessing Green IT: Principles and Practices San Murugesan, G. R. Ganadharan, Wiley & IEEE.
3. Green Data Center: Steps for the Journey Alvin Galea, Michael Schaefer, Mike Ebbers Shroff Publishers and Distributers, 2011

Reference books:

1. Green IT, Deepak Shikarpur Vishwakarma Publications, 2014
2. Green Computing Tools and Techniques for Saving Energy, Money and Resources, Bud E. Smith, CRC Press, 2014
3. Green Computing and Green IT Best Practice, Jason Harris Emereo

Examination pattern from AY 24-25 onwards progressively under NEP from first year UG

Credits assigned	Max. marks allocated to a course	Total max. marks for Semester End Examination	Total max. marks for Continuous Assessment
03 / 04 credit course	100 marks	60 marks (Exam duration – Two Hours)	# 40 marks
01 / 02 credit course	50 marks	30 marks (Exam duration – One Hour)	## 20 marks:

 # Three sub components –

i) **10 marks + 10marks** (three tests* for 10 marks each to be conducted at different instants of time amongst which best two out of three will be considered)
ii) **20 marks** assignments / projects / presentations etc.

Two sub components-

iii) **10 marks** (two tests* of 10 marks each to be conducted at different instants of time and average of two will be considered)
iv) **10 marks** assignments / projects / presentations etc.

*Class tests / Critical Essays / Article Reviews / Open Book Tests / Quizzes etc.
Duration for examination: 60 marks- 2 hours, 30 marks -1-hour, 10 marks-20 Minutes

External Component Paper Pattern (FY BSC IT Major 60 Marks)

Que 1	(Any 4 out of 6) 05 x 4 (M1)	(20)
Que 2	(Any 4 out of 6) 05 x 4 (M2)	(20)
Que 3	(Any 4 out of 6) 05 x 4 (M3)	(20)

External Component Paper Pattern (FY BSC IT Minor, Vocational (if applicable) 30 Marks)

Question No.	Description	Marks	Total marks
Que 1	Answer the following Questions Any 2/3 (M1)	05x2	10
Que 2	Answer the following Questions: (CLO 2) Any 2/3 (M2)	05x2	10
Que 3	Answer the following Questions: (CLO 3) Any 2/3 (M3)	05x2	10
		Total Marks	**30**

Internal Component (Class Test of 10 Marks) Paper Pattern (FY BSC IT Major, Minor, Vocational if applicable)

Que 1	Fill ups / Short Answers / MCQs	(04)
Que 2	Brief Answer 02 x 3 or 03 x 2	(06)

Internal Component [ICA] (FY BSC IT Vocational Practical 20 Marks)

1.	Performance during the regular sessions	15
2.	Viva Voce	5

Rubrics for Practical					
	Performance Indicator	**Poor**	**Average**	**Good**	**Excellent**
1	**Knowledge (Factual /Conceptual/Procedural/cognitive)**	**1**	**2**	**3**	**4**
2	**Describe and Demonstration (Factual /Conceptual/procedural/cognitive)**	**1**	**2**	**3**	**4**
3	**Strategy (Analyze &/or Evaluate) (Factual /Conceptual/procedural/cognitive)**	**1**	**2**	**3**	**4**
4	**Interpret/Develop/ Attitude towards Learning (Factual /Conceptual/procedural/cognitive/ receiving, attending, responding, valuing, organizing, Characterization by value)**	**1**	**2**	**3**	**4**
5	**Nonverbal communication skills/Behavior skills (motor skills, hand-eye coordination, speech behavior)**	**1**	**2**	**3**	**4**

Practical Examination Computer Based Test Pattern

(FY BSC IT Vocational Practical 30 Marks)

Que 1	Question 1 (20 marks) or Que 1a. and Que 1b. (10 marks each)	(20)
Que 2	Journal	(05)
Que 3	Viva	(05)

Evaluation Pattern for Health And Wellbeing

Assignment	Brief Description	Specifications for Satisfactory Completion	Learning Outcomes Met (#)
Weekly Assignments	Learners will be assigned weekly work (every two weeks are deadlines). These include online lectures/videos to watch, readings, online modules, worksheets, discussions, andreflections.	Weekly assignments include deep reflection, critical thinking, examples/quotes from the learning material (lectures/readings), and application of content to your personal life/ work Life/ classroom/ students.	1, 2, 3, 4, 5.
Monthly Reports and Final Reflection	Learners will submit three monthly reports and a final reflection where they reflect on the meaningful learning they had for that month and submit their tracking for your goals.	Report deep personal reflection, required length (Minimum 500 words).	1, 2, 3, 4, 5
Accountability Partner Meetings	Every two weeks learner will meet with their accountability partner via online / offline mode.	Meeting occurs. Meeting highlights sheets are submitted and show reflection on learning and relevant learning outcomes are highlighted.	1, 2, 3, 4, 5, 6.

