



**College of Arts,
Science &
Commerce**

RISE WITH EDUCATION

Sion (West), Mumbai – 400022.

(Autonomous)

Faculty: Science

Program: B.Sc.

Subject: INFORMATION TECHNOLOGY

Academic Year: 2023 - 2024

F.Y.B.Sc.

**Credit Based Semester and Grading Syllabi (as per
NEP) approved by Board of Studies in Information
Technology to be brought into effect from June 2023.**

PREAMBLE

With the growing dependence of computers in our lives, information technology has become an indispensable part of it. Information Technology is one of the most popular and fastest growing industries which provides millions of jobs to people across the globe. To address this demand for IT professionals, this three-year BSc programme in Information Technology is being introduced. The BSc(IT) Programme will enable the students to have sound knowledge in the core IT subjects through which they can develop user-friendly and scalable applications. This programme aims to prepare students for careers requiring IT expertise and to develop skills required to work in teams within organisations.

PROGRAMME SPECIFIC OUTCOMES

PSO No	Details
PSO1	Sound Knowledge: Demonstrate the knowledge of core IT concepts and apply them to develop a user-friendly, scalable and robust applications
PSO2	Critical and Rational Thinking: Exhibit higher order skills to adapt to the everchanging technological environment
PSO3	Logic Building and Programming Skills: The ability to apply logic to problem solving and acquire proficiency in various programming languages.
PSO4	Develop Communication skills and environmental awareness: Knowledge of basic communication skills and environmentally friendly computing practices. Work and communicate effectively in teams within organizations.
PSO5	Enable Employability: Create computer experts, who can be directly employed or start his/her own work as Web Designer, Database User, Programmer, Testing professional, Designer of a System and Network implementer.
PSO6	Pursue Higher Education: Make students competent to take up advanced degree courses like MCA, MSc(CS), MSc(IT) and MBA etc.
PSO7	Research: Make students competent to take up advanced level research in the field of technology

Semester I

Course Code	Course Type	Course Title	Credits
SIUSIT11	Department/Subject Specific Core (DSC) Major	Imperative Programming	3
SIUSITP11	Department/Subject Specific Core (DSC) Major Practical	Imperative Programming Practical	1
SIUSIT12	Department/Subject Specific Core (DSC) Minor	Digital Electronics	3
SIUSITP12	Department/Subject Specific Core (DSC) Minor Practical	Digital Electronics Practical	1
SIUSIT13	Vocational Skill Course (VSC)	Computer Networks	1
SIUSITP13	Vocational Skill Course (VSC) Practical	Computer Networks Practical	1
SIUSIT14	Skill Enhancement Course (SEC)	Web Designing - I	1
SIUSITP14	Skill Enhancement Course (SEC) Practical	Web Designing – I Practical	1
SIUSIT15	Open Elective (OE)	Data Presentation and Visualization in MS PowerPoint	2
SIUSITP15	Open Elective (OE) Practical	Data Presentation and Visualization in MS PowerPoint Practical	2
--	Ability Enhancement Course (AEC) (College Level)	English	2
--	Value Education Course (VEC) (College Level)	Environmental Studies	2
--	Indian Knowledge System (IKS) (College Level)	YET TO FINALISE	2
TOTAL CREDITS			22

Note:- Open Elective will be taught by the IT department to students of other departments. IT students will not take this elective

SEMESTER - I

Imperative Programming (SIUSIT11)

Course Objective:

To acquaint learners about the importance of logical thinking in software development.

Course Outcome:

Upon completion of this course, student will be able to:

CO1: Remember the data types, structure of if statement, and the loops in C language

CO2: Write programs using if-else structure, loops, switch statement and user defined functions.

CO3: Use pointers, and create a new data type structure using the existing primitive data types in C.

B. Sc (Information Technology)	Semester – I - SIUSIT11
Course Name	Imperative Programming
Periods per week (1 Period is 60 minutes)	3
Credits	3

Unit	Contents	No. of Lectures
I	What is C?, Data Types , The Decision Control Structure, The Loop Control Structure, The Case Control Structure	15
II	The Loop Control Structure, Storage Classes	15
III	Arrays, Pointers, Functions, Puppeting on Strings, Structures	15

Books and References

Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Let Us C: Authentic guide to C programming language	Yashavant Kanetkar	BPB Publications	19 th	2022
2	Programming Logic and Design	Joyce Farell	Cengage Learning	8 th	2014
3	C for beginners	Madhusudan	Mothe X-Team Series	1 st	2008
4	21st Century C	Ben Klemens	OReilly	1 st	2012

