FACULTY OF ARTS, SCIENCE, COMMERCE, MANAGEMENT AND HUMANITIES

UNDER GRADUATE PROGRAMMES

Bachelor of Computer Science

B.Sc CS

REGULATIONS -2023

CHOICE BASED CREDIT SYSTEM (CBCS)

Effective from the Academic Year 2023-2024

ST. PETER'S INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Deemed to be University)
Established under Section 3 of UGC Act, 1956
(Accredited with A+ Grade by NAAC & ISO 9001:2015 Certified)
AVADI, Chennai - 600054

B.Sc CS (Regulation 2023)

SEMESTER – I

Course Code	Course Title	Hours / Week				Marks		
		L	T	P	C	CIA	ESE	Total
23CP101	**Core 1:** Object Oriented Programming using C++	4	0	0	4	40	60	100
23CP102	**Core 1:** Object Oriented Programming using C++ Lab	0	0	4	2	40	60	100
23MA122	**Minor 1:** Mathematics –I	4	0	0	4	40	60	100
23EE125	**Multidisciplinary Course 1:** Digital Electronics	4	0	0	3	40	60	100
23CP181	**SEC 1 :** Office Automation	3	0	0	3	40	60	100
23TA121/ 23HI121/ 23TE121/ 23FR121	**AEC1 :** Language-I	3	0	0	2	40	60	100
23EN122	**AEC2 :** English-I	3	0	0	2	40	60	100
Total		**21**	**0**	**4**	**20**	**280**	**420**	**700**

SEMESTER – II

Course Code	Course Title	Hours / Week				Marks		
		L	T	P	C	CIA	ESE	Total
23CP111	Core 2: Python Programming	4	0	0	4	40	60	100
23CP112	Core 2 Lab: Python Programming Lab	0	0	4	2	40	60	100
23MA132	Minor 2: Mathematics II	4	0	0	4	40	60	100
23EE135	Multidisciplinary Course 2: Microprocessor and its Applications	4	0	0	3	40	60	100
23CP182	SEC 2: Bootstrap Framework	3	0	0	3	40	60	100
23TA131/ 23HI131/ 23TE131/ 23FR131	AEC 3 : Language-II	3	0	0	2	40	60	100
23EN132	AEC 4: English-II	3	0	0	2	40	60	100
Total		**21**	**0**	**4**	**20**	**280**	**420**	**700**

SEMESTER – III

Course Code	Course Title	Hours / Week				Marks		
		L	T	P	C	CIA	ESE	Total
23CP205	Core 3:Analysis of Algorithms & Data Structures	4	0	0	4	40	60	100
23CP206	Core 3: Analysis of Algorithms & Data Structures Lab	0	0	4	2	40	60	100
23CP207	Core 4: Database management system	4	0	0	4	40	60	100
23CP208	Core 4:Database management system Lab	0	0	4	2	40	60	100
23PH221	Minor 3: Physics - I	3	0	2	4	40	60	100
23CP241	Multidisciplinary Course 3: Internet Technologies & Tools	2	0	0	3	40	60	100
23CP270	VAC 1: System Administration and Maintenance	2	0	0	2	40	60	100
Total		**15**	**0**	**10**	**21**	**280**	**420**	**700**

SEMESTER - IV

Course Code	Course Title	Hours / Week				Marks		
		L	T	L	T	CIA	ESE	Total
23CP209	Core 5: Programming in JAVA	4	0	0	4	40	60	100
23CP210	Core 5 : Programming in JAVA Lab	0	0	4	2	40	60	100
23CP211	Core 6: Operating Systems	4	0	0	4	40	60	100
23CP212	Core 6: Operating System Lab	0	0	4	2	40	60	100
23PH231	Minor 3: Physics - II	4	0	2	4	40	60	100
23CP271	VAC2: Nutrition and Fitness	3	0	0	2	40	60	100
23CP250	SI 1: Summer Internship	0	0	0	2	-	100	100
Total		**15**	**0**	**10**	**20**	**240**	**460**	**700**

FACULTY OF ARTS, SCIENCE, COMMERCE, MANAGEMENT AND HUMANITIES

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B.Sc CS

REGULATIONS -2020

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SEMESTER – I SYLLABUS

Course Code:	Course Title:	L	T	P	C
23CP101	OBJECT ORIENTED PROGRAMMING USING C++	4	0	0	4

Prerequisites: Basic Programming Techniques

Course Objectives:

1. To understand the OOPs Concepts and its applications.
2. To understand and implement the introduction of C++ and functions in C++.
3. To understand and practice the use of C++ classes, objects, constructors and destructors, operator overloading and conversion.
4. To equip the students with the knowledge of inheritance, virtual classes, Pointers , virtual functions, polymorphisms and I/O operations.
5. To understand and implement the concepts of Streams and error handling in files and command line arguments.

UNIT–I Object Oriented Programming (OOP) **No. of Hours:12**

Principles of Object-Oriented Programming (OOP): Software Evolution – OOP Paradigm – Basic concepts of OOP – Benefits of OOP – Object Oriented Languages – Applications of OOP.

UNIT– 2 Introduction to C++ **No. of Hours: 12**

Introduction to C++: Tokens - Keywords – Identifiers and Constants –Datatypes - Variables -Operators, Manipulators, Type Cast Operator - Expressions and Control Structures.

Functions in C++: Main Function – Function Prototyping – Parameters Passing in Functions - Values Return by Functions - Inline Functions - Friend and Virtual Functions.

UNIT–III Classes and Objects **No. of Hours: 12**

Classes and Objects: Specifying a Class – Defining Member Functions – Static Data Members and Member functions – Array of objects – Constructors and Destructors - Operator Overloading and Type Conversions

UNIT-IV Inheritance **No. of Hours: 12**

Inheritance: Types of Inheritance - Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance. Multipathinheritance–Virtualbase Classes–AbstractClasses-Pointers, Virtual Functions and Polymorphism - Managing Console I/O operations.

UNIT–V Working with Files **No. of Hours: 12**

Working with Files: Classes for File Stream Operations - Opening and Closing a File - End-of-File Deduction - File Pointers - Updating a File - Error Handling during File Operations - Command line Arguments.

Text Books

1. Somashekara, M. T., Guru, D. S., Nagendraswamy, H. S., Manjunatha, K. S. , Object-Oriented Programming With C++, Second Edition, ISBN : 9788120344624.
2. Gopalan, N. P., Sivaselvan, B., Mala, C., Object - Oriented Programming Using C++, ISBN : 9788120339231.

Reference Books

1. Harish G. Narula, Object Oriented Programming Using C++ 19 April 2023, New Edition Mste, Tech Knowledge Publications
2. A.K. Sharma, Object-Oriented Programming With C++, January 2014, Publisher(S): Pearson India, ISBN: 9789332540767
3. The C++ Programming Language (4th Edition) By Bjarne Stroustrup,

Expected Course Outcomes:

Upon the completion of this course, the students will be

CO1: Able to understand OOPS applications and concepts.

CO2: Able to understand and use a variety of datatypes, operators, control structures, expressions, and Functions while designing Programmes. C++ language knowledge is necessary for this.

CO3. Able to understand and apply the concepts of classes, objects, friend functions, constructors, Destructors, operator overloading, and conversions in the design of Programmes.

CO4: Able to generate string classes, calling base class constructors, applying and analyzing operator overloading, runtime polymorphism, virtual methods, and I/O statements, as well as designing and implementing numerous inheritance schemes.

CO5: Able to understand and use C++'s methods for managing files and errors.

Course Code:	Course Title:	L	T	P	C
23CP102	OBJECT ORIENTED PROGRAMMING USING C++ LAB	0	0	4	2

Prerequisites: Basic Programming Techniques

Course Objectives:

1. To Write, Compile And Debug Programs in C++ Language.
2. To Formulate Problems And Implement Algorithms in OOPS.
3. To Effectively Choose Programming Components That Efficiently Solve Computing Problems In Real-World.

List of Programs: **No. of Hours: 30**

1. Simple Program using C++ Constructs.
2. Implementation of Looping Structures.
3. Working with the Control Structures.
4. Working with Functions.
5. Working with Inline Functions.
6. Working with Default arguments in Functions.
7. Simple Program to create and implement classes and objects.
8. Working with Constructors.
9. Working with Simple Inheritance.
10. Working with Multilevel Inheritance.
11. Working with Multiple Inheritance.
12. Working with Virtual Functions.
13. Working with Function Overloading.
14. Working with Function Overriding.
15. Working with Operator Overloading.
16. Program Using Pointer.
17. Program using File Handling Techniques.

Expected Course Outcomes:

Upon the completion of this course, the students will be able to

CO1: Create and explain Basic C++ Program using i/o variables and structures.
CO2: Apply object oriented programming concepts using class and objects
CO3: Design and assess the classes for code reuse
CO4: Analyse and Apply the generic classes concepts in programming problem
CO5: Illustrate and evaluate the file Input Output mechanisms

23MA122	MATHEMATICS-I	L	T	P	C	Total Marks
		3	1	0	4	100

PREREQUISITES: NIL

COURSE OBJECTIVES:

The main objectives of this course are to:

1	To introduce the concepts of approximation values.
2	To learn the basic concepts of matrices.
3	To form algebraic equations finding roots.
4	To gain general knowledge of trigonometry.
5	To train the students to learn basic calculus.

UNIT 1:	**NUMERICAL METHODS**	**12 hrs**

Numerical Methods: Operators E,Δ,∇, difference tables - Newton -Raphson method-Newton‟s forward and backward interpolation formulae for equal intervals.

UNIT 2:	**MATRICES**	**12 hrs**

Symmetric-Skew-Symmetric-Orthogonal-Hermetian-Skew-Hermetian-Unitary Matrices-Eigen values and Eigen-vectors-Cayley-Hamilton theorem (without proof)-verification.

UNIT 3:	**THEORY OF EQUATIONS**	**12 hrs**

Polynomial equations with real coefficients-irrational roots-complex roots-symmetric functions of roots-reciprocal equation-Newton's method to find a root approximately - simple problems.

UNIT 4:	**TRIGONOMETRY**	**12 hrs**

Expansions of $\sin(n\theta)$ and $\cos(n\theta)$ in a series of powers of $\sin\theta$ and $\cos\theta$ - Expansions of $\sin^n\theta$, $\cos^n\theta$, $\tan^n\theta$ in a series of sines, cosines and tangents of multiples of "θ" - Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in a series of powers of "θ".

UNIT 5:	**DIFFERENTIAL CALCULUS**	**12 hrs**

Successive differentiation-n^{th} derivatives-partial differentiations (simple problems)-Jacobians-maxima and minima of functions of two variables-Lagrange's multipliers - Simple problems.

60 PERIODS

COURSE OUTCOMES:

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

CO1:	Solve algebraic series and solve equations numerically
CO2:	Get knowledge of matrices to find eigen values and eigen vectors.
CO3:	Find roots of equations.
CO4:	Solve all kinds of trigonometric functions.
CO5:	Get the knowledge of basic differential calculus.

