

Title of the course : Introduction to IT Systems

Subject Code : ESCS-102

Weekly load : 2 Hours

LTP 2-0-0

Credit : 2

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the basic organization of the computers & IT systems.
CO2	Identify the various types of Hardware, Software and components of Computer.
CO3	Understand the concept of various types of Memory and Software.
CO4	Get familiar with fundamentals of computer networks.
CO5	Identify computer risks and be acquainted with various internet applications and also be familiar with the various web technology concepts.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	3	1	3	2	1	0	2	2
CO2	1	2	1	2	0	0	0	1	2
CO3	2	1	1	2	3	1	2	2	1
CO4	2	3	2	3	3	2	3	1	2
CO5	0	2	2	2	2	3	1	3	3

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Basics of Computer & IT System	Basics of computer & IT systems: Features, characteristics, applications, hardware, software. Types and generations of Computer. Basic components of a computer system.	05
	2. Input/ Output devices	Various input and output devices, Printer and Its types. Understanding computer peripherals and accessories. Mother board, expansion cards and interface.	05

	3. Memory	Primary and Secondary Memory, Semiconductor memories such as ROM, RAM, PROM, EPROM, EEPROM. Cache memory, Registers & Memory Hierarchy.	06
Unit-2	4. Hardware & Software	Basics of Hardware & Software. Types of software – System software & Application software, Utility software. Operating system, Language Translators, Booting.	06
	5. Network Fundamentals	World Wide Web (WWW), URL, Search engines, Web Browser. Concept of network, Internet, intranet, Internet Services and applications. LAN, WAN, their applications. Concept of virus, worms, threats and firewall. Networking concepts,	05
	6. Networking Fundamentals	Network devices (Switch, hub, router, etc). Network topologies and architecture. MAC address, IP address.	05

Total=32

Recommended Books:

1. R.S. Salaria, Computer Fundamentals, Khanna Publishing House
2. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House
3. Yadav DS, Foundations of IT, New Age, Delhi.
4. Curtin, Information Technology: Breaking News, TMH
5. Rajaraman V, Introduction to Computers, Prentice-Hall India.

Title of the course : Introduction to IT System Lab

Subject Code : ESCS-110

Weekly load : 2 Hours

LTP 0-0-2

Credit : 1

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the basic hardware components of a computer.
CO2	Installation of different types of operating systems and software's.
CO3	Connecting various types of peripherals and device drivers.
CO4	Understating and performing the practical's using MS-Word, Office, Excel and Power Point, Access.
CO5	Installing endpoint security tools and performing action on malware.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	0	0	2	2	2	1	3	2	2
CO2	2	3	1	2	0	2	3	1	2
CO3	1	3	0	3	1	1	3	2	1
CO4	0	3	2	1	3	2	0	1	2
CO5	3	3	2	2	2	3	2	2	2

LIST OF PRACTICALS

1. Perform Practical on Computer Hardware components: Showing these components in lab, identifying and recognizing.
2. Identify various ports/interfaces and network related cables.
3. Installation and troubleshooting of different device drivers.
4. Connect various peripherals (printer, scanner, etc.) to computer; explore various features of peripheral and their device driver software's.

5. Assembling and disassembling of PC.
6. POST: Functions, Test Sequence and error messages.
7. Install Linux / Windows operating systems on systems.
8. Create a document in using MS-Word and apply various functions viz:
Saving options, Formatting Text, Inserting Images, Using Tables, Inserting Shapes, Headers and Footers, Page Layout, Track Changes, Inserting Hyperlinks, Using Templates etc.
9. Create a document in MS-Excel and apply various functions viz:
Basic Data Entry and Formatting, Simple Calculations, Using inbuilt functions, Creating Simple Chart, Sorting and Filtering Data, Conditional Formatting etc.
10. Create a document in MS-Power-point and apply various functions viz:
Creating a Basic Presentation, Applying Themes, Adding and Formatting Text, Inserting Images, Adding Shapes and Smart Art, Adding Transitions, Adding Animations, Inserting Charts and Tables, Insert and format charts and tables.
11. Installing endpoint security tools, scanning and deleting of malware.
12. Creating web pages using HTML commands, try them with various values, and make your own Webpage.

Title of the course : Data Entry Operator

Subject Code : QPCS101

Weekly load : 8 Hours

LTP 0-0-8

Credit : 1

Course Outcomes: At the end of the course, the student will be able to:

CO1	Learn various data entry tools and basic computer operations.
CO2	Use basic and advanced features of MS-Word.
CO3	Creating spreadsheets using basics and advanced features of MS-Excel.
CO4	Prepare presentations using MS-Power point features.
CO5	Learn the use of MS-Access and create advanced programs using different tools.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	2	3	2	2	2	2	1
CO2	2	2	3	2	2	1	3	2	1
CO3	2	2	3	2	2	1	3	2	1
CO4	2	2	3	2	2	1	3	1	1
CO5	3	3	2	3	2	3	2	2	2

LIST OF PRACTICAL'S

Week 1-2: Introduction to data entry tools

1. Introduction to data entry tools:
 - Overview of data entry and its importance.
 - Introduction to common data entry software's (MS Word, Excel, PowerPoint, Access).
 - Basic keyboarding skills and typing speed improvement exercises.
2. Basic Computer Operations:
 - Starting and shutting down a computer.
 - Understanding file management (creating, saving, deleting files and folders).

- Introduction to operating systems (Windows, macOS).

Week 3-4: Introduction to MS Word

3. MS Word basics:

- Creating, saving, and editing documents.
- Formatting text (font style, size, color, alignment).
- Inserting and formatting images and tables.

4. Advanced MS Word features:

- Using styles and themes.
- Creating and formatting tables of contents.
- Mail merge for letters and labels.

Week 5-6: Introduction to MS Excel

5. MS Excel basics:

- Introduction to spreadsheets.
- Entering, editing, and formatting data in cells.
- Basic formulas and functions (SUM, AVERAGE).

6. Advanced MS Excel features:

- Creating and formatting charts.
- Using conditional formatting.
- Advanced functions (VLOOKUP, HLOOKUP, IF statements).

Week 7-8: Introduction to MS PowerPoint

7. MS PowerPoint basics:

- Creating a new presentation.
- Adding and formatting text slides.
- Inserting images, charts, and tables.