Imperative Programming Practical (SIUSITP11)

B. Sc (Information Technology)	Semester – I - SIUSITP11
Course Name	Imperative Programming Practical
Periods per week (1 Period is 60 minutes)	2 per batch
Credits	1

List of Practical: (To be done in C Language)

1.	Basic Programs:
	a. Write a program to display the message HELLO WORLD. b. Write a program to declare some variables of type int, float and double. Assign some values to these variables and display these values. c. Write a program to find the addition, subtraction, multiplication and division of two numbers.
2.	Programs on variables:
	a. Write a program to swap two numbers without using third variable. b. Write a program to find the area of rectangle, square and circle. c. Write a program to find the volume of a cube, sphere, and cylinder.
3.	Conditional statements and loops(basic)
	a. Write a program to enter a number from the user and display the month name. If number >13 then display invalid input using switch case. b. Write a program to check whether the number is even or odd. c. Write a program to check whether the number is positive, negative or zero. d. Write a program to find the factorial of a number. e. Write a program to check whether the entered number is prime or not. f. Write a program to find the largest of three numbers.
4.	Conditional statements and loops(advanced)
	a. Write a program to find the sum of squares of digits of a number. b. Write a program to reverse the digits of an integer. c. Write a program to find the sum of numbers from 1 to 100. d. Write a programs to print the Fibonacci series. e. Write a program to find the reverse of a number. f. Write a program to find whether a given number is palindrome or not. g. Write a program that solve the quadratic equation h. Write a program to check whether the entered number is Armstrong or not. i. Write a program to count the digit in a number
5.	Programs on patterns:
	a. Programs on different patterns.
6.	Functions:
	a. Programs on Functions.
7.	Recursive functions

	a. Write a program to find the factorial of a number using recursive function. b. Write a program to find the sum of natural number using recursive function.
8.	Arrays:
	a. Write a program to find the largest value that is stored in the array. b. Write a program using pointers to compute the sum of all elements stored in an array. c. Write a program to arrange the 'n' numbers stored in the array in ascending and descending order. d. Write a program that performs addition and subtraction of matrices. e. Write a program that performs multiplication of matrices.
9.	Pointers:
	a. Write a program to demonstrate the use of pointers. b. Write a program to perform addition and subtraction of two pointer variables.
10.	Structures and Unions
	a. Programs on structures. b. Programs on unions.

Course Objective:

To provide learners an insight into Digital Data Storage and the working of fundamental elements of digital electronics useful for digital communication

Course Outcome:

Upon completion of this course, student will be able to:

CO1: Understand the structure of various number systems, binary arithmetic and its applications in digital design

CO2: Apply the Boolean algebra using logic gates and Karnaugh Maps

CO3: Construct and design Combinational and Sequential Logic circuits

B. Sc (Information Technology)	Semester – I - SIUSIT12
Course Name	Digital Electronics
Periods per week (1 Period is 60 minutes)	3
Credits	3

Unit	Contents	No. of Lectures
I	Number System: Analog System, digital system, numbering system, binary number system, octal number system, hexadecimal number system, conversion from one number system to another, floating point numbers, weighted codes binary coded decimal, non-weighted codes Excess – 3 code, Gray code. Binary Arithmetic: Binary addition, Binary subtraction, Negative number representation, Subtraction using 1's complement and 2's complement.	15
II	Boolean Algebra and Logic Gates: Introduction, Logic (AND OR NOT), Boolean theorems, Boolean Laws, De Morgan's Theorem, Reduction of Logic expression using Boolean Algebra, Deriving Boolean expression from given circuit, exclusive OR and Exclusive NOR gates, Universal Logic gates, Implementation of other gates using universal gates. Minterm, Maxterm and Karnaugh Maps: Introduction, minterms and sum of minterm form, maxterm and Product of maxterm form, Reduction technique using Karnaugh maps – 2/3/4 variables K-maps, Grouping of variables in K-maps, K-maps for product of sum form, minimize Boolean expression using K-map and obtain K-map from Boolean expression.	15
III	Combinational Logic Circuits: Introduction, Multi-input, multi-output Combinational circuits, Code converters design and implementations.	