TEXT BOOKS

1.	Allied Mathematics Volume I and II by P. Duraipandian and S. Udayabaskaran, Published by S. Chand-2016 Edition (Reprint)

REFERENCES

1.	S. Narayanan and T.K. Manickavasagam Pillai – Ancillary Mathematics, S. Viswanathan Printers, 2009, Chennai

Course Code:	Course Title:	L T P C
23EE121	DIGITAL ELECTRONICS	4 0 0 4

Prerequisites: None

Course Objectives:

1. To learn the Digital fundamentals, Boolean algebra, and its applications in digital systems.
2. To familiarize with the design of various combinational digital circuits using logic gates.
3. To understand the simplification of Boolean Functions using Karnaugh Maps.
4. To study the electronic circuits involved in the making of logic gates.
5. To implement synchronous state machines using flip-flops

Unit-I: Binary Systems : **No. of Hours: 12**

Digital Computers and Digital Systems - Binary Number System – Binary Addition – Binary Subtraction- Binary Multiplication and Division-Number Base Conversion: decimal, binary, octal, hexadecimal.

Unit-II: Boolean Algebra and Logic Gates **No. of Hours: 12**

Basic Definitions of Boolean Algebra - Basic Theorems and Properties of Boolean Algebra - Digital Logic Gates : AND, OR, NOT , NAND, NOR, Exclusive OR and Exclusive NOR Gates- DeMorgan's Theorem – Universal gates.

Unit-III: Simplification of Boolean Functions **No. of Hours: 12**

Sum of Products and Product of Sums - Karnaugh Maps - Two and Three Variable Maps - Four Variable Map -Don't Care Conditions - Rolling the Map – Eliminating Redundant Groups- Quine-McCluskey method of minimization.

Unit-IV: Combinational Logic circuits: **No. of Hours: 12**

Adders: Half Adder,Full Adder – Subtractors: Half Subtractor,Full subtractor. - Binary Adder-BCD Adder – Encoder - Decoders – Multiplexers – Demultiplexers.

UNIT-V: Sequential circuits: **No. of Hours: 12**

Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop – Master Slave Flip Flop - Counters: – Asynchronous and synchronous Counter.

Text Books:

1. S Nagaraj and D Srihari , Digital Electronics, 25 April 2023, ISBN-13 - 978-6205522103
2. Anil K. Maini , Digital Electronics: Principles and Integrated Circuits, 1 September 2019, ISBN-13 - 978-8126508631, Publisher - Wiley
3. M. Morris Mano, "Digital Logic and Computer Design", PHI, 1996
4. Principles of Digital Electronics, Dr. K. Meena, PHI Learning Private Limited, New Delhi 2009.

Expected Course Outcomes:

Upon the completion of this course, the students will be able

CO1 : Able to manipulate numeric information in different Forms
CO2 : Able to design of various combinational digital circuits using logic gates.
CO3 : Able to simplify the Boolean Functions using Karnaugh Maps.
CO4 : Able to design and analyze small sequential circuits and to use standard sequential functions to build larger more complex circuits.
CO5 : Able to implement synchronous state machines using flip-flops.

Course code 23TA121	Ability Enhancement Course -1	L	T	P	C
	பொதுத் தமிழ்	3	0	0	2

அலகு - 1 கவிதை இலக்கியம்

அ. நாட்டுப்புற இலக்கியம், மரபுக் கவிதை, புதுக்கவிதை வரலாறுகள்

ஆ. தாலாட்டு பாடல், ஒப்பாரி (பாக்குறது எக்காலம்)

இ. பாரதியார் – பாரத தேசம்(1,5,9,10,12,13)

ஈ. பாரதிதாசன் – தமிழ்க் காதல் (2 பாடல்கள்)

உ. பட்டுக்கோட்டை – செய்யும் தொழிலே தெய்வம்

அலகு - 2 சிற்றிலக்கியம்

அ. சிற்றிலக்கிய வரலாறு

ஆ. நந்திக்கலம்பகம் – (பாட்டுடைத் தலைவன் வீரச்சிறப்பு, மேக விடு தூது, கையறுநிலை)

இ. குற்றாலக் குறவஞ்சி – குறத்தி மலை வளம் கூறுதல் (2 பாடல்கள்)

ஈ. இயேசுபிரான் பிள்ளைத்தமிழ் – (2 பாடல்கள்)

அலகு - 3 சிறுகதை இலக்கியம்

அ. உரைநடை இலக்கிய வரலாறு

ஆ. கு.ப.ராஜகோபாலன் – விடியுமா!

இ. குளத்தங்கரை அரசமரம் – வ.வே.சு

அலகு - 4 நாடகம்

பம்மல் சம்பந்த முதலியார் – சந்திரஹரி

அலகு - 5 மொழிப் பயற்சி

அ. அலுவல் கடிதமும் விண்ணப்பமும்

ஆ. நேர்காணல்

இ. பேச்சுக்கலை

CO NO	COURSE OUTCOME	RBT
CO1	மொழி வழியே கவித்திறனையும், படைப்பாற்றல் திறனையும் வளரத்தல்	K3, K6
CO2	கால மாற்றத்தில் வெவ்வேறு வடிங்களைப் பெறும் இலக்கியங்களை அறிதலும் அவ்வாறு தோன்றிய இலக்கியக் கூறுகளை ஆய்வுசெய்தலும்	K4
CO3	புனைவு இலக்கிய வளர்ச்சியில் சிறுகதையின் பங்கினை விளங்கிகொண்டு அப்படைப்பாற்றல் திறனைப் பயன்படுத்துதல்	K2, K3
CO4	பண்டைய கால நாடக இலக்கியம் இன்றைய தொழில்நுட்பத்தின் மூலம் அடைந்த வளர்ச்சியினை மதிப்பிடுதல் மற்றும் அதில் தனித்திறனை வளரத்தல்	K6
CO5	மொழியின் பயன்பாடுகளையும் இலக்கியத் திறனையும் விளங்க செய்தல்	K5

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	-	-	2	-	-	2	-	-
CO2	-	-	-	2	-	-	-	-
CO3	-	2	2	-	-	-	-	-
CO4	-	-	-	-	-	2	-	-
CO5	-	-	-	-	2	-	-	-
AVERAGE	-	2	2	2	2	2	-	-

Since it is mapped with, PO2, PO3, PO4, PO5, PO6, this subject is consider for empolyability

Course Code:	Course Title:	L T P C
23FR121	French - I	2 0 0 2

Prerequisites: None

Course Objectives:

1. To get a good exposure to the basics of French.
2. The learner will be able to make simple sentences in French as well as articulate using the various parts of speech.
3. Be able to effectively understand and use French grammar and the pronunciation.

Unit - 1. **No. of Hours: 06**

Decouvrir le langue francaise – Discover the French Language.

Unit – 2. **No. of Hours: 06**

Faire Connaissance – Getting to know people and learning to converse.

Unit -3 **No. of Hours: 06**

Organsizer son temps – Articulation of how we are organasing our time.

Unit – 4 **No. of Hours: 06**

Découvrir son environnement – Communication with respect to discovering and explaining one's environment.

Unit – 5 **No. of Hours: 06**

S'informer, se faire plaisir. – Learning and understanding the language with practical usage

Text Books

Campus 1. Methode de Francais. Author Jacky Girardet & Jacques Pecheur

ANNEXURE-II

Course Code: BEN123	Ability Enhancement course E1	L	T	P	C
	ENGLISH -I	3	0	0	2

Prerequisites: None

COURSE OBECTIVES:

This course is designed to equip students with a comprehensive understanding of effective communication and interpersonal skills, essential for professional growth.

UNIT – I: Vocabulary: **No.of.Hours:06**

- Synonyms and Antonyms
- One word substitution
- Word Formation (prefixes & suffixes)
- Homonyms, Homophones and Homographs
- Discourse Markers
- Cause & Effect Expressions

UNIT – II: Language and Communication: **No.of.Hours:06**

- Definition of Language
- Importance of Language
- Definition of Communication
- Barriers of Communication
- Importance of Communication
- Principles of Communication

UNIT – III: Communication Strategies: **No.of.Hours:06**

- Verbal Communication
- Tone, Audibility, Fluency
- Types of Verbal Communication
- Non- verbal Communication
- Posture, Gestures, Facial expression, Eye contact
- Advantages and Disadvantages of Verbal and Non-Communication

UNIT – IV: Self-management Skills **No.of.Hours:06**

- Self-awareness and Self-confidence
- Time management
- Stress management
- Perseverance and Resilience

- Mind mapping

UNIT-V: Social skills: **No.of.Hours:06**

- Negotiation & persuasion
- Networking
- Problem solving and Empathy
- Decision making
- Presentation skills
- Leadership skills and Team work
- Social responsibility

Total No.of.Hours: 30

Book Recommended

1. Krishna Mohan & Meera Banerji. *Developing Communication Skills*.Macmillan
2. SasiKumar. V and P.V. Dharmija. 1993. *Spoken English*: A Self-Learning Guide Conversation Practice. 34th reprint. Tata McGraw – Hill. New Delhi.
3. Suresh Kumar, E. & Sreehari, P. *Communicative English*. New Delhi: Orient BlackSwan, 2007.Print.
4. Yardi, V.V *English Conversation for Indian Students*. NewDelhi: Orient BlackSwan, 2002.Print.
5. Chandra, Joseph, Xavier Alphonse, Antony Jeyadoss and Mary Thomas. *Power Communication In English*. Chennai, Loyola Publication, 2003.
6. Cole, Kris. *Crystal clear Communication*. Chennai, East West Books Pvt.Ltd.,2001.
   McKay,Mathew,Martha Davis and Patrick Fanning. *Communication Skills*. New Delhi,B.Jain Pub.(P) Ltd;2003.

COURSE OUTCOMES:

By the end of the course students will be able to:

CO1: develop an enriched vocabulary and recognize the importance of discourse markers in effective communication.

CO2: recognize the barriers that can hinder effective communication and explore methods to overcome them.

CO3: analyze verbal communication and utilize non-verbal cues.

CO4: cultivate perseverance, resilience, and effective mind mapping for problem-solving and goal achievement.

CO5: demonstrate negotiation and persuasion skills for effective communication in various contexts.

SEMESTER – II SYLLABUS

Course Code:	Course Title:	L T P C
23CP111	PYTHON PROGRAMMING	4 0 0 4

Prerequisites: None

Course Objectives:

1. To provide basic knowledge for solving problems using computers.
2. To impart the necessary skills for the development of applications.
3. To design an algorithmic solution to a problem, create programs.
4. To introduce programming concepts using Python
5. To develop programming logic using Python
6. To develop the basic concepts and terminology of Python programming.
7. To test and execute Python programs.

Unit 1:Problem Solving Techniques: **No. of Hours:12**

Introduction to components of a computer system: Memory, processor, I/O Devices, storage, operating system, Concept of assembler, compiler, interpreter, loader and linker. Idea of Algorithm: Representation of Algorithm, Flowchart, and Pseudo code with examples, From algorithms to programs, source code.

Unit-2:Introduction Python: **No. of Hours:12**

Introduction to Python

The Python Programming Language, History, features, Applications, Installing Python,Running Simple Python program

Basics of Python

Standard data types - basic, none, Boolean (true & False), numbers, Variables, Constants, Python identifiers and reserved words, Lines and indentation, multi-line statements and Comments, Input/output with print and input ,functions Declaration, Operations on Data such as assignment, arithmetic, relational, logical and bitwise operations, dry run, Simple Input and output etc.

Unit 3: Control Statements: **No. of Hours:12**

Sequence Control – Precedence of operators, Type conversion

Conditional Statements: if, if-else, nested if-else,

Looping- for, while, nested loops, loop control statements (break, continue, pass)

Strings: declaration, manipulation, special operations, escapecharacter, string formatting operator, Raw String, Unicode strings, Built-in String methods.