8. Advanced MS PowerPoint features:

- Applying transitions and animations.
- Creating custom slide layouts.

- Using slide master for uniform design.

Week 9-10: Introduction to MS Access

9. MS Access basics:

- Introduction to databases.
- Creating and saving a database.
- Creating and managing tables.

10. Advanced MS Access features:

- Creating queries to extract data.
- Designing forms for data entry.
- Generating reports for data presentation.

Week 11-12: Case Studies and Practical Applications

11. Case Study 1: Word and Excel integration:

- Creating a report in Word using data from Excel.
- Embedding and linking Excel charts in a Word document.

12. Case Study 2: PowerPoint and Excel integration:

- Creating a PowerPoint presentation with embedded Excel charts.
- Using Excel data to create dynamic PowerPoint slides.

Week 13-14: Advanced Programs and Project Work

13. Advanced data entry techniques:

- Data validation in Excel.
- Using pivot tables for data analysis.
- Automating tasks with macros in Excel.

14. Project Work: Comprehensive data entry task:

- Combining Word, Excel, PowerPoint, and Access skills.
- Creating a project that includes data entry, analysis, and presentation.
- Presenting the project to the class.

Week 15: Review and final assessment

15. Review and final assessment:

- Review of key concepts and skills learned.
- Practical test covering Word, Excel, PowerPoint, and Access.
- Final project presentation and evaluation.

Title of the course : Assembling and Repairing of Computer Hardware
Subject Code : QPCS102
Weekly load : 8 Hrs **LTP** 0-0-8
Credit : 1

Course Outcomes: At the end of the course, the student will be able to:

CO1	Identify the purpose and operation of the internal components of a computer.
CO2	Disassemble and reassemble computer systems.
CO3	Use hardware trainer kit to identify and repair the common failures in a computer.
CO4	Install and Repair the computer's hardware and troubleshoot software problem.
CO5	Learn network basics along with troubleshooting of network problems.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	2	3	2	2	2	1	2
CO2	2	2	3	2	2	1	3	1	2
CO3	2	2	3	2	2	1	3	1	3
CO4	2	2	3	2	2	1	3	2	3
CO5	3	3	2	3	2	3	2	2	3

LIST OF PRACTICALS

Week 1-2: Introduction to Computer hardware

1. Introduction to Computer hardware:
 - Overview of computer hardware components.
 - Understanding the functions of various hardware parts.
 - Safety procedures and precautions while handling hardware.
2. Identifying hardware components:
 - Identification and functionality of the motherboard, CPU, RAM, hard drives, power supply, and peripheral devices.

- Hands-on practice with component identification.

Week 3-4: Resetting of a Computer

3. Disassembly of a Computer:
 - Step-by-step guide to safely disassemble a desktop computer.
 - Labeling and organizing components.
4. Reassembly of a Computer:
 - Step-by-step guide to reassemble a desktop computer.
 - Ensuring proper connections and cable management.

Week 5-6: Installing and Configuring Hardware Components

5. Installing internal components:
 - Installing and configuring the motherboard, CPU, RAM, and power supply.
 - Installing storage devices (HDDs, SSDs).
6. Installing peripheral devices:
 - Connecting and configuring peripheral devices such as keyboards, mice, monitors, printers, and scanners.
 - Understanding USB, HDMI, VGA, and other port connections.

Week 7-8: BIOS and Firmware Updates

7. Understanding BIOS/UEFI:
 - Introduction to BIOS/UEFI settings.
 - Navigating the BIOS/UEFI interface.
8. Updating BIOS/Firmware:
 - Procedure for updating BIOS/UEFI firmware.
 - Importance of keeping firmware up to date.

Week 9-10: Troubleshooting and repair techniques using PC hardware trainer kit

9. Diagnosing common hardware Issues:

- Identifying and diagnosing common hardware issues (e.g., no power, no display, overheating).
- Using diagnostic tools and software.

10. Repairing Hardware Issues:

- Techniques for repairing or replacing faulty components.
- Preventive maintenance and best practices.

Week 11-12: Networking and connectivity

11. Assembling a Basic Network:

- Setting up a local area network (LAN).
- Understanding and configuring routers, switches, and network cables.

12. Network Troubleshooting:

- Diagnosing and fixing common network issues.
- Using network diagnostic tools.

Week 13-14: Advanced hardware configurations and upgrades

13. Advanced Configurations:

- Configuring RAID setups.
- Over-clocking CPU and RAM.

14. Hardware Upgrades:

- Upgrading components for better performance (e.g., adding more RAM, upgrading the CPU).
- Compatibility considerations during upgrades.

Week 15: Review and final assessment

15. Review and final assessment:

- Comprehensive review of all lab activities and concepts.
- Practical test involving disassembly, reassembly, troubleshooting, and repair.
- Final project presentation demonstrating a complete hardware setup, configuration, and troubleshooting process.

Title of the course : Free and Open Source Software Lab
Subject Code : QPCS103
Weekly load : 24 Hrs **LTP** 0-0-24
Credit : 3

Course Outcomes: At the end of the course, the student will be able to:

CO1	Learn various free and open source software's available.
CO2	Installation of applications and software's.
CO3	Get familiar with FOSS web development tools.
CO4	Create and edit documents with free/ open source office.
CO5	Use free generative AI tools.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	1	1	1	2	2	2	2
CO2	2	2	3	2	1	2	2	2	2
CO3	3	2	3	2	3	2	2	3	2
CO4	2	2	2	1	2	1	2	2	1
CO5	3	3	2	3	3	3	2	3	3

LIST OF PRACTICALS

Week 1: Introduction to FOSS

1. Overview of Free and Open Source Software:
 - Understanding the principles and philosophy of FOSS.
 - Distinction between free software and open source software.

Week 2: Installation of FOSS

2. Setting Up the Development Environment:

- Installing Linux distributions (e.g., Ubuntu, Fedora).
- Basic Linux command line usage and file system navigation.
- Installation of latest application and system software's.

Week 3: Web Development with FOSS Tools

3. Introduction to HTML, CSS and JavaScript:

- Introduction to web development basics and HTML tags.
- Creating and styling web pages using HTML and CSS.
- Creating a resume using HTML and CSS.
- Linking your social media accounts and LinkedIn accounts with your resume.
- Adding interactivity with JavaScript.