	Multiplexer, Demultiplexer, Encoder and Decoder: Introduction, Multiplexer, Demultiplexer, Decoder, Encoders. Sequential Circuits: Flip-Flop: Introduction, Terminologies used, S-R flip-flop, D flip-flop, JK flip-flop, Race-around condition, Master – slave JK flip-flop, T flip-flop.	
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Books and References

Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Digital Electronics and Logic Design	N. G. Palan	Technova	1 st	2000
2	Make Electronics	Charles Platt	O'Reilly	1 st	2010
3	Modern Digital Electronics	R. P. Jain	Tata McGraw Hill	4 th	2009
4	Digital Principles and Applications	Malvino and Leach	Tata McGraw Hill	8 th	2014

Digital Electronics Practical (SIUSITP12)

B. Sc (Information Technology)	Semester – I - SIUSITP12
Course Name	Digital Electronics Practical
Periods per week (1 Period is 60 minutes)	2 per batch
Credits	1

List of Practical:

1.	Study of Logic gates and their ICs and universal gates:
	a. Study of AND, OR, NOT, XOR, XNOR, NAND and NOR gates b. IC 7400, 7402, 7404, 7408, 7432, 7486, 74266 c. Implement AND, OR, NOT, XOR, XNOR using NAND gates. d. Implement AND, OR, NOT, XOR, XNOR using NOR gates.
2.	Implement the given Boolean expressions using minimum number of gates.
	a. Verifying De Morgan's laws. b. Implement other given expressions using minimum number of gates. c. Implement other given expressions using minimum number of ICs.
3.	Implement combinational circuits.
	a. Design and implement combinational circuit based on the problem given and minimizing using K-maps.
4.	Implement code converters.
	a. Design and implement Binary – to – Gray code converter. b. Design and implement Gray – to – Binary code converter. c. Design and implement Binary – to – BCD code converter d. Design and implement Binary – to – XS-3 code converter
5.	Implement Encode and Decoder and Multiplexer and Demultiplexers.
	a. Design and implement 8:3 encoder. b. Design and implement 3:8 decoder. c. Design and implement 4:1 multiplexer. Study of IC 74153, 74157 d. Design and implement 1:4 demultiplexer. Study of IC 74139 e. Implement the given expression using IC 74151 8:1 multiplexer. f. Implement the given expression using IC 74138 3:8 decoder
6.	Study of flip-flops.
	a. Study of IC 7473. b. Study of IC 7474. c. Study of IC 7476. d. Conversion of Flip-flops.

Computer Networks (SIUSIT13)

Course Objective:

To orient the students about the OSI networking model and study the bottom four layers of the model in detail.

Course Outcome:

Upon completion of this course, student will be able to:

CO1: Describe the OSI layers with their services and protocols.

CO2: Use networking protocols in the context of a conceptual model, such as the OSI or TCP/IP framework.

B. Sc (Information Technology)	Semester – I - SIUSIT13
Course Name	Computer Networks
Periods per week (1 Period is 60 minutes)	1
Credits	1

Unit	Contents	No. of Lectures
I	Introduction, Network Models: Protocol layering, TCP/IP protocol suite, The OSI model. Introduction to Physical layer: Digital and Analog transmission, Transmission media, Switching Introduction to the Data Link Layer: Link Layer Addressing, data link layer protocols Introduction to the Network Layer: Network layer services, packet switching, network layer performance, IPv4 addressing, Internet Protocol, IPv6 addressing and protocol Unicast Routing: Introduction, routing algorithms Introduction to the Transport Layer:- TCP and UDP Protocol Standard Client Server Protocols: World wide-web and HTTP, FTP, Electronic mail, Telnet, Secured Shell, Domain name system.	15

Books and References

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Data Communicationand Networking	Behrouz A .Forouzan	Tata McGraw Hill	Fifth Edition	2013
2.	TCP/IP Protocol Suite	Behrouz A .Forouzan	Tata McGraw Hill	Fourth Edition	2010
3.	Computer Networks	Andrew Tanenbaum	Pearson	Fifth	2013

Computer Networks Practical (SIUSITP13)

B. Sc (Information Technology)	Semester – I - SIUSITP13
Course Name	Computer Networks Practical
Periods per week (1 Period is 60 minutes)	2 per batch
Credits	1

List of Practical (Using network simulators)

1.	IPv4 Addressing and Subnetting a) Given an IP address and network mask, determine other information about the IP address such as: • Network address • Network broadcast address • Total number of host bits • Number of hosts b) Given an IP address and network mask, determine other information about the IP address such as: • The subnet address of this subnet • The broadcast address of this subnet • The range of host addresses for this subnet • The maximum number of subnets for this subnet mask • The number of hosts for each subnet • The number of subnet bits • The number of this subnet
2.	Use of ping and tracert / traceroute, ipconfig / ifconfig, route and arp utilities.
3.	Configure IP static routing.
4.	Configure IP routing using RIP.
5.	Configuring OSPF.
6.	Configuring DHCP server and client.
7.	Configuring DNS Server and client.
10.	Scan and check the packet information of following protocols • HTTP, ICMP, TCP, SMTP, POP3

Web Designing - I (SIUSIT14)

Course Objective:

To create basic web pages using HTML tags

Course Outcome:

Upon completion of this course, student will be able to:

CO1: Understand the different HTML tags and its usage.