Unit-4: Lists, functions, tuples and dictionaries, Sets: **No. of Hours:12**

Python Lists: Concept, creating and accessing elements, updating & deleting lists, traversing a List, reverse Built-in List Operators, Concatenation, Repetition, In Operator, Built-in List functions and methods.

Functions: Definitions and Uses, Function Calls, Type Conversion Functions, Math Functions, Composition, Adding New Functions, Flow of Execution, Parameters and Arguments, Variables and Parameters, Stack Diagrams, Void Functions, Anonymous functions Importing with from, Return Values, Boolean Functions, More Recursion, Functional programming tools - filter(), map(), and reduce(),recursion, lambda forms.

Tuples and Dictionaries: Tuples, Accessing values in Tuples, Tuple Assignment, Tuples as return values, Variable-length argument tuples, and Basic tuples operations, Concatenation, Repetition, in Operator, Iteration, Built-in tuple functions, indexing, slicing and matrices. 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.

Sets- Definition, transaction of set(Adding, Union, intersection), working with sets

Unit-5: Classes,Objects,Modules,Packages,Files,Exception Handling: **No. of Hours:12**

Classes & Objects: Introduction-class Definition-creating Objects-Objects as a Arguments Object as Return Values-Built-in Class Attributes-Inheritance-Method Overriding-Data Encapsulation-Data Hiding.

Modules: Importing module, Creating & exploring modules, Math module, Random module, Time module

Packages: Importing package, creating package,examples

Working with files: Creating files and Operations on files (open, close, read, write), File object attributes, file positions, Listing Files in a Directory, Testing File Types, Removing files and directories, copying and renaming files, splitting pathnames, creatingand moving directories

Regular Expression- Concept of regular expression, various types of regular expressions, using match function.

Exception Handling: Built-in Exceptions, Handling Exceptions, Exception with Arguments, User-defined Exceptions.

Text Books

1. E. Balagurusamy, "Introduction to Computing & Problem Solving Using Python", Mc Graw Hill Education, 2016.
2. Code with Python Programming Books | Python for data analysis | By S. Chand's Latest Edition 2023.

Reference Books

1. Beginning Programming with Python for Dummies Paperback – 2015 by John PaulMueller
2. An Introduction to Computer Science using Python 3 by Jason Montojo, JenniferCampbell, Paul Gries, The pragmatic bookshelf-2013
3. James Payne, "Beginning Python: Using Python and Python 3.1,Wrox Publication
4. T. Budd, Exploring Python, TMH, 1st Ed, 2011.
5. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.

Expected Course Outcomes:

Upon the completion of this course, the students will be able

CO1: To identify computer hardware and peripheral devices.
CO2: To develop logic, examine, and analyze alternative solutions to a problem.
CO3: To understand the introduction and basic concepts of Python.
CO4: To learn how to write loops, decision statements, and strings in Python.
CO5: To create and develop Python programs by utilizing the data structures like lists, functions**,** dictionaries, tuples, and sets
CO6: To learn how to implement classes, objects, modules, packages, files, and exception handling and expressions in Python.

Course Code:	Course Title:	L	T	P	C
23CP112	PYTHON PROGRAMMING LAB	0	0	4	2

Prerequisites: None

Course Objectives:

1. To Write, Compile And Debug Programs In Python Language.
2. To Formulate Problems And Implement Algorithms In Python.
3. To Effectively Choose Programming Components That Efficiently Solve Computing Problems In Real-World.

List of Programs: **No. of Hours: 30**

1. Write a program to swap two numbers
2. Write a program to convert kilogram into pound
3. Write a program to find largest among given three numbers
4. Write a function program to find HCF of some given numbers
5. Write a function program to display the factors of a given number
6. Write a function to find the ASCII value of the character.
7. Write a function program to convert a decimal number to its binary,octal and hexa decimal equivalents
8. Write a function program to find sum of several natural numbers using recursion
9. Write a program to find duplicate characters in a given string.
10. Write a program to check whether a string is palindrome or not.
11. Write a program to remove punctuations from a string
12. Write a program to transpose a matrix
13. Write a function to print the resolution of an image file.
14. Write a program to catch on divide by zero exception .Add a finally block too.
15. Write a program to write data in a file for both write and append modes.

Expected Course Outcomes:

CO1: To understand the basic concept of python programming.

CO2: To use The Conditional Expressions and Looping Statements To Solve Problems Associated with Conditions And Repetitions.

CO3: To use String Manipulations using String Handling Functions.

CO4: To demonstrate the role of functions involving the idea of modularity.

CO5: To understand the concept of file.

23MA132	MATHEMATICS-II	L	T	P	C	Total s
		4	0	0	4	100

PREREQUISITES: NIL

COURSE OBJECTIVES:

The main objectives of this course are to:

1	To learn the basic concepts of Integrations.
2	To train the students in Differential equations.
3	Concepts of Laplace Transforms is also introduced.
4	To Understand Partial Differential Equations.
5	To Learn Laplace transformations.

UNIT 1:	**INTEGRAL CALCULUS**	**12**

Bernoulli's formula. Reduction formulae - $\int_o^{\frac{\pi}{2}} sin^n x dx$, $\int_o^{\frac{\pi}{2}} cos^n x dx$, $\int_o^{\frac{\pi}{2}} sin^m x cos^n x dx$

(m, n being positive integers).

UNIT 2:	**FOURIER SERIES**	**12**

Fourier series for functions in (0,2π) and (0, 2*l*)- Half range sine and cosine series in (0, π) .

UNIT 3:	**DIFFERENTIAL EQUATIONS**	**12**

Ordinary Differential Equations: Second order non- homogeneous differential equations with constant coefficients of the form ay"+by'+cy=X where X is of the form $e^{\alpha x} sin\beta x$ and $e^{\alpha x} cos\beta x$.

UNIT 4:	**PARTIAL DIFFERENTIAL EQUATIONS**	**12**

Formation, complete integrals and general integrals-four standard types and solving Lagrange's linear equation P p +Q q=R

UNIT 5:	**LAPLACE TRANSFORMS**	**12**

Laplace transformations of standard functions and simple properties- inverse Laplace transforms-Application to solution of linear differential equations up to 2nd order- simple problems.

60 PERIODS

COURSE OUTCOMES:

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

CO1:	Solve all type of integrals.
CO2:	Acquire the knowledge of Fourier series.
CO3:	Get the knowledge to solve ordinary differential equations.
CO4:	Get the knowledge to solve partial differential equations.
CO5:	Acquire the knowledge of Laplace transformations.

TEXT BOOKS

1.	Allied Mathematics Volume I and II by P. Duraipandian and S. Udayabaskaran, Published by S. Chand-2016 Edition (Reprint)
2.	Dr. A.Singaravelu-Allied Mathematics, Published by Meenakshi Agency 2017

REFERENCES

1.	S. Narayanan and T.K. Manickavasagam Pillai – Ancillary Mathematics, S. Viswanathan Printers, 2009, Chennai

Course Code:	Course Title:	L T P C
23EE135	MICROPROCESSOR AND ITS APPLICATIONS	4 0 0 3

Prerequisites: None

Course Objectives:

1. To understand the architecture and programming of 8085 and 8086 microprocessor.
2. To impart the knowledge about the instruction set.
3. To understand the features of different peripheral devices and standard buses.
4. To understand the basic idea about the data transfer schemes and its applications.
5. To develop skilsl in simple program writing for 8085 & 8086 and applications.

Unit 1: Computer Architecture: **No. of Hours:9**

Computer architecture Processor to memory communication, processor to I/O device communication, Instruction Format; Instruction Cycle: Fetch Cycle, Execution Cycle; Instruction Set: CISC Architecture, RISC Architecture, Comparison; Memory Chips; Pipelining and Parallel Processing; Input / Output Organization: Asynchronous Data Transfer, Programmed I/O (concepts only); DMA: DMA Controller, DMA Transfer Modes; I/O Processor.

Unit-2: The 8086 Microprocessor: **No. of Hours:9**

The 8086 Internal Architecture: Execution Unit, Bus Interface Unit, Multiplexing of address/ data bus, 8086 registers, Memory bank: Even bank, Odd Bank, Pins and Signals, Bus cycles, Direct Memory Access, DMA Transfer modes.

Unit 3: Instruction set of 8086 & Addressing Modes: **No. of Hours:9**

Instruction set of 8086:Data transfer, Arithmetic, Bit manipulation, string, Branch control, Iteration control and Processor control, Addressing modes, Interrupts: Interrupt Vector Table, Response, Types, Priority.

Addressing modes-with example,Role of index and pointer registers.8086 instruction set Data transfer, arithmetic, logical, shift and rotate, branching, loop control and string instructions,processor control instructions with simple examples.

Unit-4: Assembly Language Programming: **No. of Hours:9**

Assembly Language Programming Program development tools, variables and constants used in assembler, Assembler directives, Procedures and macros, Interrupts of personal computers, Hand coding of assembly language programs, examples.

Unit-5: Interrupts and Peripheral ICs Interrupts:- **No. of Hours:9**

Concept, classification–internal and external, maskable and non-maskable, hardware and software. Interrupt Vector Table, interrupt cycle, interruptsservice routine, and interrupt priorities. DOS and BIOS routines as interrupt service routines. Programmable Peripheral ICs: Functional block diagram, features, various operating modes of IC 8255. Features of8253, 8259, 8251, &8257. Relevance and features of8087 co-processor.

Text Books

1. N Mathivanan, Microprocessors, PC Hardware and Interfacing, PHI Edition.
2. Introduction to Information Technology, 2nd Edition, ITL Education solutions limited, Pearson

Reference Books

1. A. Nagoor Kani, Microprocessor (8085) and its Applications 2 Edition, January 2022.
2. R. Theagarajan, S. Dhanasekaran, S. Dhanapal, Microprocessor and Its Applications 1st Edition, Reprint, New Age International (P) Ltd. 2010.
3. John D Carpinelli, Computer system organization and architecture, Pearson Education.

Web Resources:

1. https://www.slideshare.net/poojithchowdhary/8086-micro-processor(8086)
2. https://www.youtube.com/watch?v=VgkW2nU-cqg (8086)

3. https://www.slideshare.net/thandaiah/8051-microcontroller-15593218(8051)
4. https://www.youtube.com/watch?v=pA6K5NgWTow (8051)

Expected Course Outcomes:

Upon the completion of this course, the students will be able

CO1: To remember the basic concepts of computers.
CO2: To understand the architectural features of 8086 processor
CO3: To **u**nderstand the functional units of a standard PC and its working
CO4: To create assembly language programs for 8086 processor.
CO5: To analyse addressing modes and instructions of 8086
CO6: To understand the need and handling of interrupts in 8086 and features of peripheral ICs.
CO7: To apply the tools debug TASM/MASM.

Course Code:	Course Title:	L T P C
23CP182	BOOTSTRAP FRAMEWORK	3 0 0 3

Prerequisites: None

Course Objectives:

1. To acquire basic skills for designing static and dynamic Web Applications using HTML, CSS, Java Script.
2. To acquire the knowledge of Bootstrap CSS Contains global CSS classes for typography, tables, grids, forms, buttons, images etc.
3. To acquire the knowledge of High built-in Support for layout, grids, fluid grids, and responsive and mobile first web designs.
4. To acquire the knowledge of Bootstrap Components which contain various reusable components including Icons, Dropdowns, Navbars, Breadcrumbs, Popovers, Alerts, and many more.
5. To acquire the knowledge of Various jQuery and JavaScript Plug-ins which added one by one in web pages to enhance user experience

Unit 1: Introduction to WWW, HTML, CSS & JavaScript: No. of Hours: 9

World Wide Web: Introduction, Web Browsers, Web Servers, URL, HTTP, TCP Port. **HTML**: Standard HTML document structure, Basic Tags, Images, Hypertext Links, Lists, Tables, Frames.