Week 4: FOSS for creating and editing documents/ spreadsheets

4. Exploring free/ open source office productivity suite:

- Open office.
- Google workspace.

Week 5: Introduction to free generative AI tools

5. Registering/ login to various free generative AI tools:

- ChatGPT, Plus AI, Gemini
- AI presentation maker (Canva, Slidesgo, Copilot).

Week 6: Review and final project

6. Comprehensive review and final project:

- Review of all concepts and tools covered in the lab.
- Students present their final projects demonstrating the application of FOSS tools.
- Peer review and feedback on projects.

Title of the course : Computer Programming

Subject Code : PCCS201

Weekly load : 4 Hrs

LTP 3-1-0

Credit : 4 (Lecture 3, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Learn designing structure for engineering problem solution and basic need of machine and low level language
CO2	Use different data types & design programs involving decision structures, loops and functions.
CO3	Understand the concept of arrays, structures and union through which derived data types can be used
CO4	Learn pointers dealing with memory management and file handling for permanent storage of data and record.
CO5	Understand the basic concepts of C programming which provides students with the means of writing efficient code compile & debug programs in C language.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	3	0	2	0	3	3	1
CO2	2	2	3	0	2	0	2	3	1
CO3	2	2	3	0	2	0	2	3	1
CO4	2	2	3	0	2	0	2	3	1
CO5	3	3	3	0	2	0	3	3	1

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Steps for problem solving, Flow of control, representation of Algorithms and Program Debugging, basic program structure.	06
	2. Program Structure	Identifier and its rule, Keyword, Constants, variables, comments and data types, Operators and Expressions, type conversion, Statements(Input/ Output and assignment) ,Use of Header & Library files.	06
	3. Control Structures	Decision making with if, if-else, nested if and if-else-if ladder structure, alternate to if-else-if ladder, loop structure (for, While and do-while), change the flow of iteration with	06

		Break and continue, jump statement (goto).	
	4. Functions	Introduction to built in functions and user define functions, , Function Declaration, calling and prototype definition, formal and actual parameters, Parameter Passing, Call – by value/reference, recursion	06
Unit-2	5. Arrays	Introduction to Arrays, Array Declaration and Initialization, Single and Multidimensional Array, Arrays of characters.	06
	6. Structures and Unions	Introduction to structure and Union, Creating and Using Structure and Union, difference between Structure and Union	08
	7. Pointers	Need of Pointe, Creating and Using Pointers, Pointer to Pointer, Pointer and Array	06
	8. File handling	Introduction to file, file opening/closing, File reading/writing in different modes	04

Total=48

Recommended Books:

1. Salaria RS, Application Programming in C, Khanna Book Publishing Co (P) Ltd. New Delhi.
2. Byron Gottfried, Schaum Series, Programming in C, McGraw Hills Publishers, New York.
3. Yashwant Kanetkar, Exploring – BPB Publications, New Delhi.

Title of the course : Internet & Web Technologies

Subject Code : PCCS-203

Weekly load : 3Hrs

LTP 2-1-0

Credit : 3 (Lecture 2, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the basic concepts of web and internet technology
CO2	Write html code and know the advantages and use of different types of CSS.
CO3	Acquaint with the various internet related technologies and systematic way of developing a website and understand the basic concepts of java script, and php.
CO4	Design dynamic and interactive web pages by embedding java script code in HTML.
CO5	Use basic skills, tools, languages and technologies related to website development.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	3	2	3	1	1	0	3	2
CO2	1	2	3	2	1	2	0	3	2
CO3	1	3	3	2	1	2	0	3	2
CO4	1	2	3	3	1	2	0	3	2
CO5	1	2	3	2	1	2	1	3	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction to World wide web (WWW)	World-Wide-Wed (WWW), Web fundamentals, Protocols and programs, secure connections, application and development tools, the web browser; What is server, setting up UNIX and LINUX web servers, Logging users, dynamic IP Web Design: Website design principles, planning the site and navigation	06
	2. Web Systems Architecture	Architecture of Web based systems- client/server (2-tier) architecture, 3-Tier architecture, Building blocks of fast and scalable data access concepts - Caches-Proxies- Indexes- Load Balancers- Queues.	06
	3. Javascript	Client side scripting, What is Javascript, simple Javascript, variables, functions, conditions, loops and repetition	04

Unit-2	4. Advance scripting	Javascript and objects, Javascript own objects, DOM and web browser environments, forms and validations;	05
	5.Dynamic HTML	DHTML: Combining HTML, CSS and Javascript, events and buttons, controlling your browser.	05
	6. PHP	Server side scripting, Arrays, function and forms, PHP Databases: Basic command with PHP examples, Connection to server, performing database operations (list, select, create, update, delete tables etc.)	06

Total=32

Recommended Books:

1. “Web Technologies--A Computer Science Perspective”, Jeffrey C.Jackson,
2. “Internet & World Wide Web How To Program”, Deitel, Deitel, Goldberg, Pearson Education
3. “Web programming- Building Internet Application”, Chris Bales
4. Web Applications: Concepts and Real World Design, Knuckles.

Title of the course : Operating System

Subject Code : PCCS205

Weekly load : 4 Hrs

LTP 3-1-0

Credit : 4 (Lecture 3, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Learn fundamentals of Operating System and its various classifications.
CO2	Understand architecture of UNIX/LINUX along with concept of Kernel and system calls.
CO3	Know about processes, scheduling queues, various operation on processes and process management.
CO4	Understand how operating system manages primary memory and moves processes back and forth between main memory and disk during execution.
CO5	Acquire knowledge of I/O system and OS security.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	1	1	1	1	2	1	2
CO2	2	2	3	2	1	2	3	2	2
CO3	2	2	2	3	2	2	3	1	1
CO4	2	2	2	2	1	3	3	2	2
CO5	3	3	3	1	2	1	3	2	3

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Introduction to Operating system, Operating System: Functions, Features, advantages, and Disadvantages, basic concepts, UNIX/LINUX Architecture, Kernel, services and systems	08
	2. Process Management	Process concepts, operations on processes, IPC, Process Scheduling, Multi-threaded programming.	08
	3. Memory Management	Memory allocation, Swapping, Paging, Segmentation, Virtual Memory, various faults.	08

Unit-2	4. File Management	Concept of a file, access methods, Types of File systems, directory structure, file system mounting, file sharing and protection, file system structure and implementation, directory implementation, freespace management.	08
	5. I/O System	Mass storage structure - overview, disk structure, disk attachment, disk scheduling algorithms	08
	6. OS Security	Authentication, Access Control, Access Rights, System Logs	08

Total=48

Recommended Books:

1. Silberschatz A & Galvin, Operating System Concepts, John Wiley & Sons.
2. W. Stallings, Operating Systems: Internals and Design Principles, Pearson Pub.
3. Andrew S Tanenbaum, Operating Systems - Design and Implementation, PHI.
4. Dietel, An Introduction to Operating System, Addison Wesley.