CO2: Create a basic website using HTML and Cascading Style Sheet

Theory Component:

B. Sc (Information Technology)	Semester – I - SIUSIT14
Course Name	Web Designing -1
Periods per week (1 Period is 60 minutes)	1
Credits	1

Unit	Contents	No. of Lectures
I	Introduction, Why HTML5? Formatting text by using tags, using lists and backgrounds, Creating hyperlinks and anchors. Style sheets, CSS formatting text using style sheets, formatting paragraphs using style sheets. HTML5 Page layout and navigation: Creating navigational aids: planning site organization, creating text based navigation bar, creating graphics based navigation bar, creating graphical navigation bar, creating image map, redirecting to another URL, creating division based layouts: HTML5 semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions. HTML5 Tables, Forms and Media: Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment, creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.	15

Books and References

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Web Design The Complete Reference	Thomas Powell	TataMcGraw Hill	2nd	2000
2.	HTML5 Step by Step	FaitheWempen	Microsoft Press		2011
3.	Head First HTML 5 programming	Eric Freeman	O'Reilly		2013

Web Designing - I Practical (SIUSITP14)

B. Sc (Information Technology)	Semester – I – SIUSITP14
Course Name	Web Designing -I Practical
Periods per week (1 Period is 60 minutes)	2 per batch
Credits	1

List of Practical:

1.	Design a web page using different text formatting tags.
2.	Design a web page with links to different pages and allow navigation between web pages.
3.	Design a web page demonstrating all Style sheet types
4.	Design a web page with Imagemaps.
5.	Design a web page demonstrating different semantics
6.	Design a web page with different tables. Design a webpages using table so that the content appears well placed.
7.	Design a web page with a form that uses all types of controls.
8.	Design a web page embedding with multimedia features.

Data Presentation and Visualization in MS PowerPoint (SIUSIT15)

Course Objective:

To help presenter to communicate more effectively by creating visually compelling presentations, and also enable them to highlight important information that they can use to persuade audiences.

Course Outcome:

Upon completion of this course, student will be able to:

CO1: Create and manipulate simple slide shows with outlines and notes.

CO2: Create slide presentations that include text, graphics, animation, and transitions.

CO3: Use various visualization techniques in power point presentations

Theory Component:

B. Sc (Information Technology)	Semester – I - SIUSIT15
Course Name	Data Presentation and Visualization in MS PowerPoint
Periods per week (1 Period is 60 minutes)	2
Credits	2

Unit	Contents	No. of Lectures
I	Basics of Powerpoint, Editing Slides, Working in Outline View, Proofing the presentations, Notes and Slide Show. Fonts and Text Formatting, Designing and animating the slides, Working with Slide Master	15
II	Inserting Pictures and Drawing on slides, Working with charts, Working with smartArt, Adding sound and video to the slides, Tables, hyperlinks and Action Buttons, Collaborating in the cloud with Office 365, Exporting your presentations to other formats, Data visualizations for power point.	15

Books and References

Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Microsoft Powerpoint 2019 for dummies	Doug Lowe	Wiley	1st	2018
2	Microsoft Powerpoint: Theory, Exercises and Video Tutorials	Dr. Andy Williams	—	—	2021
3	Microsoft Office 365: A Complete Guide to Master Word, Excel and PowerPoint 365 for Beginners and Pro	Matt Vic	—	—	—

Data Presentation and Visualization in MS PowerPoint Practical (SIUSITP15)

B. Sc (Information Technology)	Semester – I - SIUSITP15
Course Name	Data Presentation and Visualization in MS PowerPoint Practical
Periods per week (1 Period is 60 minutes)	4 per batch
Credits	2

List of Practical:

Any 10 practical with respect to the syllabus topics.