CSS: In-line style sheets, Internal Style sheets and External Style sheets.

JavaScript: Introduction, Basics of JavaScript-variables, data types and operators, Control Structures, Arrays, Functions, HTML Forms, Events and event handling.

Unit-2: Introduction to jQuery and Bootstrap Framework: No. of Hours:9

Introduction to jQuery - Importance of jQuery, jQuery syntax, jQuery selectors, jQuery Events - Bootstrap Framework - Why Bootstrap? - History of Bootstrap - Advantages of Bootstrap Framework - Responsive web page - How to remove Responsiveness - Major Features of Bootstrap. Mobile-First Strategy - Setting up Environment - How to apply Bootstrap to Applications

Unit 3: Bootstrap Grid : No. of Hours:9

Bootstrap Grid - Apply Bootstrap Grid, Container, OffsetColumn, Reordering Columns - Advantages of Bootstrap Grid - Display responsive Images - Bootstrap Typography, use Typography- Bootstrap Tables, Form Layout, Button - Display images in different styles like Circle shape etc. - Carets Classes, hide or show the text inBootstrap

Unit-4: Bootstrap Components : No. of Hours:9

Bootstrap Components, Advantages of Bootstrap Components, The different types of Bootstrap Components - Glyphicons Component, Use Glyphicons Component -

Bootstrap Dropdown Menu Component- Bootstrap Card Component - Button Groups and Button Toolbar, Use Button Groups and Button Toolbar -Different Input Groups Components.

Navigation Pills & Tabs Components -Use Navigation Pills and Tabs Components - Navbar Component, build a Responsive Navbar - Add Forms and other controls to Navbar, Fix the position of navbar - Breadcrumb Component - Pagination Component, apply Pagination in Application.

Labels/Badge Components, Jumbotron/Page Header Components, Thumbnail Component - Alerts & Dismissible Alerts, How to Create Progress Bar, Media Objects Component - Bootstrap List Group Component, Bootstrap Panel Component.

Unit-5: BootstrapPlug-Ins : No. of Hours:9

Why bootstrap plug-ins - Use of bootstrap plug-ins - Transition plug-in -Modal dialog box -The different properties, methods andevents of model dialog box -Scrollspy plug-in, tab plug-in, use of tab plug-in, Drop Down plug-in -Tooltip plug-in, Use of Button plug-in,Methods and events of tooltip plug-in - popover plug-in, alert and button plug- ins - Collapse plug-in, different types of properties, methods and events of collapse plug-in - Carousel plug-in, affix plug-in.

Text & Reference Books

1. Mastering Bootstrap: A Beginner's Guide, by Sufyan Bin Uzayr, CRC press.2022.
2. HTML & CSS: The Complete Reference, Thomas Powell, Tata McGrew Hills, New Delhi, ISBN: 9780070701946.
3. Bootstrap in 24 Hours, Sams Teach Yourself Paperback – Illustrated, 19 November 2015, by Jennifer Kyrnin.
4. Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education
5. Bootstrap, Jake Spurlock, O'Reilly Media, Inc. , ISBN: 9781449343910
6. Bootstrap Reference Guide, Jacob Lett, Bootstrap Creative, ISBN:1732205833
7. Bootstrap 4 Cookbook, AjdinImsirovic , Packt Publishing Limited., ISBN:178588929X
8. Mastering Bootstrap 4 -Second Edition, BenjaminJakobus, Packt Publishing Limited., ISBN:1788834909
9. Bootstrap 4 By Example, Silvio Moreto, Packt Publishing Limited, ISBN:1785288873.

Expected Course Outcomes:

Upon the completion of this course, the students will be able

CO1: To design a static web pages using HTML, CSS. and create dynamic web pages , client side validation using JavaScript.

CO2: To understand basics of jQuery and the importance of Bootstrap framework.

CO3: To design first basic responsive page based on Mobile First Strategy and design web pages using bootstrap grid structure

CO4: To apply different form layout, buttons and text formatting while designingweb pages.

CO5: To design web pages using caret class and also design a effective web page with different bootstrap components likeGlyphicons, DropdownMenu Button Groups and Button Toolbar.

CO6: To design webpages using bootstrap card, NavigationPills and Tab Components

CO7: To understand importance ofvarious bootstrap plug-ins and apply different model dialog box, Scrollspy, Tooltip, popover plug-in, alert andbutton plug-ins while designing page to make it more interactive.

CO8: To design home screen more attractive by using Carouselplug-in.

Course code 23TA131	Ability Enhancement Course -3	L	T	P	C
	பொதுத் தமிழ்	3	0	0	2

அலகு – 1 செவ்வியல் இலக்கியம்

அ. தமிழ்ச் செவ்விலக்கிய வரலாறு (41 நூல்கள் அறிமுகம்)

ஆ. புறநானூறு – கபிலர் பாடல்கள் (8,105,106)

இ. முத்தொள்ளாயிரம்

அலகு - 2 அற இலக்கியம்

அ. அற இலக்கிய வரலாறு

ஆ. திருக்குறள் – நட்பு, உழவு

இ. நாலடியார் – கல்வி

ஈ. இனியவை நாற்பது – (1,2,9,16,28)

அலகு - 3 காப்பியம்

அ. தமிழ்க் காப்பியம் இலக்கிய வரலாறு

ஆ. சிலப்பதிகாரம் – வழக்குரைக் காதை

இ. பெரியபுராணம் – கண்ணப்ப நாயனார் புராணம்

ஈ. மணிமேகலை – மலர்வனம் புக்க காதை

அலகு - 4 சமயக் காப்பியம்

அ. இஸ்லாம் , கிறிஸ்துவ இலக்கிய வரலாறு

ஆ. சீறாப்புராணம் – மானுக்கு பிணை நின்ற படலம்

இ. தேம்பாவணி – வளன் சனித்தப் படலம்

அலகு - 5 மொழிப் பயிற்சி

அ.சந்திப் பிழை நீக்குதல்

ஆ மதிப்புரை எழுதுதல்

இ.மொழி பெயர்ப்பு

CO NO	COURSE OUTCOME	RBT
CO1	செவ்வியல் தமிழ் இலக்கியங்களை அறிந்து போற்றுதல்	K2
CO2	தமிழ்க் காப்பியங்களையும் அற இலக்கியங்களையும் அறிந்து பயன்கொள்ளுதல்	K6
CO3	சமூக பண்பாட்டு வாழ்வியல் விழுமியங்களைப் பெறுதல்	K5
CO4	சமயங்கள் தமிழ் இலக்கியத்திற்கு அளித்த கொடையினை புரிந்துகொள்ளுதல்	K2
CO5	அடிப்படை மொழித்திறனையும் படைப்பாற்றலையும் மேம்படுத்துதல்	K3

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	-	2	-	-	-	-	-	-
CO2	-	-	-	-	-	2	-	-
CO3	-	-	-	-	2	-	-	-
CO4	-	2	-	-	-	-	-	-
CO5	-	-	2	-	-	-	-	-
AVERAGE	-	2	2	-	2	2	-	-

Since it is mapped with, PO2, PO3, PO5, PO6, this subject is consider for Skill development

Course Code:	Course Title:	L T P C
23FR131	French - II	2 0 0 2

Prerequisites: None

Course Objectives:

1. To understand the intermediate concepts of French.
2. The learner will be able to make slightly more complex sentences in French as well as articulate using the various parts of speech.
3. Be able to effectively understand and use French grammar and the pronunciation.

Unit - 1. **No. of Hours: 06**

Emphasis on grammar building the awareness in using correct sentences. Conjugation of verbs. (er, ir, re – verbs). Adjectives.

Unit – 2. **No. of Hours: 06**

Improving the vocabulary. Proposing, accepting or denying a proposal. Verbs – To speak, To go, To come, To learn, to play, to work, to write, to take - for both writing and speaking and expressing day to day activities with these verbs.

Unit -3 **No. of Hours: 06**

Demonstrative pronom, Adverbial pronom, Les pronoms relatifs (qui, que)-Parler du passé - Compréhension/ production écrite- - Épreuves Usage of Pourquoi and Parce que.

Unit – 4 **No. of Hours: 06**

Conversion of verbs to noun and vice versa. Usage of Depuis and ilya. Mon, ton. Son, votre… Usage of Pronom Complement direct and Indirect

Unit – 5 **No. of Hours: 06**

Subjonctifs, Pronominaux verbs, Futur proche, Interrogative adjectifs, Compréhension/ production écrite-Épreuves

Text Books

Campus 1. Methode de Francais. Author Jacky Girardet & Jacques Pecheur

Course Code: BEN133	Ability Enhancement Course E2	L	T	P	C
	ENGLISH -II	3	0	0	2

Prerequisites: None

COURSE OBECTIVES:

The objective of this course is to enhance students; communication abilities and equip them with the necessary skills to excel in various communication contexts.

UNIT – I: Listening Skills: **No.of.Hours:06**

- Importance of Listening
- Process of Listening
- Types of Listening
- Listening to stories/event narration; documentaries and interviews
- Listen to a classroom lecture

UNIT – II: Speaking Skills: **No.of.Hours:06**

- Self Introduction
- Process and Types of Speaking
- Extempore topics
- Public Speech
- Conducting and Organizing seminars and conferences

UNIT – III: Reading Skills: **No.of.Hours:06**

- Process of Reading
- Importance of Reading
- Components of Readings
- Types of Readings
- Reading Stories, Essays, biographies, News paper articles

UNIT – IV: Writing Skills: **No.of.Hours:06**

- Process of Writing
- Dialogue Writing
- Paragraph Writing
- Note Taking/Note Making
- Letter Writing and Hints development

UNIT – V: Interview Skills **No.of.Hours:06**

- Face to face conversation

- Telephonic conversation
- Formal and Informal Conversation
- Interviews for Placement - Mock Interviews Job/Internship application–Cover letter& Resume
- Group Discussions and Debates

Total No.of.Hours: 30

Book Recommended

1. Krishna Mohan & Meera Banerji. *Developing Communication Skills*.Macmillan
2. SasiKumar. V and P.V. Dharmija. 1993. *Spoken English*: A Self-Learning Guide Conversation Practice. 34th reprint. Tata McGraw – Hill. New Delhi.
3. Suresh Kumar, E. & Sreehari, P. *Communicative English*. New Delhi: Orient BlackSwan, 2007.Print.
4. Yardi, V.V *English Conversation for Indian Students*. NewDelhi: Orient BlackSwan, 2002.Print.
5. Chandra, Joseph, Xavier Alphonse, Antony Jeyadoss and Mary Thomas. *Power Communication In English*. Chennai, Loyola Publication, 2003.
6. Cole, Kris. *Crystal clear Communication.* Chennai, East West Books Pvt.Ltd.,2001.
7. McKay,Mathew,Martha Davis and Patrick Fanning. *Communication Skills*. New Delhi,B.Jain Pub.(P) Ltd;2003.

COURSE OUTCOMES:

By the end of the course students will be able to:

CO1: understand the sequential process of listening & its impact and identify various types of listening.

CO2: demonstrate effective public speaking skills, utilizing appropriate body language, tone, and content.