Specifications Grading Rubric

This course uses specifications grading. This means that work is 'bundled' and graded as satisfactory or unsatisfactory with following grades (see above for satisfactory criteria). Below are the criteria for the final grades for this course:

To Earn:	
A	Do all of the following: ✓ Completes the monthly reports at a satisfactory level. ✓ 90% of weekly assignments are complete at a satisfactory level. ✓ Demonstrates improvement in the areas identified for those items that are graded as unsatisfactory, either through revisions/resubmissions, or improvements in subsequentsubmissions. ✓ Completes all required accountability partner meetings at a satisfactory level.

B	Do 2 or more of the following: ✓ Completes the monthly at a satisfactory level. ✓ 80% of weekly assignments are complete at a satisfactory level. ✓ Demonstrates moderate improvement in the areas identified for those items that are gradedas unsatisfactory, either through revisions/resubmissions, or improvements in subsequent submissions. ✓ Completes 4 of 5 required accountability partner meetings at a satisfactory level.
C	Do 2 or more of the following: ✓ Completes the monthly reports at an unsatisfactory level. ✓ 70% of weekly assignments are complete at a satisfactory level. ✓ Demonstrates minimal improvement in the areas identified for those items that are graded asunsatisfactory, either through revisions/resubmissions, or improvements in subsequent submissions. ✓ Completes 3 of 5 required accountability partner meetings at a satisfactory level.
D	Do 2 or more of the following: ✓ Completes the monthly reports at an unsatisfactory level. ✓ 60% of weekly assignments are complete at a satisfactory level. ✓ Demonstrates no improvement in the areas identified for those items that are graded asunsatisfactory, either through revisions/resubmissions, or improvements in subsequent submissions. ✓ Completes 2 of 5 required accountability partner meetings at a satisfactory level.
E	Do 2 or more of the following: ✓ Completes the monthly reports at an unsatisfactory level. ✓ 50% of weekly assignments are complete at a satisfactory level. ✓ Demonstrates no improvement in the areas identified for those items that are graded as unsatisfactory, either through revisions / resubmissions, or improvements in subsequent submissions. ✓ Completes 1 of 5 required accountability partner meetings at a satisfactory level.

OPEN ELECTIVES Offered by IT Department

Program:		Semester: I	
Course: Data Management in Excel		**Course Code:**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA)**	**Semester End Examinations (SEE)**
2	2	20	30

Learning Objectives:

- To use and utility of functions and formulas on excel
- To understand and apply ranges, filters and sort, and validation lists on data.
- To analyze data using Pivot Tables and Pivot Chart.

Course Outcomes:

After completion of the course, learners would be able to:

- CO1: Implement the functions and formulas in excel
- CO2: Analyze the complexity and performance of data
- CO3: Visualize data into graphics and charts

Outline of Syllabus: (per session plan)

Modules	Topics	Duration (Lecture)
Module 1		**15**
	Introduction to Excel : Spreadsheet window pane, Title Bar, Menu Bar, Standard Toolbar, Formatting Toolbar, Ribbon, File Tab, and Backstage View, Formula Bar, Workbook Window, Status Bar, TaskPane, Workbook, and sheets. Key operations involve Columns and Rows management, including selecting, adjusting width and height, autofitting, hiding or unhiding, as well as inserting or deleting. Cells, with their addresses, contain formats, values, and formulas, facilitating paste and paste special actions. Functionality extends to using ranges, selecting and entering information into them, and employing AutoFill for efficiency. Calculations involve naming data groups, creating formulas for computation, summarizing specific data, and error detection and correction. .Practical i. Enter data into a Spreadsheet ii. Use AutoFill with labels, data and formulas	

	iii. Format Cell Borders and Contents iv. Calculate the total across the rows v. Calculate the total for each column vi. Create worksheet with following fields Empno, Ename, Basics, Travelling Allowance, DearnessAllowance, House Rent Allowance, Income Tax, Provident Fun, Net Pay i. Given: DA= 20% of Basic pay, HRA=10% of Basic Pay, TA=15% of Basic Pay, IT=10% of Basic Pay, Provident Fund=12% of Basic Pay ii. Calculate the Net Pay and Gross pay by using the formulae vii. Create an Excel Worksheet with fields as student Roll no., student Name, Marks of Five subjects. i. Find the Total Number & Average in all Subjects in Each Student. ii. Find Grade Using If Function.	
Module 2		**15**
	Arranging worksheet data, Structuring data into tiers, Retrieving information from a worksheet. Evaluating Alternative Data Sets: Specifying an alternative Data Set, Defining Multiple alternative Data Sets, Adjusting Data to Achieve a Desired Outcome via Goal Seek, Discovering Optimal Solutions using Solver, Analyzing Data employing Descriptive Statistics. Constructing Dynamic Worksheets through Pivot Tables: Examining Data Dynamically with PivotTables, Filtering, Displaying, and Concealing PivotTable Data, Modifying PivotTables, Styling PivotTables, Generating PivotTables from External Data. Crafting Charts and Graphics: Crafting Charts, Tailoring the Appearance of Charts, Identifying Patterns in Data, Summarizing Data through Sparklines, Crafting Dynamic Charts through PivotCharts, Crafting Diagrams via SmartArt, Producing Shapes and Mathematical Equations. Printing: Incorporating Headers and Footers to Printed Pages, Preparing Worksheets for Printing, Printing Worksheets. i. Create an Excel Worksheet to apply Text Function on Full Name of the person. • Calculate First Name • Calculate Last Name • Calculate Email id ii. Create an Excel Worksheet with fields Roll no, Name , Marks	