Semester II

Course Code	Course Type	Course Title	Credits
SIUSIT21	Department/Subject Specific Core (DSC) Major	Object Oriented Programming with C++	3
SIUSITP21	Department/Subject Specific Core (DSC) Major Practical	Object Oriented Programming with C++ Practical	1
SIUSIT22	Department/Subject Specific Core (DSC) Minor	Discrete Mathematics	3
SIUSITP22	Department/Subject Specific Core (DSC) Minor Practical	Discrete Mathematics Practical	1
SIUSIT23	Vocational Skill Course (VSC)	Operating Systems	1
SIUSITP23	Vocational Skill Course (VSC) Practical	Operating Systems Practical	1
SIUSIT24	Skill Enhancement Course (SEC)	Web Designing - II	1
SIUSITP24	Skill Enhancement Course (SEC) Practical	Web Designing – II Practical	1
SIUSIT25	Open Elective (OE)	Data Analysis in MS Excel	2
SIUSITP25	Open Elective (OE) Practical	Data Analysis in MS Excel Practical	2
--	Ability Enhancement Course (AEC) (College Level)	English	2
--	Value Education Course (VEC) (College Level)	Understanding India	2
--	Co-Curricular Course (CC) (College Level)	NCC/NSS/Sports/Cultural/Yoga	2
TOTAL CREDITS			22

Note:- Open Elective will be taught by the IT department to students of other departments. IT students will not take this elective

SEMESTER II

Object Oriented Programming with C++ (SIUSIT21)

Course Objective:

To orient the learners about the principles behind object-oriented programming, its benefits and application in real world scenarios.

Course Outcomes:

Upon completion of this course, student will be able to:

CO1: Explain the difference between top down and bottom up approach in programming and outline the essential features and elements of C++ programming

CO2: Apply the concepts of function and operator overloading and inheritance. Incorporate exception handling in object oriented programs and Use template classes and standard library in C++.

B. Sc (Information Technology)	Semester – II – SIUSIT21
Course Name	Object Oriented Programming with C++
Periods per week (1 Period is 60 minutes)	3
Credits	3

Unit	Contents	No. of Lectures
I	Introduction: Object oriented and Procedure oriented Language. Principles of OOPS, Classes and Objects, Constructors and Destructors.	15
II	Polymorphism ,Inheritance, Virtual Functions & Abstract Class,	15
III	String Handling, Exception Handling, Templates, Working with Files	15

Books and References

Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Object Oriented Programming with C++	E Balagurusamy	TMH	8 th	2020
2	Mastering C++	K R Venugopal, RajkumarBuyya, T Ravishankar	TMH	2 nd	2017
3	C++ for beginners	B. M. Hirwani	SPD	--	2013

Object Oriented Programming Practical (SIUSITP21)

B. Sc (Information Technology)	Semester – II - SIUSITP21
Course Name	Object Oriented Programming Practical
Periods per week (1 Period is 60 minutes)	2 per batch
Credits	1

List of Practical: (To be done in C++)

1.	Classes and methods
	a. Design an employee class for reading and displaying the employee information, the getInfo() and displayInfo() methods will be used respectively. Where getInfo() will be private method b. Design the class student containing getData() and displayData() as two of its methods which will be used for reading and displaying the student information respectively. Where getData() will be private method. c. Design the class Demo which will contain the following methods: readNo(), factorial() for calculating the factorial of a number, reverseNo() will reverse the given number, isPalindrome() will check the given number is palindrome, isArmstrong() which will calculate the given number is armStrong or not. Where readNo() will be private method. d. Write a program to demonstrate function definition outside class and accessing class members in function definition.
2.	Using friend functions
	a. Write a friend function for adding the two complex numbers, using a single class b. Write a friend function for adding the two different distances and display its sum, using two classes. c. Write a friend function for adding the two matrix from two different classes and display its sum.
3.	Constructors and method overloading.
	a. Design a class Complex for adding the two complex numbers and also show the use of constructor b. Design a class Geometry containing the methods area() and volume() and also overload the area() function. c. Design a class StaticDemo to show the implementation of static variable and static function.
4.	Operator Overloading
	a. Overload the operator unary(-) for demonstrating operator overloading b. Overload the operator + for adding the timings of two clocks, And also pass objects as an argument. c. Overload the + for concatenating the two strings. For e.g “Py” + “thon” = Python
5.	Inheritance
	a. Design a class for single level inheritance using public and private type derivation.