CO3: understand the process of reading by engaging with diverse reading materials.

CO4: comprehend the writing process, construct coherent and focused paragraphs and develop efficient note-taking and note-making techniques.

CO5: engage effectively in group discussions and debates to excel in interviews.

SEMESTER – III SYLLABUS

Course Code	Course Title	L	T	P	C
23CP205	Analysis of Algorithms & Data Structures	4	0	0	4

Prerequisites : None

Course Objectives:

1. Exposes students to basic data structures and algorithms.
2. Introduces students to various techniques for representation of the data in the real world.
3. Helps understand and compute the complexity of various algorithms, be able to design and analyze the time and space efficiency of the data structures.

Unit 1: Introduction to Data Structure: **No. of Hours: 12**

Definition, Basic Terminology, Elementary Data Organization - Types of Data Structures- Linear & Non-Linear Data Structures-Data Structure Operations. Algorithm Specifications: Performance Analysis and Measurement (Time and space analysis). Abstract Data Types- Advantages of ADT. Array: Representation of arrays, Types of arrays, Applications of arrays, Sparse matrix and its representation.

Unit 2: Stacks and Queues: **No. of Hours: 12**

Stack-Stack Representation & Implementation-Stack Operations-Applications of Stack. Queue-Queue Representation & Implementation-Queue Operations- using arrays and linked list, Deque- Types Input and output restricted, Priority Queues-Array and Linked list representation.

Unit 3: Linked List: **No. of Hours: 12**

Linked List as Data Structures- Representation of Linked List-Operations on Linked List-Stack as Linked List-Queue as Linked List-Doubly Linked List-Circular List.

Unit 4: Trees and Graphs: **No. of Hours: 12**

Trees: Concept of Trees, Tree terminologies, Binary tree: Complete and Extended Binary tree, Expression trees, Representation of Binary Tree, Traversing Binary Trees – Preorder, Inorder, Postorder.

Graph: Graph Terminologies-Types of Graphs-Graph Representation. Hashing: Hash Functions. Sorting: Bubble Sort-Selection Sort-QuickSort-Heap Sort- Merge Sort.

Unit 5: Algorithm Design Techniques: **No. of Hours: 12**

Greedy Algorithms - Prim's Algorithm, Kruskal's Algorithm. Divide and Conquer: Running Time of Divide and conquer algorithms. Decrease and Conquer- Depth First Search and Breadth First Search. Backtracking Algorithms - n Queens Problem, Branch and Bound – Travelling Salesman Problem.

Text Books:

1. Data Structures And Algorithms Made Easy: Data Structures And Algorithmic Puzzles Paperback – Import, 21 July 2023 by Narasimha Karumanchi (Author)
2. Data Structures using C & C++ : As per AICTE Paperback – 1 January 2019, by Rajesh K. Shukla (Author)
3. Seymour Lipschutz, G A Vijayalakshmi Pai Data Structures Tata McGraw-Hill 2014
4. Rajesh K. Shukla Data Structures using C & C++ Wiley India, 2009

Reference Books:

1. Wisnu Anggoro, C++ Data Structures and Algorithms Packt Publishing 2018.
2. Anany Levitin , Introduction to Design and Analysis of Algorithms Pearson education 2009.
3. YedidyahLangsam, Moshe J.Augentein, aron M.Tenenbaum , Data Structures using C & C++, PHI Learning, 2nd, Edition 2009.

Expected Course Outcomes: The student will be able to:

CO1: Recall about the concepts of types of data structures, ADT, and its applications, and also analyze the performance of algorithms.

CO2: Implement the operations of Stack, Queue, deque, and priority queue operations using arrays and linked lists.

CO3: Understand about the linked list data structures of Stack, Queue and doubly linked list operations.

CO4: Understand and analyze the concepts of Trees, graphs, hashing functions, and sorting.

CO5: Apply and analyze the Algorithm Design Techniques for different applications.

Course Code	Course Title	L	T	P	C
23CP206	Analysis of Algorithms & Data Structures Lab	0	0	4	2

Prerequisites : None

Course Objectives:

1. To understand and apply suitable data structures in all possible applications.
2. To develop and design algorithms using the data structures concept

List of Programs:

1. Write a program to read „N" numbers of elements into an array and also perform the following operation on an array
   a. Add an element at the begging of an array
   b. Insert an element at given index of array
   c. Update a element using a values and index
   d. Delete an existing element
2. Write a program using stacks to convert a given
   a. postfix expression to prefix
   b. prefix expression to postfix
   c. infix expression to postfix
3. Write Programs to implement the Stack operations using an array
4. Write Programs to implement the Stack operations using Liked List.
5. Write Programs to implement the Queue operations using an array.
6. Write Programs to implement the Queue operations using Liked List.
7. Write a program for arithmetic expression evaluation.
8. Write a program for Binary Search Tree Traversals
9. Write a program to implement dequeue using a doubly linked list.
10. Write a program to search an item in a given list using the following Searching Algorithms
    a. Linear Search
    b. Binary Search.
11. Write a program for implementation of the following Sorting Algorithms
    a. Bubble Sort
    b. Insertion Sort
    c. Quick Sort
12. Write a program for polynomial addition using single linked list
13. Write a program to find out shortest path between given Source Node and Destination Node in a given graph using Dijkstrar"s algorithm.
14. Write a program to implement Depth First Search graph traversals algorithm.
15. Write a program to implement Breadth First Search graph traversals algorithm

Expected Course Outcomes: The student will be able to:

CO1: Choose appropriate linear and non-linear data structures to develop any application.
CO2: Apply the suitable sorting and searching algorithms in real world applications.
CO3: Create effective solution for challenging real world problems.

Course Code	Course Title	L	T	P	C
23CP207	Database Management System	4	0	0	4

Prerequisites : None

Course Objectives:

1. To introduce the design and development of databases with special emphasis on relational databases.
2. To Understand about Structured Query Language for manipulation of data.
3. To get knowledge about PL/SQL program.

Unit 1: Overview of Database Management System: **No. of Hours: 12**

Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Various Data Models, Components of Database Management System, three schema architecture of data base, costs and risks of database approach.

Unit 2: Entity-Relationship Model: **No. of Hours: 12**

Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, **ISA** relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, advantages of ER modelling.

Unit 3: Relational Model: **No. of Hours: 12**

Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC), Functional dependencies and normal forms upto 3rd normal form.

Unit 4: Structured Query Language: **No. of Hours: 12**

Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Join Operation, Set Operations, View, Sub Query

Unit 5: PL/SQL: **No. of Hours: 12**

Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Procedure, Function, Database Triggers, Types of Triggers.

Text Books:

1. Database Management Systems, by A. A. Puntambrkar and Dr. Pramod Patil, January 2022.
2. Database System Concepts,7th Edition,by Abraham Silberschatz,Henry F.Korth,etal.,July 2021
3. SQL All - In - One For Dummies, 3ed, January 2019, by Allen G. Taylor..
4. Getting Started with SQL: A Hands-On Approach for Beginners,January 2016, by Thomas Nield (Author).

Reference Books:

1. Database System Concepts by Abraham Silberschatz, Henry Korth, S. Sudarshan, McGrawhill
2. Database Management Systems by Raghu Ramakrishnan, McGrawhill
3. Principles of Database Systems by J. D. Ullman
4. Fundamentals of Database Systems by R. Elmasri and S. Navathe
5. SQL: The Ultimate Beginners Guide by Steve Tale. .

Expected Course Outcomes: The student will be able to:

CO1: Gain knowledge of Database and DBMS.

CO2: Understand the fundamental concepts of DBMS with special emphasis on relational data model

CO3: Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.

CO4: Model database using ER Diagrams and design database schemas based on the model

CO5: Create a small database using SQL and Store, Retrieve data in database and understand the PL/SQL Programming language to control the database.

Course Code	Course Title	L	T	P	C
23CP208	Database Management System Lab	0	0	4	2

Prerequisites : None

Course Objective:

To impart the students with the knowledge about the process of creation and maintenance of databases

List of Programs:

1. (Exercise on retrieving records from the table) EMPLOYEES (Employee_Id, First_Name, Last_Name, Email, Phone_Number, Hire_Date, Job_Id, Salary, Commission_Pct, Manager_Id, Department_Id)
   (a) Find out the employee id, names, salaries of all the employees
   (b) List out the employees who works under manager 100
   (c) Find the names of the employees who have a salary greater than or equal to 4800
   (d) List out the employees whose last name is 'AUSTIN'
   (e) Find the names of the employees who works in departments 60,70 and 80
   (f) Display the unique Manager_Id.
2. (Exercise on updating records in table) Create Client_master with the following fields(ClientNO, Name, Address, City, State, bal_due)
   (a) Insert five records
   (b) Find the names of clients whose bal_due> 5000 .
   (c) Change the bal_due of ClientNO " C123" to Rs. 5100
   (d) Change the name of Client_master to Client12 .
   (e) Display the bal_due heading as "BALANCE" .
3. Rollback and Commit commands Create Teacher table with the following fields(Name, DeptNo, Date of joining, DeptName, Location, Salary)
   (a) Insert five records
   (b) Give Increment of 25% salary for Mathematics Department .
   (c) Perform Rollback command
   (d) Give Increment of 15% salary for Commerce Department
   (e) Perform commit command.
4. (Exercise on order by and group by clauses) Create Sales table with the following fields(Sales No, Salesname, Branch, Salesamount, DOB)
   (a) Insert five records
   (b) Calculate total salesamount in each branch
   (c) Calculate average salesamount in each branch.
   (d) Display all the salesmen, DOB who are born in the month of December as day in character format i.e. 21-Dec-09
   (e) Display the name and DOB of salesman in alphabetical order of the month.
5. Create an Emp table with the following fields: (EmpNo, EmpName, Job,Basic, DA, HRA,PF, GrossPay, NetPay) (Calculate DA as 30% of Basic and HRA as 40% of Basic)
   a) Insert Five Records and calculate GrossPay and NetPay.
   b) Display the employees whose Basic is lowest in each department .
   c) If NetPay is less than <Rs. 10,000 add Rs. 1200 as special allowances .
   d) Display the employees whose GrossPay lies between 10,000 & 20,000
   e) Display all the employees who earn maximum salary.
6. Employee Database An Enterprise wishes to maintain a database to automate its operations. Enterprise is divided into certain departments and each department consists of employees. The following two tables describes the automation schemas Dept (deptno, dname, loc) Emp (empno, ename, job, mgr, hiredate, sal, comm, deptno)
   a) Update the employee salary by 15%, whose experience is greater than 10 years.
   b) Delete the employees, who completed 30 years of service.
   c) Display the manager who is having maximum number of employees working under him?

d) Create a view, which contain employee names and their manager

7. Using Employee Database perform the following queries
   a) Determine the names of employee, who earn more than their managers.
   b) Determine the names of employees, who take highest salary in their departments.
   c) Determine the employees, who are located at the same place.
   d) Determine the employees, whose total salary is like the minimum Salary of any department.
   e) Determine the department which does not contain any employees.
8. Consider the following tables namely "DEPARTMENTS" and "EMPLOYEES" Their schemas are as follows, Departments (dept _no , dept_ name , dept_location); Employees (emp_id , emp_name , emp_salary,dept_no);
   a) Develop a query to grant all privileges of employees table into departments table
   b) Develop a query to grant some privileges of employees table into departments table
   c) Develop a query to revoke all privileges of employees table from departments table
   d) Develop a query to revoke some privileges of employees table from departments table
   e) Write a query to implement the save point.
9. Using the tables "DEPARTMENTS" and "EMPLOYEES" perform the following queries
   a) Display the employee details, departments that the departments are same in both the emp and dept.
   b) Display the employee name and Department name by implementing a left outer join.
   c) Display the employee name and Department name by implementing a right outer join.
   d) Display the details of those who draw the salary greater than the average salary.
10. Write a PL/SQL program to demonstrate Exceptions.
11. Write a PL/SQL program to demonstrate Cursors.
12. Write a PL/SQL program to demonstrate Functions.
13. Write a PL/SQL program to demonstrate Packages.
14. Write PL/SQL queries to create Procedures.
15. Write PL/SQL queries to create Triggers.