Title of the course : Computer Architecture and Organization

Subject Code : PCCS207

Weekly load : 3 Hrs

LTP 3-0-0

Credit : 3

Course Outcomes: At the end of the course, the student will be able to:

CO1	Explain the basics of digital electronics
CO2	Elaborate basic computer organization, control unit and central processing unit
CO3	Do binary addition, subtraction, multiplication and division.
CO4	Explain the input output organization of a processor.
CO5	Differentiate between various types of memories.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	1	1	1	1	1	1	1
CO2	1	1	1	1	1	2	1	1	1
CO3	1	3	2	1	1	1	1	1	1
CO4	2	2	1	1	1	1	1	1	1
CO5	1	1	1	1	1	1	1	1	1

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Basics of Digital Electronics:	Codes, Logic gates, Flip flops, Registers, Counters, Multiplexer, Demultiplexer, Decoder, Encoder.	8
	2. Register Transfer Language and Micro-Operations	Register transfer Language, Register transfer, Bus & memory transfer, Logic micro operations, Shift micro operation. Basic Instruction codes, Computer instructions, Timing & control,	8
	3. Computer Organization:	Instruction Cycles, Memory reference instruction, Input/Output & Interrupts, Complete computer description &	8

		design of basic computer, Control Unit: Hardwired vs. Micro programmed control unit.	
Unit-2	4. Computer Arithmetic	Addition & subtraction, Multiplication Algorithms, Division algorithms	8
	5. Input-Output Organization	. Peripheral devices, I/O interface, Data transfer schemes, Program control, Interrupt, DMA transfer, I/O processor	8
	6. Memory Unit	Memory hierarchy, Processor vs. memory speed, High-speed memories, Cache memory, Associative memory, Interleave, Virtual memory, Memory management	8

Total=48

Recommended Books:

1. Mano, Morris M., Computer System Architecture, Prentice Hall (1992) 3rded.
2. Hayes, J.P., Computer Architecture and Organization, McGraw Hill (1998) 3rded.
3. Hennessy, J.L., Patterson, D.A, and Goldberg, D., Computer Architecture a Quantitative
4. Approach, Pearson Education Asia (2006) 4thed. Leigh, W.E. and Ali, D.L., System Architecture: software and hardware concepts, South Wester Publishing Co. (2000).

Title of the course : Software Engineering

Subject Code : PCCS209

Weekly load : 3Hrs

LTP 3-0-0

Credit : 3

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the importance and role of the software, and software engineering concepts.
CO2	Get familiar with working of SDLC models which enables to appropriate selection of SDLC model according to requirements.
CO3	Elicit the correct set of requirements, which will satisfy users' needs and proper software design.
CO4	Handle the complexity of design process effectively.
CO5	Understand the concept of project management and various estimation techniques.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	3	2	2	3	3	2	1
CO2	2	3	3	3	1	3	3	2	1
CO3	2	2	2	3	1	2	2	1	1
CO4	3	3	3	3	2	3	2	2	2
CO5	3	2	2	3	1	3	3	2	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Introduction to software engineering, Software objectives, needs, Applications, Characteristic and Components	08
	2. Process models	Need for a Software Life Cycle, Process Models, Traditional v/s Agile processes	08
	3.Requirement Gathering and Analysis	Introduction to Requirement Engineering, Requirements Gathering and Analysis, Requirement Elicitation, Design Concepts.	08
	4.Design principles	Objective of software design, Software Architecture and architectural style, Basic GUI, Effective Coding, Debugging and Debugging techniques.	08

Unit-2	5.Testing Strategies	Objectives of Software testing, Unit, Integration, System, Acceptance, Introduction to various Testing techniques, Test case and Test Plan, Quality Assurance.	08
	6.Project Management	Project management concepts, Software Project Plan, Configuration and Release Management, Version Control and its tools, Release Planning, Change Management, Software Maintenance, Project Metrics.	08

Total=48

Recommended Books:

1. Pressman, Roger S., “Software Engineering: A Practitioner’s Approach”, McGraw Hill
2. Jalote, Pankaj, “Software Engineering”, Narosa
3. Schaum’s Series, “Software Engineering”, TMH
4. Alexis, Leon and Mathews Leon, “Fundamental of Software Engineering”, Vikas Publications.
5. Sommerville, Ian, “Software Engineering”, AWL, 2000
6. Bell, “Software Engineering for students”, Pearson Education

Title of the course : Computer Programming Lab
Subject Code : PCCS211
Weekly load : 4 Hrs **LTP** 0-0-4
Credit : 2

Course Outcomes: At the end of the course, the student will be able to:

CO1	Acquire knowledge about the basic concept of writing a program.
CO2	Understand the basic concepts of C programming which provides students with the means of writing efficient code compile & debug programs in C language.
CO3	Design programme using the concept of arrays, structures and union to solve real time problems
CO4	Learn programming approach regarding Pointers
CO5	Understand the basic concepts of C programming which provides students with the means of writing efficient code compile & debug programs in C language.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	3	0	2	0	3	3	2
CO2	3	3	3	0	2	0	3	3	2
CO3	2	2	3	0	2	0	2	3	1
CO4	2	2	3	0	2	0	2	3	2
CO5	2	2	3	0	2	0	2	3	2

LIST OF PRACTICALS

1. Write Codes to demonstrate the concept of Data Types and Operators.
2. Write Codes to study the concept of Type Casting.
3. WAP to calculate temperature in Fahrenheit to Celsius using formula $C = (F - 32)/1.8$.
4. WAP to calculate Sum and Average of 5 numbers using sequence of statements.
5. WAP to understand the concept of switch case.
6. WAP to find maximum out of 3 numbers a, b & c using Control Statements (if-else-if ladder structure).
7. WAP to study the concept of break statements.
8. WAP to study the concept of continue statements.
9. WAP to study the concept of GOTO statement.
10. WAP to find a^b using loops (for, while, do while).
11. WAP to find factorial of positive integer using for loop.
12. WAP to print all the number between 1 to 100 which are divisible by 7 using the concept of loops.