	Use lookup (hlookup/vlookup)function to display student's name and to find the computer score of the students.Create pivot table iii Create an Excel Worksheet to perform • alphabetical sort • numerical sort • Specify the cell color iv Create an Excel Worksheet to perform data validation • Allow only numeric or text values in a cell. • Allow only numbers within a specified range • Allow data entries of a specific • Restrict dates and times outside a given time frame. v Create an Excel Worksheet to perform data validation vi Generate an Excel spreadsheet for implementing data validation with the following criteria: • Permit only numeric or text values in a cell. • Limit only numbers within a specified range • Authorize data entries of a specific • Restrict dates and times outside a given time frame.to a selection from a drop-down list. • Show the messages in input cells vii Introduction to Macros	
Total Lectures		**30**

Online reference/Text Books

1. https://www.quackit.com/microsoft_access/tutorial/
2. https://www.tutorialspoint.com/ms_access/index.htm
3. Access 2016 in easy steps, by Mike McGrath, In Easy Steps, 1st Edition, 2017
4. Relational Databases and Microsoft Access, by Ron McFadyen, 1st Edition

Reference Books

1. MICROSOFT ACCESS 2019 by David Murray, Kendall Hunt Publishing, 1st Edition, 2020.

2. Step by Step Microsoft Access 2013, by Joyce Cox and Joan Lambert, 1st Edition, Microsoft Press, 2013
3. Access 2019 Bible, by Michael Alexander, Richard Kusleika, Wiley, 1st Edition, 2018
Access 2019 For Dummies, by Laurie A. Ulrich, Ken Cook, Wiley, 1st Edition, 2018

Program:			**Semester: II**
Course: Information Technology in Business Management			**Code:**
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Internal Continuous Assessment (ICA) (weightage)**	**Term End Examinations (TEE) (weightage)**
2	**2**	**20**	**30**

Learning Objectives:

1. Understand the basic concepts and components of information technology, including computer hardware, software, and networks.
2. Master advanced features and functionalities of Microsoft Excel, including PivotTables, Power Query, Power Pivot, and macros.
3. Apply advanced Excel functions and formulas for data manipulation, analysis, and visualization.
4. Demonstrate proficiency in using Excel for statistical analysis, financial modeling, and forecasting.
5. Identify common security threats and vulnerabilities in information systems, networks, and applications.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Comprehensive Understanding: Students will demonstrate a comprehensive understanding of fundamental concepts in information technology, advanced Excel features, and security/data privacy principles.

CO2: Technical Proficiency: Students will develop technical proficiency in using computer hardware and software, advanced Excel functions and formulas, and security tools and technologies.

CO3: Data Analysis Skills: Students will acquire data analysis skills using advanced Excel techniques such as PivotTables, Power Query, and statistical functions to analyze, interpret, and visualize data effectively.

CO4: Problem-Solving Abilities: Students will develop problem-solving abilities to identify, analyze, and solve IT-related problems, both individually and collaboratively.

Outline of Syllabus: (per session plan)

Module	Description	No of Hours
1	**Fundamentals of Information Technology**	**10**
	Chapter 1: Computer Hardware and Software ➢ Basics of computer hardware ➢ Computer software - Operating system, Application software and system software, Types of operating system, Functions and objectives of operating system ➢ Working with Windows and Linux operating system (Basic commands on cmd) Chapter 2: Networks and Communication Technologies ➢ The Internet, Intranet and Extranet ➢ Data transfer over the internet ➢ Basics of computer networks, types of networks and network topologies ➢ Network protocols (TCP/IP, OSI, WiFi, Ethernet) Chapter 3: Web Technologies and Applications ➢ World Wide Web ➢ Client server architecture ➢ Web development technologies - HTML and CSS ➢ Building and hosting websites Ecommerce and online businesses	
2	**Advanced Excel & Data Analysis**	**10**
	Advanced Formulas and Functions ➢ Logical functions: IF, AND, OR, NOT ➢ Lookup and reference functions: VLOOKUP, HLOOKUP, INDEX, MATCH ➢ Text functions: CONCATENATE, TEXT, LEFT, RIGHT, MID ➢ Date and time functions: DATE, TIME, TODAY, NOW **Statistical Analysis and Forecasting**	