Expected Course Outcomes: The student will be able to:

CO1: Implement Orderby and Group by clauses.

CO2: Gain knowledge on How to use SQL for Creating, Modifying and Accessing tables in Database.

Course Code	Course Title	L T P C
23PH221	Physics I	4 0 0 4

(For students majoring in Mathematics, Chemistry, Computer Science, etc)

Prerequisites : None

Course Objectives:

1. To study the basics of Waves and oscillations
2. To acquire knowledge about the elastic properties of Materials
3. To study the basics of Thermal Physics
4. To understand the concepts of Acoustics and ultrasonics
5. To study the various aspects of lasers and fiber optics

Unit 1: Waves and Oscillations. **No. of Hours: 12**

Simple harmonic motion – composition of two simple harmonic motion at right angles (periods in the ratio 1:1) – Lissajou's figures – uses – laws of transverse vibrations of strings – Melde's string – transverse and longitudinal modes – determination of a.c frequency using sonometer (steel and brass wires).

Unit2: Properties of matter: **No. of Hours: 12**

Elasticity: Elastic constants – bending of beam – Young's modulus by non- uniform bending – energy stored in a stretched wire – torsion in a wire – determination of rigidity modulus by torsional pendulum – static torsion. **Viscosity:** Coefficient of viscosity – Poissuelle's formula – comparison of viscosities - burette method – Stoke's law – terminal velocity – viscosity of highly viscous liquid – lubrication. Surface tension: Molecular theory of surface tension – excess of pressure inside a drop and bubble – variation of surface tension with temperature – Jaeger's method.

Unit 3: Thermal Physics : **No. of Hours: 12**

Joule-Kelvin effect – Joule-Thomson porous plug experiment – theory and application – liquefaction of gasses – Linde's process – Helium I and II – adiabatic demagnetization. Thermodynamic equilibrium – laws of thermodynamics – entropy change of entropy in reversible and irreversible processes

Unit 4: Acoustics & Ultrasonics: **No. of Hours: 12**

Classification of sound-decibel, Weber-Fechner law-Reverberation-Reverberation time-Sabine's' formula-Derivation using Jaeger's Method-absorption coefficient and its determination – factors affecting acoustics of buildings and their remedies-Production of Ultrsonics by Magetostriction and Piezoelectric method – Acoustical Grating-Non-destructive Testing- application and uses.

Unit 5: Laser & Fiber Optics: **No. of Hours: 12**

Lasers : population of energy levels, Einstein's A and B coefficients derivation – resonant cavity, optical amplification (qualitative) – Solid state ,Gas laser, Semiconductor lasers– Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibres (material, refractive index, mode) – Application in Communication.

Text Books:

1. Allied Physics by R. Murugesan, S.Chand& Co, New Delhi (2005).
2. Waves and Oscillations by Brijlal & N.Subramanyam,Vikas Publishing house,New Delhi, 2001.
3. Properties of Matter by Brij Lal and N.Subramaniam, S. Chand & Co.,New Delhi,(1994).
4. Heat and Thermodynamics by J.B.Rajam and C.L.Arora, 8th edition, S.Chand& Co., New Delhi (1976).
5. Optics and Spectroscopy by R. Murugesan, S.Chand& Co, New Delhi (2005).

Reference Books:

1. Fundamentals of Physics by Resnick Halliday and Walker, 6th edition, John Willey and Sons, Asia Pvt.Ltd., Singapore.
2. Text book of Sound by V.R.Khanna and R.S.Bedi,1st edition, Kedharnaath Publish & Co,Meerut 1998.
3. Electricity and Magnetism by N.S. Khare and S.S. Srivastava, 10th Edition, Atma Ram & Sons, New Delhi (1983).
4. Optics by D.R. Khanna and H.R. Gulati, S. Chand & Co. Ltd., New Delhi (1979).

Expected Course Outcomes: The student will be able to:
CO1: understand the basics of wave oscillations.
CO2: Gain knowledge about the elastic properties of materials.
CO3: Understand the basics of thermal physics.
CO4: Understand the concepts of acoustics, ultrasonics and fiber optic communication.

Course Code	Course Title
23PH221	Physics I - Lab

(For students majoring in Mathematics, Chemistry, Computer Science, etc)

Prerequisites : None

Course Objectives:

1. To Know fundamentals stress, strain and Hooke's law.
2. To gain practical knowledge by applying the experimental methods to correlate with the physics theory.
3. Apply the analytical technique and graphical analysis to the experimental data.

List of Programs:

1. Young's Modulus by Non-uniform bending using Pin and Microscope
2. Young's Modulus by Non-uniform bending using Optic lever – Scale and telescope
3. Rigidity modulus by Static torsion method
4. Rigidity modulus by torsional oscillations without mass
5. Sonometer – Determination of a.c frequency
6. Surface tension and interfacial tension – Drop Weight method
7. Comparison of viscosities of two liquids – Burette method
8. Potentiometer – Low range Voltmeter Calibration

Note : Use of digital balance is permitted.

Expected Course Outcomes: The student will be able to:

CO1: Gain Knowledge on the fundamentals of properties of matter like stress, strain and Hooke's law.

CO2: Gain practical knowledge by applying the experimental methods to correlate with the physics theory.

CO3: - Apply the analytical technique and graphical analysis to the experimental data.

CO4: Use the different measuring devices and meters to record the date with precision.

Course Code	Course Title	L T P C
23CP241	Internet Technologies & Tools	4 0 0 4

Prerequisites : None

Course Objectives:

1. To teach the basics involved in publishing content on the World Wide Web.
2. To learn 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting.
3. To expose students to the basic tools and applications used in Web publishing.

Unit 1 : Networking Protocols and Internet: **No. of Hours: 9**

Introduction, Protocols in Computer Communications, the OSI Model, OSI Layer Functions. Why Internet Working?, Problems in Internet Working, Dealing with Incompatibility Issues, A Virtual Network, Internet Working Devices, Repeaters, Bridges, Routers, Gateways, A Brief History of the Internet, Growth of the Internet.

Unit 2 : WWW, HTTP, TELNET: **No. of Hours: 9**

Introduction, Brief History of WWW, the Basics of WWW and Browsing, Hyper Text Markup Language, Common Gateway Interface, Remote Login.

Unit 3 : JavaScript and AJAX **No. of Hours: 9**

Introduction, JavaScript, Basic Concepts, Controlling JavaScript Execution, Miscellaneous Features, JavaScript and Form Processing, Pop-up Boxes. AJAX: Introduction, How AJAX Works? , Life without AJAX, AJAX Coding, Life with AJAX.

Unit 4 : Introduction to XML: **No. of Hours: 9**

What is XML?, XML versus HTML, Electronic Data Interchange, XML Terminology, Introduction to DTD, Document-Type Declaration, Element-Type Declaration, Attribute Declaration, Limitations of DTDs, Introduction to Schema, Complex Types, Extensible Style sheet Language Transformations, Basics of Parsing, JAXP.

Unit 5 : Creating Good Web Pages: **No. of Hours: 9**

Introduction, Top Level Navigation, Creating Sample Layouts, Metaphor, Theme, and Storyboard, Screen Resolution,3-Column Layout, Using Frameworks, Using Graphics, Usability for the Handheld Devices, Creating Multilingual Web sites, XHTML and Web Browser Compatibility Issues, Designing the Basic Elements of a Home Page.

Text Books:

1. Achyut Godbole,Atul Kahate"Web Technologies:TCP/IP,Web/Java Programming, and Cloud Computing",Third Edition,McGraw Hill Education.
2. The Interenet Book: Everything You Need to Know about Computer Networking and How the Internet Works Hardcover – 22 August 2018 by Douglas E. Comer (Author, Contributor).

Reference Books:

1. Web Content Delivery: 2 (Web Information Systems Engineering and Internet Technologies Book Series) Paperback – Import, 6 December 2010 by Xueyan Tang (Editor), Jianliang Xu (Editor), Samuel T. Chanson (Editor).
2. Deitel,Deitel,Goldberg,"Internet & WorldWideWeb How to Program",3rd Edition, Pearson Education, 2006.
3. Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill

Expected Course Outcomes: The student will be able to:

CO1: Understand the protocols and network devices and internet usage.

CO2: Analyze a web page and identify its elements and attributes of HTML and WWW.

CO3: Create web pages using XML, DTD and Cascading Style Sheets and build dynamic web pages using JavaScript (Client side programming).

CO4: Create XML documents and Schemas.

CO5: Build interactive web applications using AJAX and XHTML.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	3	3	3	3	2	2	3	3
CO2	2	3	3	3	2	3	2	2	3	2	3	2
CO3	3	3	3	3	3	3	2	2	3	2	3	2
CO4	3	3	3	3	3	3	2	2	2	2	3	3
CO5	3	3	3	2	3	3	2	2	3	2	3	3
AVERAGE	3	3	3	2	3	3	2	2	3	2	3	3

Course Code	Course Title	L	T	P	C
23CP270	System Administration and Maintenance	3	0	0	2

Prerequisites : None

Course Objectives:

1. To understand that system administration is the field of work in which someone manages one or more systems, be they software, hardware, servers or workstations.
2. To ensure the systems are running efficiently and effectively.

Unit 1: (Linux/Unix) : **No. of Hours: 5**

Basics of operating system, services, Installation and configuration, maintenance, What is Linux/Unix Operating systems, Kernel, API, cli, gui, Difference between Linux/Unix and other operating systems, Features and Architecture, Linux features, advantages, disadvantages

Unit2: (Windows) : **No. of Hours: 5**

Windows as operating system, history, versions, PC hardware, BIOS, Devices and drivers, Kernel Configuration and building , Application installation, configuration and maintenance, Server services and Client services

Unit 3: Software Lab Based on System Administration and Maintenance Linux:

No. of Hours: 6

Linux Desktop tour. Configuring desktop environment and desktop settings, Basic Commands : Terminal, shell, cat, ls, cd, date, cal, man, echo, pwd, mkdir, rm, rmdir ps, kill Package Installation Synaptic package manager

Unit 4: Software Lab Based on System Administration & Maintenance Windows:

No. of Hours: 6

Creating users – Admin and regular, Path of their personal files. Adding and changing passwords. Difference between workgroup and domain. Concept of roles .user profiles – creating and roaming Concept of Active Directory. Creating active directoryin windows, Process and Disk management Windows Task manager. File systems – NTFS, FAT. Services Control Panel C:/program Files, C:/system C:/windows ,Add /remove new hardware (like printer), Add/remove new programmes.