	b. Design a class for multiple inheritance. c. Implement the hierarchical inheritance
6.	Virtual functions and abstract classes
	a. Implement the concept of method overriding. b. Show the use of virtual function c. Show the implementation of abstract class.
7.	String handling
	a. String operations for string length , string concatenation b. String operations for string reverse, string comparison, c. Console formatting functions.
8.	Exception handling
	a. Show the implementation of exception handling b. Show the implementation for exception handling for strings c. Show the implementation of exception handling for using the pointers.
9.	File handling
	a. Design a class FileDemo open a file in read mode and display the total number of words and lines in the file. b. Design a class to handle multiple files and file operations c. Design a editor for appending and editing the files
10.	Templates
	a. Show the implementation for template function b. Show the implementation of template class library for swap function. c. Design the template class library for sorting ascending to descending and vice versa

Discrete Mathematics (SIUSIT22)

Course Objective:

To develop the logical and analytical thinking of the student which will familiarize them with the concepts required for the competitive exams

Course Outcome:

Upon completion of this course, student will be able to:

- CO1: Describe concepts of set theory , conditional statements , and identify valid and invalid arguments
- CO2: Explain the significance of quantified statements and describe sequences, mathematical induction and recursion in Mathematics.
- CO3: Classify relations, graphs and trees ,implement functions on general sets and solve problems related to counting and probability.

Theory Component:

B. Sc (Information Technology)	Semester – II – SIUSIT22
Course Name	Discrete Mathematics
Periods per week (1 Period is 60 minutes)	3
Credits	3

Unit	Contents	No. of Lectures
I	Set Theory: Definitions, Properties of Sets, Venn Diagram, Problems on sets, Principle of Inclusion and Exclusion (only statement), problems. Functions: Functions Defined on General Sets, One-to-One and Onto, Inverse Functions, Composition of Functions, Floor and Ceiling.	15
II	Sequences, Mathematical Induction, and Recursion: Sequences, Mathematical Induction, defining sequences recursively, solving recurrence relations by iteration, Second order linear homogenous recurrence relations with constant coefficients. Relations: Relations on Sets, Reflexivity, Symmetry, and Transitivity, Equivalence Relations, Partial Order Relations, Digraph.	15

III	Graphs and Trees: Definitions and Basic Properties, Trails, Paths, and Circuits, Matrix Representations of Graphs, Isomorphism's of Graphs, Trees, Rooted Trees, Isomorphism's of Graphs, Spanning trees and shortest paths. Probability and Pigeon hole Principle: Introduction, Addition rule, Product rule, Conditional probability, permutations and combinations, pigeon hole principle.	15
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Books and References

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Discrete Mathematics with Applications	Sussana S. Epp	Cengage Learning	4 th	2010
2.	Discrete Mathematics, Schaum's Outlines Series	Seymour Lipschutz, Marc Lipson	Tata McGraw Hill		2007
3.	Discrete Mathematics and its Applications	Kenneth H. Rosen	Tata McGraw Hill		
4.	Discrete mathematical structures	B Kolman RC Busby, S Ross	PHI		
5.	Discrete structures	Liu	Tata McGraw Hill		

Discrete Mathematics Practical (SIUSITP22)

B. Sc (Information Technology)	Semester – II – SIUSITP22
Course Name	Discrete Mathematics Practical
Periods per week (1 Period is 60 minutes)	2 per batch
Credits	1

List of Practical: (To be done in Scilab)

1.	Set Theory
a.	Inclusion Exclusion principle.
b.	Power Sets
c.	Mathematical Induction
2.	Functions and Algorithms
a.	Recursively defined functions
b.	Cardinality
c.	Polynomial evaluation
d.	Greatest Common Divisor
3.	Counting
a.	Sum rule principle
b.	Product rule principle
c.	Factorial
d.	Binomial coefficients
e.	Permutations
f.	Permutations with repetitions
g.	Combinations
h.	Combinations with repetitions
i.	Ordered partitions
j.	Unordered partitions
4.	Probability Theory
a.	Sample space and events
b.	Finite probability spaces
c.	Equiprobable spaces
d.	Addition Principle
e.	Conditional Probability
f.	Multiplication theorem for conditional probability

g.	Independent events
h.	Repeated trials with two outcomes
5.	Graph Theory
a.	Paths and connectivity
b.	Minimum spanning tree
c.	Isomorphism
6.	Directed Graphs
a.	Adjacency matrix
b.	Path matrix
7.	Properties of integers
a.	Division algorithm
b.	Primes
c.	Euclidean algorithm
d.	Fundamental theorem of arithmetic
e.	Congruence relation
f.	Linear congruence equation
8.	Algebraic Systems
a.	Properties of operations
b.	Roots of polynomials
9.	Boolean Algebra
a.	Basic definitions in Boolean Algebra
b.	Boolean algebra as lattices
10.	Recurrence relations
a.	Linear homogeneous recurrence relations with constant coefficients
b.	Solving linear homogeneous recurrence relations with constant coefficients
c.	Solving general homogeneous linear recurrence relations

Operating Systems (SIUSIT23)

Course Objective:

To orient the students about the role of operating systems in resource (processor, memory, file and disk) management.