13. WAP to generate Fibonacci series up to n using loops.
14. Write a program to calculate area of circle using function.
15. Write an iterative function to calculate factorial of given number.
16. WAP to find even & odd up to a given limit using the concept of array and loops.
17. WAP to perform string handling function in C.
18. WAP to find addition of two matrix of $n \times n$ order using the concept of 2 dimensional array
19. WAP program to study the concept of structure.
20. WAP to demonstrate the concept of Pointers.
21. WAP to learn about Pointer to Pointer.
22. WAP to implement read/write functions on a file.

Title of the course : Internet & Web Technologies Lab
Subject Code : PCCS-213
Weekly load : 2 Hrs **LTP** 0-0-2
Credit : 1

Course Outcomes: At the end of the course, the student will be able to:

CO1	Use LAMP/XAMP/WAMP/MAMP Stack for web applications.
CO2	Interlink HTML, CSS and JS for simple and efficient website designs.
CO3	Use php server side scripting and connection to MySQL database client.
CO4	Connect to database and query it to get results.
CO5	Create dynamic and responsive web pages for a website.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	3	3	3	1	2	0	3	2
CO2	2	3	3	3	1	2	1	3	2
CO3	2	3	3	3	1	2	0	3	1
CO4	2	2	3	2	0	2	0	3	2
CO5	1	2	3	3	0	1	0	3	2

LIST OF PRACTICALS

1. Study the overview of the HTML.
2. Introduction to various HTML tags such as html page elements, headings, attributes, paragraphs, styles.
3. Using HTML to insert an images, tables, links, lists, frames and forms in HTML documents.
4. Practicing CSS inside a simple HTML documents: CSS Basics, syntax, selectors.
5. Create HTML document with External, internal and inline types of CSS.
6. Create HTML document with CSS for color, background, border and margin styling.
7. Create HTML document enabled with CSS to understand the CSS box model and to modify the website layout.
8. Introduction to JavaScript, <script> tag in <head>,<body>, external .JS file.
9. Create an HTML documents to understand syntax of JS and display output of a .JS script.
10. Create an HTML document using JS to create different type of variables.
11. Create an HTML document with JS, to print all of the even numbers between 1 to 100 using concept for loop on a button click event.

12. Install and use LAMP/XAMP/WAMP/MAMP stack as per operating system to setup php server and MySQL client.
13. Create HTML document to understand syntax for php scripting and usage.
14. Write phpcode to display the current data and time onto webpage.
15. Write php code to open and close a connection to MySQL database.

Title of the course : Web Development

Subject Code : QPCS201

Weekly load : 8 Hrs

LTP 0-0-8

Credit : 1

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the basic concepts of web development.
CO2	Write html code and know the advantages and use of different types of CSS.
CO3	Understand the systematic way of developing a website.
CO4	Familiar with the basic concepts of HTML, CSS, XML, Java script, PHP and JDBC.
CO5	Design dynamic and interactive web pages by embedding java script code in HTML.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	0	0	0	0	2	3	2
CO2	3	0	3	3	1	0	3	3	2
CO3	3	2	2	3	1	0	3	3	2
CO4	3	0	0	0	0	0	3	3	2
CO5	3	0	3	2	1	0	3	3	2

LIST OF PRACTICALS

Week 1-2: Setup and HTML Basics

1. Setup of Development Environment:

- Install Visual Studio Code, Git, and a modern browser (Chrome/Firefox).
- Create folder structure for HTML, CSS, JS files.
- Configure live server extension for live preview.

Outcome: Student understands how to set up the workspace and project structure.

2. Build a Personal Profile Page using HTML:

- Use elements like <h1>, <p>, , <a>, , , <table>, and <form>.
- Add comments and indentation for clarity.

Outcome: Student learns HTML structure and basic semantic tags.

Week 3-4: CSS Basics and Layouts

3. Styling with CSS:

- Apply internal and external CSS to Week 2's page.
- Use selectors, colors, fonts, background images, and box model.

Outcome: Student understands styling concepts and visual formatting.

4. Create a Responsive Web Page Layout:

- Divide page into header, navbar, main content, sidebar, and footer.
- Use Flexbox and Grid for layout control.
- Make design mobile-responsive with media queries.

Outcome: Student creates adaptive layouts across screen sizes.

Week 5-6: JavaScript Basics and DOM Manipulation

5. JavaScript Calculator:

- Implement functions for arithmetic operations.
- Take inputs from user and display results dynamically.

Outcome: Understand JS basics: variables, functions, operators, inputs/outputs.

6. Interactive To-Do List App:

- Use JS to add, edit, delete, and mark tasks as complete.
- Utilize DOM methods like `getElementById`, `querySelector`, `createElement`, etc.

Outcome: Learn real-time interaction and DOM control.

Week 7-8: Forms Validation and Bootstrap Framework

7. HTML Form with JavaScript Validation:

- Create form with inputs for name, email, phone, password.

- Use JS to validate input patterns before submission.

Outcome: Learn data validation techniques and error handling.

8. Design a Responsive Page using Bootstrap:

- Use Bootstrap grid system and components like navbar, cards, buttons, modals.
- Customize with Bootstrap classes and utilities.

Outcome: Learn rapid UI development using CSS framework.

Week 9-10: Git & Node.js Basics

9. Version Control with Git:

- Initialize Git in project folder.
- Perform `git add`, `commit`, `push` to GitHub.
- Understand version tracking and basic branching.

Outcome: Learn version control and collaboration basics.

10. Create a Basic HTTP Server:

- Set up a server using Node.js `http` module.
- Serve static HTML and CSS files.
- Log basic request/response data.

Outcome: Understand server-side programming basics.

Week 11-12: Express.js API and MongoDB Integration

11. Build a REST API with Express.js:

- Setup Express project and define routes for CRUD operations.
- Return JSON data in API responses.

Outcome: Understand routing and backend API design.

12. Connect Node.js App to MongoDB:

- Use Mongoose to define schema and models.
- Perform operations: insert, read, update, delete documents.