Unit – V Network Administration: **No. of Hours: 8**

Ipconfig, Ping, tracert, route, hostname, net, netstat, who am I , Set manual IP address, check connectivity – ipv4, ipv6 Administrator Tools Control Panel -> Administrative Tools, Computer Management, Local security Policy, Performance Monitor, Task Scheduler, Antivirus and firewall. Misc Start->Accessories->System tools -> All options (Remote desktop, backup/restore etc.) LAN – Configuration, Switch, Router, sharing printer, files and folder over the network.

Text Books:

1. Mastering Linux Administration: A comprehensive guide to installing, configuring, and maintaining Linux systems in the modern data center , ByAlexandru Calcatinge ,Julian Balog, Jun 2021,1st Edition
2. Essential System Administration, Eleen Frisch, O'REILLY, Third Edition, 2002.

Reference Books:

1. The Practice of System and Network Administration, Thomas A.Limoncelli**,** Christina J.Hogan**,** Strata R. Chalup
2. Modern System Administration, Jennifer Davis

Expected Course Outcomes: The student will be able to:

CO1: Troubleshoot and fix issues that compromise system performance or access to an IT service.

CO2: Understand to make regular system improvements, such as upgrades based on evolving end-user and business requirements.

CO3: Maintain common system and network administration tasks and practices.

CO4: Understand how to implement and maintain standard services like email, file sharing, DNS, NTFS, FAT and similar tasks.

CO5: Understand about network administration tools..

SEMESTER – IV SYLLABUS

Course Code	Course Title	L T P C
23CP209	Programming in Java	4 0 0 4

Prerequisites : Concepts of Programming in C++.

Course Objectives:

1. To introduce students to the Java programming language.
2. To create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism; use data types, arrays and other data collections.
3. To implement I/O functionality to read from and write to text files.
4. To understand Stream Files, Thread and Multithreading concepts.
5. To understand the concepts involved in internet application development.

UNIT – I **No. of Hours: 12**

Introduction to Java: Features of Java - The Java virtual Machine - Parts of Java

Naming Conventions and Data Types: Naming Conventions in Java, Data Types in Java, Literals - Operators in Java: Operators, Priority of Operators

Control Statements in Java: if... else Statement, do... while Statement, while Loop, for Loop, switch Statement, break Statement, continue Statement, return Statement

Input and Output: Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class, Displaying Output with System.out.printf(), Displaying Formatted Output with String.format() - **Arrays:** Types of Arrays, Three Dimensional Arrays (3D array), arrayname.length, Command Line Arguments.

UNIT – II **No. of Hours: 12**

Strings: Creating Strings, String Class Methods, String Comparison, Immutability of Strings

Introduction to OOPs: Problems in Procedure Oriented Approach, Features of Object- Oriented Programming System (OOPS)

Classes and Objects: Object Creation, Initializing the Instance Variables, Access Specifiers, Constructors

Methods in Java: Method Header or Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword „this", Instance Methods, Passing Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods

Inheritance: Inheritance, The keyword „super", The Protected Specifier, Types of Inheritance **UNIT – III** **No. of Hours: 12**

Polymorphism: Polymorphism with Variables, Polymorphism using Methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final Methods, final Class

Type Casting: Types of Data Types, Casting Primitive Data Types, Casting Referenced Data Types, The Object Class

Abstract Classes: Abstract Method and Abstract Class

Interfaces: Interface, Multiple Inheritance using Interfaces

Packages: Package, Different Types of Packages, The JAR Files, Interfaces in a Package, Creating Sub Package in a Package, Access Specifiers in Java, Creating API Document **Exception Handling:** Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re – throwing an Exception.

UNIT – IV **No. of Hours: 12**

Streams: Stream, Creating a File using FileOutputStream, Reading Data from a File uingFileInputStream, Creating a File using FileWriter, Reading a File using FileReader, Zipping and Unzipping Files, Serialization of Objects, Counting Number of Characters in a File, File Copy, File Class

Threads: Single Tasking, Multi-Tasking, Uses of Threads, Creating a Thread and Running it, Terminating the Thread, Single Tasking Using a Thread, Multi-Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Deadlock of Threads, Thread Communication, Thread Priorities, thread Group, Daemon Threads, Applications of Threads, Thread

Life Cycle.

UNIT – V **No. of Hours: 12**

Applets: Creating an Applet, Uses of Applets, <APPLET> tag, A Simple Applet, An Applet with Swing Components, Animation in Applets, A Simple Game with an Applet, Applet Parameters.

Java Database Connectivity: Database Servers, Database Clients, JDBC (Java Database Connectivity), Working with Oracle Database, Working with MySQL Database, Stages in a JDBC Program, Registering the Driver, Connecting to a Database, Preparing SQL Statements, Using jdbc–odbc Bridge Driver to Connect to Oracle Database, Retrieving Data from MySQL Database, Retrieving Data from MS Access Database, Stored Procedures and CallableStatements, Types of Result Sets. Accessing databases and performing CRUD operations using Java.

Text Books:

1. Java The Complete Reference, 13E, 21 March 2024 by Herbert Schildt
2. Programming with Java,7th Edition,12 November 2023 by E. Balagurusamy.
3. Herbert Schildt, "The Complete Reference-Java", 2017, Eleventh Edition, Tata Mcgraw-Hill.
4. Bruce Eckel, "Thinking in Java", Pearson Education, Fourth Edition 2006.

Reference Books:

1. Cay S. Horstman, "Core Java Volume-1, Fundamentals",2020, Eleventh Edition, Oracle Press. 2. Nicholas S. Williams, "Professional Java for Web Applications", 2014, first edition, Wrox Press.
2. Core Java: An Integrated Approach, Authored by Dr. R. NageswaraRao&Kogent Learning Solutions Inc.
3. E.Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw- Hill Company.
4. John R. Hubbard, Programming with Java, Second Edition, Schaum‟s outline Series, TMH.

Expected Course Outcomes:

The student will be able to

CO1: Provide a basic understanding and solving the computational problems using Java programming.

CO2: Handle object oriented concepts and run-time errors

CO3: Execute collection framework, multi-processes using threads and handle files

CO4: Design interactive GUI applications using JavaFX

CO5: Create database programs to perform CRUD operations

Course Code	Course Title	L	T	P	C
23CP210	**Programming in Java Lab**	0	0	4	2

Prerequisites: Concepts of Programming in C++.

Course Objectives:

1. To understand the basics of JAVA programs and their execution.
2. To learn concepts like inheritance, packages and interfaces.
3. To understand the life cycle of the applets, database connectivity and their functionality.

List of Experiments:

APPLICATIONS:

1. Write a program to sort the given numbers using arrays.
2. Write a program to implement the FIND and REPLACE operations in the given text.
3. Write a program to implement a calculator to perform basic arithmetic Operations, doing with constructers.
4. Write a program to find the student's percentage and grade using command line arguments.
5. Write a program to draw circle or triangle or square using polymorphism and inheritance.
6. Implement multiple inheritance concepts in java using interface, you can choose your own example of a company or education institution or a general concept which requires the use of interface to solve a particular problem.
7. Write java program for the following matrix operations:
   a. Addition of two matrices
   b. Summation of two matrices
   c. Transpose of a matrix
   d. Input the elements of matrices from user.
8. Write a program to create threads and perform operations like start, stop, suspend, resume.
9. Write a program to develop an applet to play multiple audio clips using multithreading.
10. Write a program to retrieve employee data from a file
11. Database - CRUD operations.
12. Write a program to retrieve student data from a Database.

APPLETS:

1. Working with Frames and Various Controls.
2. Working with Dialog Box and Menus.
3. Working with Colors and Fonts.
4. Drawing various shapes using Graphical statements.
5. Working with panel and all types of Layout.
6. Design a simple calculator with minimal of 10 operations
7. Usage of buttons, labels, text components in suitable application
8. Usage of Radio buttons, check box ,choice list in suitable application

Expected Course Outcomes: The student will be able to

CO1: Provide a basic understanding and solving the computational problems using Java programming.

CO2: Execute collection framework, multi-processes using threads and handle files

CO3: Design interactive GUI applications using JavaFX

CO4: Create database programs to perform CRUD operations

CO5: Acquire the knowledge to build the logic and develop a solution for a problem statement.

Course Code:	Course Title:	L	T	P	C
23CP213	Operating System	4	0	0	4

Prerequisites: To provide a discussion of the fundamentals of operating system design and to relate these to contemporary design issues and to current directions in the development of operating systems Security.

Course Objectives:

1. To understand the concept of operation system and its principle.
2. To study the various functions and services provided by operating system.
3. To understand the notion of process and threads.

UNIT I **No. of Hours: 12**

Introduction and process concepts: Definition of OS **- Definition of process - Process States - Process State Transition -** Interrupt Processing - Interrupt classes- Semaphores - **Deadlock and Indefinite postponement.**

UNIT II **No. of Hours: 12**

Storage management: Real storage: Real storage management strategies - **Contiguous Vs non-contiguous storage allocation - Single user contiguous storage allocation** - Fixed partition multiprogramming - Variable partition multiprogramming - **-Virtual storage: Virtual storage management strategies:** Page replacement strategies - working sets – Demand paging-Page Size.

UNIT III **No. of Hours: 12**

Processor management: Introduction - Job and processor scheduling: **Preemptive Vs Non preemptive scheduling** – priorities - Deadline scheduling - **FIFO-RR** – Quantum Size - SJF-SRTHRN - Distributed computing–Pipelining – Vector processing - Array Processing - Dataflow computers – Multiprocessing - **Fault Tolerance.**

UNIT IV **No. of Hours: 12**

Device and information management: Disk performance optimization: Operation of moving head disk storage - **Need for disk scheduling** – **FCFS - SSTF – SCAN** - RAM Disks - Optical Disks - **file and database systems: File system – functions – Organization - Access control by user Classes** Allocating and freeing space - file descriptor -Backup and Recovery.

UNIT V **No. of Hours: 12**

Operating System Security: Introduction – Security Requirements – **Password Protection** – Auditing – Access Controls – Security Kernels – **Fault – Tolerant System** – Cryptography – Operating System -Penetration – Unix Operating System Security – **Worms and Viruses.**

Text Books:

1. Operating System Concepts Loose Leaf – Import, 9 February 2021by Abraham Silberschatz.
2. Abraham Silberschatz, Peter B. Galvin, Greg Gagne Operating System Concepts, 10th Edition 2018.
3. Deitel H.M An Introduction to Operating System Addison Wesley Publishing Company, Second edition 2005

Reference Books:

1. Andrew S.Tanenbaum, Albert S.Woodhull, Operating Systems- Design and Implementation Pearson Education, 3rd Edition 2011.
2. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne Operating System Concepts John Wiley & Sons,8th edition 2010.
3. Archer J Harries Operating Systems Tata McGraw Hill, First Edition 2008.

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

CO1: Recall about the basic concepts of operating system and its Security.

CO2: Understand the operating systems objectives and functionality along with system programs system calls and storage management.

CO5: Understand and apply the concepts of managing processor like scheduling, pipelining and fault tolerance.

CO4: Apply various concepts and algorithms for scheduling, partitioning, storage management concepts and Security Concepts.

CO5: Analyze the operating system Storage, Deadlock, File System and Security.

Course Code:	Course Title:	L T P C
23CP214	Operating System Lab	0 0 4 2

Prerequisites : None

Course Objectives:

1. To understand the concept of operation system and its principle.
2. To study the various functions and services provided by operating system.
3. To understand the notion of process and threads.