Course Outcome:

Upon completion of this course, student will be able to:

CO1: Describe the virtual machines and basics of virtualization techniques

CO2: Compare and contrast various memory management schemes.

CO3: Analyze various scheduling algorithms.

B. Sc (Information Technology)	Semester – II - SIUSIT23
Course Name	Operating systems
Periods per week (1 Period is 60 minutes)	1
Credits	1

Unit	Contents	No. of Lectures
I	Introduction: What is an operating system? History of operating system, computer hardware, different operating systems, operating system concepts, system calls, operating system structure. Processes and Threads: Processes, threads, interprocess communication, scheduling, IPC problems. Memory Management: No memory abstraction, memory abstraction: address spaces, virtual memory, page replacement algorithms, design issues for paging systems, implementation issues, segmentation. Input-Output: Principles of I/O hardware, Principles of I/O software, I/O software layers, disks, clocks, user interfaces: keyboard, mouse, monitor, thin clients, power management. Deadlocks: Resources, introduction to deadlocks, the ostrich algorithm, deadlock detection and recovery, deadlock avoidance, deadlock prevention, issues.	15

Books and References

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Modern Operating Systems	Andrew S. Tanenbaum, Herbert Bos	Pearson	4 th	2014
2.	Operating Systems – Internals and Design Principles	Willaim Stallings	Pearson	8 th	2009
3.	Operating System Concepts	Abraham Silberschatz, Peter B. Galvineg Gagne	Wiley	9 th	2012
4.	Operating Systems	Godbole and Kahate	McGraw Hill	3 rd	2017

Operating Systems Practical (SIUSITP23)

B. Sc (Information Technology)	Semester – II – SIUSITP23
Course Name	Operating Systems Practical
Periods per week (1 Period is 60 minutes)	2 per batch
Credits	1

List of Practical:

1.	Installation of virtual machine software.
2.	Installation of Linux operating system (RedHat / Ubuntu) on virtual machine.
3.	Installation of Windows operating system on virtual machine.
4.	Linux commands: Working with Directories:
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
5.	Linux commands: Working with files:
a.	ps, top, kill, pkill, bg, fg,
b.	grep, locate, find, locate.
c.	date, cal, uptime, w, whoami, finger, uname, man, df, du, free, whereis, which.
d.	Compression: tar, gzip.
6.	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
7.	CPU Scheduling Algorithms
a.	First Come First Serve (FCFS)
b.	Shortest Job First (SJF)
c.	Round Robin
8.	Page Replacement Algorithms
a.	First In First Out (FIFO)
b.	Least Recently Used (LRU)

Web Designing - II (SIUSIT24)

Course Objective:

To impart knowledge on client and server scripting, database technology, so as to successfully design and implement a web site.

Course Outcome:

Upon completion of this course, student will be able to:

CO1: Design and implement dynamic web page with validation using JavaScript objects and apply different event handling mechanisms.

CO2: Design frontend and connect to backend databases.

CO3: Build a dynamic website using server-side PHP programming.

B. Sc (Information Technology)	Semester – II – SIUSIT24
Course Name	Web Designing –II
Periods per week (1 Period is 60 minutes)	1
Credits	1

Unit	Contents	No. of Lectures
I	Java Script: Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security. Operators: Assignment Operators, Comparison Operators, Arithmetic Operators, % (Modulus), ++(Increment), --(Decrement), -(Unary Negation), Logical Operators, Short-Circuit Evaluation, String Operators, Special Operators, ?: (Conditional operator), , (Comma operator), delete, new, this, void. Statements in JavaScript: Break, comment, continue, delete, do...while, export, for, for...in, function, if...else, import, labelled, return, switch, var, while, with Core JavaScript (Properties and Methods of Each) : Array, Boolean, Date, Function, Math, Number, Object, String, regExp Events and Event Handlers PHP: Why PHP and MySQL? Server-side scripting, PHP syntax and variables, comments, types, control structures, branching, looping, termination, functions, passing information with PHP, GET, POST, formatting form variables, superglobal arrays, strings and string functions, regular expressions, arrays, number handling, basic PHP errors/problems. Advanced PHP and MySQL :	15