Outcome: Understand how to interact with a NoSQL database.

Week 13-14: User Authentication and Full Stack Mini Project

13. Implement Login and Registration System:

- Create login and registration forms.
- Store and verify credentials.
- Use Express sessions or JWT for authentication.

Outcome: Learn secure login implementation.

14. Develop a Complete Web App (e.g., Blog, Task Manager):

- Integrate front-end (HTML/CSS/JS), back-end (Node.js/Express), and database (MongoDB).
- Add authentication, CRUD operations, and dynamic rendering.

Outcome: Build and test a complete working web application.

Week 15: Deployment

15. Deploy Full Stack App to the Web:

- Host front-end on Vercel or Netlify.
- Deploy backend on Render or Glitch.
- Connect database remotely (e.g., MongoDB Atlas).

Outcome: Learn how to publish projects and manage production deployment.

Title of the course : Object Oriented Programming

Subject Code : PCCS-202

Weekly load : 4 Hrs

LTP 3-1-0

Credit : 4 (Lecture 3, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the concept of classes and objects.
CO2	Apply object-oriented approach to design the programs.
CO3	Familiar with the reusability of code using inheritance.
CO4	Analyse polymorphic and virtual behaviour of functions.
CO5	Use stream classes in file-handling.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	0	0	0	0	2	3	2
CO2	3	1	3	0	1	0	3	3	2
CO3	3	0	2	2	1	0	3	3	1
CO4	3	0	0	3	1	0	2	3	2
CO5	3	0	2	2	1	0	3	3	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Introduction to Problem Solving (computational way of thinking), Procedure Oriented Programming (POP) versus Object-Oriented Programming (OOP), Basic Concepts of OOP, Object-oriented programming languages, Applications of OOP, Characteristics of OOPs, C versus C++, Basic program construction, Simple C++ program.	04
	2. Basic concepts	Variables, operators, basic data types, user defined data types, type casting, loops, decisions making and control statements	04
	3. Structures and Functions	Structure and unions, functions, passing arguments to functions and returning values from functions,function overloading.	05
	4. Classes and Objects	Introduction, specifying a class, access specifiers, defining member functions, creating objects, memory allocations for objects, accessing class members, private vs public, concept	06

		of constructor and destructor. Types of constructors, multiple constructors in a class	
Unit-2	5. Member Functions	Method definition, Inline functions implementation, static data members, static member functions, friend functions and friend classes.	06
	6. Inheritance	Introduction to inheritance, defining a derived class, accessing modes: protected, private and public, types of inheritance: single, hierarchical, multiple, multilevel and hybrid. virtual base class, abstract class, constructors and destructors in derived classes, order of invocation,	07
	7. Concept of pointer and Polymorphism in OOPs	Introduction to pointer, pointer declaration, pointer to object, this pointer, pointer to derived class, Introduction to polymorphism, types of polymorphism: compile time and run time polymorphism, function overloading, operator overloading, Need and rules for operator overloading, overloading of unary and binary operators, virtual function, need and rules for virtual functions, pure virtual functions	08
	8. File and Streams	File and Streams components of a file, Classes for file stream operations, opening files, closing files, reading and writing into files, updating of file, detection of end of file, different file modes.	08

Total=48

Recommended Books:

1. SB Lippman and J Lajoie, C++ Primer, Addison Wesley, New Delhi
2. KR Venugopal, Mastering C++, TMH Publishing, New Delhi
3. E. Balaguruswamy, Object Oriented Programming in C++, TMH Publishing, New Delhi.
4. Robert Lafore, C++, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi.

Title of the course : Data Structures

Subject Code : PCCS-204

Weekly load : 3 Hrs

LTP 2-1-0

Credit : 3 (Lecture 2, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the problem-solving concept and basic data structures.
CO2	Develop and analyze algorithms for linear data structures.
CO3	Familiar with the algorithms for non-linear data structures.
CO4	Implement sorting and searching algorithms.
CO5	Develop and analyze the solutions related to real world problems using various data structures.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	0	0	0	0	3	2	1
CO2	3	0	3	2	1	0	2	2	1
CO3	3	0	3	2	1	0	2	1	1
CO4	3	0	2	2	1	0	2	2	1
CO5	3	0	3	2	3	0	3	2	1

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Problem solving concept, top down and bottom-up design, structured programming, concept of data types, constants, variables, and pointer variables.	04
	2. Basic concepts and fundamental notations	Introduction to Algorithms, Key features of an algorithm, Introduction to data structure (Linear, Non-Linear, Primitive, Non-Primitive): Array, Linked list Stack, Queue, Trees, Graphs.	04
	3. Arrays	Concept of arrays(base address, lower bound, upper bound), Single dimensional array, Two-dimensional array, Representation of arrays, Row and Column major arrays, Operation on arrays with algorithms (searching, traversing, inserting, deleting).	04
	4. Linked Lists	Introduction to linked list and double linked list, Representation of linked lists in Memory, traversing and searching in linked list, Insertion and deletion in linked list	04

Unit-2	5.Stacks and Recursion	Introduction to stacks, representation of stacks with array and link List, Implementation of stacks, Application of stacks (Polish Notations, converting infix to post fix notation, evaluation of Post fix notation), Recursion: concept and comparison between recursion and iteration.	04
	6.Queues	Introduction to queues, Implementation of queues with Algorithm, Circular queues, De-queues, Applications of queue.	04
	7. Binary search tree	Basic Terminologies, Definition and Concepts of Binary Search Tree, Representations of a Binary Search Tree using Arrays and Linked Lists, Operations on a Binary Search Tree: Insertion, Deletion, Traversals(Pre-order, Post-order and In-order), Applications of Binary Search Tree.	04
	8. Sorting and Searching	Search algorithm: Linear and Binary, Sorting algorithms: Bubble Sort, Insertion Sort, Quick Sort, Selection Sort, Merge Sort.	04

Total=32

Recommended Books:

1. Data Structures Using C, Reema Thareja, Oxford University Press India.
2. Data Structures and Algorithms: Concepts, Techniques and Applications, G. A. V. Pai, McGraw-Hill Education, India.
3. Lipschutz,Schaum Series, Data Structures, TMH
4. A.M. Tanenbaum, Data Structures using C and C++, Pearson Education.