	➢ Statistical functions in excel ➢ Using excel charts for visualizing statistical data - box plots, histograms, scatter plots ➢ Adding trendlines and data labels ➢ Creating and evaluating forecasts in excel **Advanced Excel Data Modelling and What-If Analysis** ➢ Importance of data-driven decision making ➢ Hide and goal seeking ➢ What-If analysis Data analysis tools and add-ins	
3	**Security, Data Privacy, and Protection**	**10**
	Chapter 1: Data Privacy and Protections ➢ Overview of data privacy and protection regulations (GDPR, HIPAA CCPA) ➢ Risks and consequences of data breaches ➢ Data backup and recovery ➢ Data retention and destruction ➢ Setting permission and restrictions on file access Chapter 2: Security in cyberspace ➢ Security objectives ➢ Threats and cybercrimes ➢ Enabling security through cryptography, firewalls, VPN, and SSL Cybersecurity measures and best practices for businesses.	
Total Lectures		**30**

Textbook:

1. Computer Fundamentals, V. Rajaraman, PHI
2. Microsoft Excel 2019 All-in-One for dummies, Greg Harvey, Wiley

Reference Books:

1. Fundamental of Information Technology, Srivastava Cheton
2. Network Security William Stallings, Prentice Hal
3. Computer Networks Forouzon, Tata McGraw-Hill
4. Introduction to CyberSecurity : Guide to the World of CyberSecurity
5. Data Privacy: Principles and Practice, William Stallings and Lawrence Brown

Program:		**Semester: II**	
Course: Introduction to Python Programming		**Course Code:**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA) (Marks - 20)**	**Semester End Examinations (SEE) (Marks- 30 in Question Paper)**
2	2	20	30

Learning Objectives:

The course aims to equip students with a thorough understanding of Python programming language fundamentals, defining program structure and components, mastering loop and decision statement construction, and understanding built-in input/output operations and compound data types.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: understand the concept of variables, expressions, looping and conditions used in Python programming

CO2: implement functions, strings, lists, tuples and directories

CO3: import and create modules in Python

Outline of Syllabus: (per session plan)

Modules	**Topics**	**Duration (Lecture)**
Module 1		**15**
	Introduction: History of Python, Features of Python, Installing Python, Writing and Executing First Python Program, Comparison of Python with C and Java, Debugging: Syntax Errors, Runtime Errors, Semantic Errors, Experimental Debugging **Variables and Expressions** Values and Types, Variables, Variable Names and Keywords, Type conversion, Expressions, Interactive Mode and Script Mode. **Operators:** Arithmetic operators, Assignment operators, Unary minus operator, Relational operators, Logical operators, Bitwise operators, Membership operators, Identity operators, Precedence of Operators, Associativity of Operators. **Input and Output Operations:** Input Function, Output Statements, Command Line Arguments. **Control Statements:** The if statement, the if … else statement, the if …elif … else statement. **Loop Statement**- while loop, for loop, Infinite loop, Nested loop, the else suite, terminating loops, skipping specific conditions. **Strings:** Creating Strings, Functions of Strings, Working with Strings, Length of a String, Indexing and Slicing, Repeating and Concatenating Strings, Checking Membership, Comparing Strings, Removing Spaces, Finding Substrings, Counting Substrings.	
Module 2		**15**

	List and Tuples: List, Nested List, List Slices, List Functions and Methods, List Operations, Tuples, Built-in Tuple functions, Basic tuples operations**. Dictionaries:** Creating a Dictionary, Accessing Values in a dictionary, Updating Dictionary, Deleting Elements from Dictionary, Properties of Dictionary keys, Operations in Dictionary, Built-In Dictionary Functions, Built-in Dictionary Methods. **Functions:** Function definition and call, Returning Results, Returning Multiple Values from a Function, Built-in Functions, Difference between a Function and a Method, Pass Value by Object Reference, Parameters and Arguments, Formal and Actual Arguments, Positional Arguments, Keyword Arguments, Default Arguments, Arbitrary Arguments, Recursive Functions, **Modules**: Importing module, Creating and exploring modules, Math module, Random module, Time module	
Total Lectures		**30**

Reference books:

1. Python: The Complete Reference, Martin C. Brown, McGraw Hill, 2018
2. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress, 2017
3. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University Press, 2017
5. Let Us Python, Yashwant. B. Kanetkar, BPB Publication, 2019