List of Experiments :

1. Write a program (using fork() and/or exec() commands) where parent and child execute: a) same program, same code. b) same program, different code. c) before terminating, the parent waits for the child to finish its task.
2. Write a program to report behaviour of Linux kernel including kernel version, CPU type and model. (CPU information)
3. Write a program to report behaviour of Linux kernel including information on 19 configured memory, amount of free and used memory. (memory information)
4. Write a program to print file details including owner access permissions, file access time, where file name is given as argument.
5. Write a program to copy files using system calls.
6. Write a program to implement FCFS scheduling algorithm.
7. Write a program to implement Round Robin scheduling algorithm.
8. Write a program to implement SJF scheduling algorithm.
9. Write a program to implement non-preemptive priority based scheduling algorithm.
10. Write a program to implement preemptive priority based scheduling algorithm.
11. Write a program to implement SRJF scheduling algorithm.
12. Write a program to calculate sum of n numbers using thread library.
13. Write a program to implement first-fit, best-fit and worst-fit allocation strategies.

Reference Books:

1. Silberschatz, A., Galvin, P. B., & Gagne, G. (2008). *Operating Systems Concepts*. 8th edition.. John Wiley Publications.
2. Dhamdhere, D. M. (2006). *Operating Systems: A Concept-based Approach*. 2nd edition. Tata McGraw-Hill Education.

Expected Course Outcomes:

Upon the completion of this course, the students will be able

CO1: To Implement multiprogramming, multithreading concepts for a small operating system.
CO2: To Create, delete, and synchronize processes for a small operating system.
CO3: To Implement simple memory management techniques.
CO4: To Implement CPU and disk scheduling algorithm.
CO5: To use services of modern operating system efficiently and to Implement a basic file system.

Course Code:	Course Title:	L T P C
23PH231	Physics II	4 0 0 4

(For students majoring in Mathematics, Chemistry, Computer Science, etc)

Prerequisites : None

Course Objectives:

1. To give a coherent introduction to the development of physical optics, with particular attention to the wave properties of light and optical application
2. To develop a basic understanding of physics of atoms and molecules: definitions, units, laws and rules.
3. To have a basic knowledge of nuclear size, shape, bindingenergy.etc and also the characteristics of nuclear force in detail.
4. To have a understanding of the mathematical foundations of quantum mechanics.
5. To acquire knowledge in basic electronics and digital electronics.

Unit 1: Physical Optics: **No. of Hours: 12**

Velocity of light – Michelson's method. Interference :Colours of thin films –air wedge – determination of diameter of a thin wire by air wedge – test for optical flatness – Diffraction – Fresnel's explanation of rectilinear propagation of light – theory of transmission grating – Normal incidence – polarization – double refraction - optical activity – polarimeter.

Unit2: Atomic Physics: **No. of Hours: 12**

Atom model – vector atom model – electron, spin, quantum numbers – Pauli's exclusion principle – electronic configuration of elements and periodic classification of elements – various quantum numbers – magnetic dipole moment of electron due to orbital and spin motion – Bohr magneton – spatial quantisation – Stern and Gerlach experiment.

Unit 3: Nuclear Physics : **No. of Hours: 12**

Nuclear model – liquid drop model – magic numbers - shell model – nuclear energy – mass defect – binding energy. Radiation detectors – ionization chambers – GM Counter – Fission Controlled and Uncontrolled chain reaction – nuclear reactor – thermonuclear reactions – stellar energy

Unit 4: Quantum Mechanics: **No. of Hours: 12**

Postulates of wave mechanics- Properties of matter waves- G.P. Thomson Experiment- uncertainty principle – Schrodinger's equation – Physical significance of wave function-application to a particle in a one dimensional box.

Unit 5: Digital Electronics: **No. of Hours: 12**

Basic logic gates-OR,AND,NOT gates-NAND and NOR gates – Universal building blocks – Boolean algebra – Demorgan's theorem – verification – elementary ideas of ICs – SSI , MSI, LSI and VLSI – Half adder, Full adder, Half Subtractor and Full subtractor.

Text Books:

1. Allied Physics by R. Murugesan, S.Chand& Co, New Delhi (2005).
2. Allied Physics by K. Thangaraj and D. Jayaraman, Popular Book Depot, Chennai (2004).
3. Text book of Optics by Brijlal and N. Subramanyam, S.Chand& Co, New Delhi (2002).
4. Modern Physics by R. Murugesan, S.Chand& Co, New Delhi (2005).
5. Applied Electronics by A. Subramaniyam, 2nd Edition, National Publishing Co., Chennai (2001).

Reference Books:

1. Fundamentals of Physics by Resnick Halliday and Walker, 6th edition, , John Willey and Sons, Asia Pvt.Ltd., Singapore.
2. Optics by D.R. Khanna and H.R. Gulati, S. Chand & Co. Ltd., New Delhi (1979).
3. Concepts of Modern Physics by A.Beiser, Tata McGraw Hill Publication, New Delhi (1997).
4. Digital Fundamentals by Thomas L.Floyd, Universal Book Stall – New Delhi (1998).

Expected Course Outcomes: The student will be able to:

CO1: Use the principles of wave motion and superposition to explain the physics of polarisation, interference and diffraction.

CO2: Gain an ability of basic problems analysing and solving in physics of atoms and molecules.

CO3: Have a basic knowledge of nuclear size ,shape , bindingenergy.etc and also the characteristics of nuclear force in detail.

CO4: Be well-versed in both Schrodinger and Heisenberg formulations of time development and their applications

CO5: understand the digital electronics basics using logic gates and working of major digital devices.

Course Code:	Course Title:
23PH231	Physics II - Lab
(For students majoring in Mathematics, Chemistry, Computer Science, etc)	

Prerequisites : None

Course Objectives:

1. To Know fundamental properties of liquids
2. To gain practical knowledge by applying the experimental methods to correlate with the physics theory.
3. Apply the analytical technique and graphical analysis to the experimental data.

List of Programs:

1. Specific heat Capacity of a liquid – Method of mixtures
2. Spectrometer – Grating – Wavelength of Mercury lines – Normal Incidence
3. Construction of AND, OR, NOT gates – using diodes
4. Half adder and Half subtractor
5. Semiconductor laser: Determination of wavelength of laser and determination of particle size.
6. Determination of numerical aperture and acceptance angle of an optical fiber.
7. NAND gate as a universal gate
8. P.O. Box – Specific resistance

Note : Use of digital balance is permitted.

Expected Course Outcomes:

The student will be able to:

CO1: Gain Knowledge on the fundamentals of properties of liquids.

CO2: Gain practical knowledge by applying the experimental methods to correlate with the physics theory.

CO3: - Construct and verify the basic gates using the universal gates.

CO4: Use the different measuring devices and meters to record the date with precision.

Course Code:	Course Title:	L	T	P	C
23CP271	VAC2: Nutrition and Fitness	3	0	0	2

Prerequisites: To provide a discussion of the fundamentals of operating system design and to relate these to contemporary design issues and to current directions in the development of operating systems Security.

Course Objectives:

1. To help understand the importance of a healthy lifestyle.
2. To familiarize students about physical and mental health.
3. To create awareness of various life style related diseases.
4. 4. To provide understanding of stress management

UNIT I **No. of Hours: 5**

Health & Fitness:

Concept of positive Health and Wellne1ss as per WHO Guidelines - Physical Fitness - definition - Role of Nutrition for Health and Fitness.

UNIT II **No. of Hours: 6**

Nutritional Guidelines:

Balanced Diets and Food Pyramid - How to plan balanced diets for various age groups - Dietary Goals and Guidelines for Indians (Reference man & woman)

UNIT III **No. of Hours: 5**

Processed Foods:

Concept of Processed Foods - Impact of Packaged, Ultra-processed and Convenience Foods on Health.

UNIT IV **No. of Hours: 6**

Physical Activity & Nutrition:

Effects on health of Physical Activity and Dietary Habits - Dual Burden of Malnutrition.

UNIT V **No. of Hours: 8**

Management of Health and Wellness:

Substance abuse (Drugs, Cigarette, Alcohol), de-addiction, Counseling and rehabilitation - Types of Physical Fitness and its health benefits - Postural deformities and corrective measures - Spirituality and mental health - Role of Yoga, asanas and meditation in maintaining health and wellness - Role of Sleep in maintenance of physical and mental health.

Text Books:

1. M.Swaminathan (2015): Advanced Text Book of Food and Nutrition. Volume I & II. The Bangalore Press, India.
2. Ravindra Chadhha & Pulki Mathur (2015) : Nutrition and Life Cycle Approach. The Orient Blackswan; First Ed.
3. Dietary Guidelines for Indians - A Manual (2011) , NIN, Hyderabad

Reference Books:

1. Physical Activity and Health by Claude Bouchard, Steven N. Blair, William L. Haskell.
2. Mental Health Workbook by Emily Attached & Marzia Fernandez, 2021.
3. Mental Health Workbook for Women: Exercise to Transform Negative Thoughts and Improve
4. Well-Being by Nashay Lorick, 2022.
5. Lifestyle Diseases: Lifestyle Disease Management, by C. Nyambichu & Jeff Lumiri, 2018.
6. Physical Activity and Mental Health by Angela Clow & Sarah Edmunds, 2013.

Websites: https://www.fao.org/3/ca5644cn/ca5644cn.pdf
https://www.who.int/news-room/fact-sheets/detail/healthy-diet

Expected Course Outcomes:

The student will be able to

CO1: Enhance the basic understanding of nutrition and physical fitness.

CO2: Develop a healthy attitude towards physical wellbeing.

CO3: Inculcate values of conscious and correct eating habits.

CO4: Understand about the awareness of generation regarding processed foods and their effects on health & wellness.

CO5: Understand importance of physical activity, nutrition and its effect, on health & wellness.

Course Code:	Course Title:	L T P C
23CP250	SI 1: Summer Internship	0 0 0 2

Prerequisites: BSC Internship is carefully researched and prepared by professionals from MNC to meet the demands expected in the IT industry.

Course Objectives:

1. Students are also encouraged to pursue a summer internship in an industry laboratory at the end of the first year
2. An internship is an opportunity offered by an employer to potential employees, called interns, to work at a firm for a fixed period of time.
3. Interns are usually undergraduates or students, and most internships last between a month and three months.
4. Internships are usually part-time if offered during a semester and full-time if offered during the vacation periods.

B.SC Internship – Course Curriculum

- Systems Management
- Systems Development
- Systems Engineering
- Application Software
- Management Information Systems (MIS)
- Software Development
- Troubleshooting
- Hardware Technology
- Networking

Internship for B.Sc programme provides a real exposure for the students on the latest and trending technologies. Some of the Top jobs in the IT Industry.

1. Software Engineer / Developers − Good in Machine Learning and Artificial Intelligence programming
2. Web Application Developer − Website Designers, Animation Experts
3. Information Security Analyst − Security Specialist
4. Network Engineers / Analyst
5. BlockChain Administrators.

Procedure:

- Student Midterm Progress Review Report
- Employer Evaluation of the work Experience
- Student Report on the Work Experience. This report contains:
    1. Cover Page
    2. Introduction
    3. Description of the work
    4. Conclusions
    5. Appendix
    6. Approved by

Expected Course Outcomes:

CO1: To get a chance to develop your knowledge and skills in a particular field or industry
CO2: To Explore different roles to see which one you would like to pursue
CO3: To get insight into the way businesses work and what challenges they face on a daily basis
CO4: To get the opportunity to create a network of contacts and to Gain valuable work experience to set you apart from other candidates
CO5: To acquiring Institute module credits and to apply the concepts and strategies of academic study in a live work environment.