	PHP/MySQL Functions, Integrating web forms and databases, Displaying queries in tables, Building Forms from queries, String and Regular Expressions, Sessions, Cookies and HTTP, E-Mail.	
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Books and References

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	PHP 5.1 for Beginners	Ivan Bayross Sharanam Shah,	SPD		2013
2.	PHP Project for Beginners	SharanamShah, Vaishali Shah	SPD		2015
3.	PHP 6 and MySQL Bible	Steve Suehring, Tim Converse, Joyce Park	Wiley		2009
4.	JavaScript 2.0: The Complete Reference	Thomas Powell and Fritz Schneider	TataMcGraw Hill	2 nd	
5.	Murach's PHP and MySQL	Joel Murach Ray Harris	SPD		2011

Web Designing - II Practical (SIUSITP24)

B. Sc (Information Technology)	Semester – II – SIUSITP24
Course Name	Web Designing -II Practical
Periods per week (1 Period is 60 minutes)	2 per batch
Credits	1

List of Practical:

1.	Java Script
a.	Using JavaScript design, a web page that prints factorial/Fibonacci series/any given series.
b.	Design a form and validate all the controls placed on the form using Java Script.
c.	Write a JavaScript program to display all the prime numbers between 1 and 100.
a.	Write a JavaScript program to accept a number from the user and display the sum of its digits.
d.	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).
e.	Write a java script program to design simple calculator.
2.	Control and looping statements and Java Script references
a.	Design a web page demonstrating different conditional statements.
b.	Design a web page demonstrating different looping statements.
c.	Design a web page demonstrating different Core JavaScript references (Array, Boolean, Date, Function, Math, Number, Object, String, regExp).
3.	Basic PHP I
a.	Write a PHP Program to accept a number from the user and print it factorial.
b.	Write a PHP program to accept a number from the user and print whether it is prime or not.
4.	Basic PHP II
a.	Write a PHP code to find the greater of 2 numbers. Accept the no. from the user.
b.	Write a PHP program to display the following Binary Pyramid: 1. 0 1 1 0 1 0 1 0 1
5.	String Functions and arrays
a.	Write a PHP program to demonstrate different string functions.
b.	Write a PHP program to create one dimensional array.

6.	PHP and Database
a.	Write a PHP code to create: • Create a database College Create a table Department (Dname, Dno, Number_Of_faculty)
b.	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.
c.	Design a PHP page for authenticating a user.

Data Analysis in MS Excel (SIUSIT25)

Course Objective:

Help students to organize data in an easy-to-navigate way, turn piles of data into helpful graphics and charts and analyze data and make forecasting predictions.

Course Outcome:

Upon completion of this course, student will be able to:

CO1: Remember and apply the basics of excel such as formatting cells, sorting and filtering of the given large data set.

CO2: Remember to design the various charts in excel.

CO3: Apply powerful features like pivot table and chart to large data set in excel.

Theory Component:

B. Sc (Information Technology)	Semester – II – SIUSIT25
Course Name	Data Analysis in MS Excel
Periods per week (1 Period is 60 minutes)	2
Credits	2

Unit	Contents	No. of Lectures
I	What is Excel? Cells, Rows, and Columns, Navigation, Formatting, Separating Text within a Cell, Sorting, Filters, Functions and Formulas Excel New Features: Chart Recommendations, Format Charts, Chart Design, Richer Data Labels, Leader Lines Fundamental Data Analysis: Instant Data Analysis, Sorting Data by Color, Slicers, Flash Fill	15
II	Powerful Data Analysis: PivotTable and Pivot Chart, Data Model, Power Pivot, External Data Connection, Pivot Table Tools, Power View, Visualizations, Pie Charts, Format Reports, Handling Integers, Templates, Manage Passwords.	15

Books and References

Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Excel Fundamentals - St.George's University				
2	Advanced Excel – Tutorial's Point				

Data Analysis in MS Excel Practical (SIUSITP25)

B. Sc (Information Technology)	Semester – II – SIUSITP25
Course Name	Data Analysis in MS Excel Practical
Periods per week (1 Period is 60 minutes)	2 per batch
Credits	2

List of Practical:

Any 10 practical with respect to the syllabus topics.