Title of the course : Database Management System

Subject Code : PCCS-206

Weekly load : 3Hrs

LTP 2-1-0

Credit : 3 (Lecture 2, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Comprehend the functional components of the DBMS.
CO2	Utilize different type of data models.
CO3	Apply the concepts of SQL query language.
CO4	Assimilate the concept of functional dependency, normalization and its necessity in Database design.
CO5	Recognize the critical role of database system in designing several information system-based software systems or applications.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	0	0	0	0	3	1	1
CO2	3	0	3	2	1	0	2	1	1
CO3	3	0	3	2	1	0	2	2	2
CO4	3	0	2	2	1	0	2	2	2
CO5	3	0	3	2	3	0	3	2	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Introduction; Database Systems, Database and its purpose, Characteristics of the database approach, Advantages and disadvantages of database systems;	04
	2. Database System Concepts and Architecture	Data models, schemas, instances, database state. DBMS Architecture; Three tier schema architecture, Mapping, Data independence.	04
	3. Types of data models	Entity-Relationship Model, Relational Data Model, Network Data Model, Hierarchical Model.	04
	4. SQL	Introduction to SQL programming language, Schema definition and updating using DDL and DML commands, Constraints, Queries.	04

Unit-2	5. Database design	Data modeling using ER model and Relational model; ER model concepts and constraints, Relational model concepts and constraints.	05
	6. Keys	Key, Different types of keys, Integrity Principles.	05
	7. Normalization	Functional dependencies and normalization for relational databases (First, Second and Third normal forms, Boyce Codd normal form.)	06

Total=32

Recommended Books:

1. Fundamentals of Database Systems, Elmasri&Navathe, Pearson Education
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata McGraw-Hill.
3. Database System Concepts, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw- Hill, New Delhi, India.
4. Introduction to Database Systems, C.J.Date, Pearson Education
5. Introduction to SQL, Rick F.VanderLans, Pearson Education

Title of the course : Digital Electronics

Subject Code : PECS-202A

Weekly load : 4 Hrs

LTP 3-1-0

Credit : 4 (Lecture 3, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Perform conversions among different number systems, became familiar with basic logic gates and understand Boolean algebra.
CO2	Simplify Boolean functions by using basic Boolean properties & K Map.
CO3	Design of combinational circuits such as MUX, DEMUX, Encoder, Decoder etc.
CO4	Understand the design of sequential Circuits such as Flip-Flops, Registers, and Counters.
CO5	Obtain a basic level of Digital Electronics knowledge and set the stage to perform the analysis and design of Complex Digital electronic Circuits.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	2	0	3	1	0	1	1
CO2	1	2	3	2	2	2	0	1	1
CO3	3	0	1	1	1	2	2	1	1
CO4	2	2	3	2	1	3	1	1	1
CO5	3	3	3	1	2	3	0	1	1

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction Digital System , Number Systems and codes	Definitions- bit, nibble, byte, word, and parity bit. Number system definition, types, radix, decimal, BCD, binary and hexadecimal. BCD addition. Binary addition, subtraction, Multiplication, Division, 1's and 2's complement. Hexadecimal addition, subtraction, advantages. Conversion- decimal to binary and hexadecimal and vice versa. ASCII, Gray codes, and list applications.	07
	2. Boolean Algebra and Logic gates	Definition- Boolean variable, complement, Boolean function, expression, truth table and Buffer. Boolean Algebra- rules and laws. Logic gates NOT, AND, OR, NAND, NOR, EX-OR- definition, symbol, Boolean equation, truth table and working. De Morgan's theorems- statement and equations. Universal gates- definition,	09

		realization of NOT, OR, AND and EXOR gates. Definitions of SOP and POS terms. Karnaugh's map up to three variables- Simplification and draw logic diagram.	
	3. Combinational Logic Circuits	Combinational Logic Circuits:-definition. Adders- definition, types. Half adder- block diagram, logic diagram using AND and XOR, truth table and working. Full adder- block diagram, logic diagram using AND, OR and XOR, truth table and working. Multiplexer- definition, block diagram. 4:1 MUX- block diagram, truth tables.	08
Unit-2	4. Combinational Logic Using MSI Circuits	Binary Parallel; BCD Adder; Encoder, Priority Encoder, Decoder; Multiplexer and De-multiplexer Circuits; Implementation of Boolean Functions Using Decoder and Multiplexer; ALU; BCD to 7-Segment Decoder.	07
	5. Introduction to Flip-flop Circuits	Basic Concepts of Sequential Circuits; Cross Coupled SR Flip-Flop Using NAND or NOR Gates; D-Type and Toggle Flip-Flops JK Flip-Flop & race Condition; Clocked Flip-Flops; Truth Tables & Excitation Tables for Flip-Flops; Edge & Level Triggering; Master Slave Configuration; Edge triggered D flip-flop; Flip-Flops With Preset & Clear.	07
	6. Sequential Logic Circuit Design & Counters	Sequential circuit; state table and state diagram; Design procedure; Basic Concepts of Counters and Registers; Shift Left and Right Register; Registers With Parallel Load; SIPO and PISO	06
	7. Ripple (asynchronous) counters	Up Down and Mod-N ripple counters; Design of Synchronous Counter Using State Diagrams and Table; BCD Counters; Modulo-N Counter; Up Down Counter; Ring counter.	04

Total=48

Recommended Books:

1. Morris Mano: "Digital Logic and Computer Design", PHI.
2. Bartee Thomas: "Digital Computer Fundamentals", McGraw-Hill.
3. Richard Sandige: "Modern Digital Design", McGraw-Hill.
4. Taub and Schilling: "Digital Integrated Electronics", McGraw-Hill.
5. Fletcher W.I.: "Engineering Approach to Digital Design", PHI.
6. Malvino & Leech: "Digital Principles & Applications", TMH.
7. J. F. Wakerly: "Digital design: principles and practice package", Pearson

Title of the course : Computer Graphics

Subject Code : PECS202B

Weekly load : 4 Hrs

LTP 3-1-0

Credit : 4 (Lecture 3, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Provide comprehensive introduction about computer graphics system and design algorithms.
CO2	Understand the concept of two-dimensional transformations.
CO3	Make the students familiar with techniques of clipping.
CO4	Understand the concept and applications of parallel and perspective projections.
CO5	Describe various hidden surface removal and shading techniques.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	3	3	1	3	1	2	1
CO2	2	2	1	2	2	2	3	2	1
CO3	2	2	2	3	1	2	2	2	1
CO4	2	2	2	2	2	1	1	2	1
CO5	3	3	3	2	2	3	2	2	1

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Overview of graphics systems	Introduction to Computer Graphics and its components, Display devices and its classification, physical input and output devices.	06
	2. Output Primitives	Point plotting, Line Drawing algorithms – Slope Line Method, DDA algorithms, Bresenham's Line drawing algorithm	06
	3. Two-dimensional Transformations	Basic transformations-translation, scaling, rotation, Reflection, Shearing, Matrix representation and homogenous coordinates, composite transformations.	06
	4. Windowing and Clipping Techniques	Windowing concepts, Point and Line clipping algorithms	06

Unit 2	5. Projections	Parallel projections, perspective projections	06
	6. Hidden-Surface and Hidden-Line Removal	Back face removal method, Depth-buffer method, Scan-line method	06
	7. Illumination concepts	Concept of lighting and Illumination models.	06
	8. Shading Overview	Introduction to various Shading Techniques.	06

Total=48

Recommended Books:

1. Computer Graphics, Hearn & Baker, PHI
2. Principles of Interactive Graphics, Newman & Sproul, Mcgraw Hill
3. Computer Graphics-A Programming Approach, Steven Harrington, Mcgraw Hill
4. Computer Graphics, Sinha & Udai, Mcgraw Hill

Title of the course : Cyber Ethics

Subject Code : PECS202C

Weekly load : 4 Hrs

LTP 3-1-0

Credit : 4 (Lecture 3, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Recognize the main ethical aspects of cyber environments
CO2	Apply ethics, and core values to all decisions that are made within cyberspace
CO3	Acquire knowledge of cyber protection and cyber privacy concerns
CO4	Familiarize with cyber laws and IPR
CO5	Create new principles of behavior in cyberspace that meet global ethical principles and rules

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	3	2	3	2	3	1	3
CO2	3	3	3	3	3	2	3	1	3
CO3	2	1	2	2	3	1	3	1	3
CO4	3	2	2	2	3	1	3	1	3
CO5	3	2	3	2	3	2	3	2	3

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Cyber Ethics	Definition of ethics, specificities and dimensions of cyber ethics, values and virtues. Ethics for IT workers and IT users	06
	2. Cyber Media	Freedom of speech on the internet, dignity, citizen responsibility, net neutrality	06
	3. Cyber Peace	Autonomous weapons and ethics	06
	4. Cyber Protection of the vulnerable	Health, Bullying, Children, Dataism as Religion	06
	5. Privacy	Privacy from and ethical and moral point of view, Privacy Protection and the Law – Information Privacy, Privacy	06

Unit 2		Laws, Applications, and Court Rulings; Key Privacy and Anonymity Issues.	
	6. IPR	Intellectual Property, Copyright; Patent; Trade Secrets; Intellectual Property Issues: Plagiarism, Reverse Engineering, Open Source Code, Competitive Intelligence, Trademark Infringement, and Cyber squatting	06
	7. Cyber Law and Governance and Ethics	Cyber Law; Provision of Cyber Law, Voluntary values and legally binding norms. International conventions	06
	8. Codes and Issues	Professional codes of ethics, Issues related to ethical hacking	06

Total=48

Recommended Books:

1. Ethics in Information Technology, Sixth Edition, George W. Reynolds.
2. Ethics and Technology: Controversies, Questions, and Strategies for Ethical Computing, Fifth Edition, Herman T. Tavani, John Wiley and Sons, 2016.
3. Ethics for Information Age, Eighth Edition, Michael J. Quinn, Pearson.
4. Cyber Ethics 4.0: Serving Humanity with Values' by Christoph Stückelberger and Pavan Duggal

Title of the course : Computer Programming

Subject Code : OECS-202A

Weekly load : 3 Hrs

LTP 3-0-0

Credit : 3

Course Outcomes: At the end of the course, the student will be able to:

CO1	Learn designing structure for engineering problem solution and basic need of machine and low level language
CO2	Use different data types & design programs involving decision structures, loops and functions.
CO3	Understand the concept of arrays, structures and union through which derived data types can be used
CO4	Learn pointers dealing with memory management and file handling for permanent storage of data and record.
CO5	Understand the basic concepts of C programming which provides students with the means of writing efficient code compile & debug programs in C language.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	3	0	2	0	3	3	2
CO2	2	2	3	0	2	0	2	3	2
CO3	2	2	3	0	2	0	2	3	1
CO4	2	2	3	0	2	0	2	3	1
CO5	3	3	3	0	2	0	3	3	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Steps for problem solving, flow of control, representation of Algorithms and Program Debugging, basic program structure.	06
	2. Program Structure	Identifier and its rule, Keywords, Constants, variables, comments and data types, Operators and Expressions, Statements (Input/ Output and assignment), Use of Header & Library files.	06
	3. Control Structures	Decision making with if, if-else and nested if structure, Switch Statement, loop structure (for, While and do-while), change the flow of iteration with Break and continue.	10

	4. Functions	Introduction to built in functions and user define functions, , Function Declaration, calling and prototype definition, formal and actual parameters, Parameter Passing, Call – by value/reference.	06
Unit-2	5. Arrays	Introduction to Arrays, Array Declaration and Initialization, Single and Multidimensional Array.	06
	6. Structures and Unions	Introduction to structure and Union, Creating and Using Structure and Union, difference between Structure and Union	04
	7. Pointers	Need of Pointer, Creating and Using Pointers	06
	8. File handling	Introduction to file, file opening/closing, File reading/writing in different modes	04

Total=48

Recommended Books:

1. Salaria RS, Application Programming in C, Khanna Book Publishing Co (P) Ltd. New Delhi.
2. Byron Gottfried, Schaum Series, Programming in C, McGraw Hills Publishers, New York.
3. Yashwant Kanetkar, Exploring – BPB Publications, New Delhi.

Title of the course : Software Engineering

Subject Code : OECS202B

Weekly load : 3Hrs

LTP 3-0-0

Credit : 3

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the importance and role of the software, and software engineering concepts.
CO2	Get familiar with working of SDLC models which enables to appropriate selection of SDLC model according to requirements.
CO3	Elicit the correct set of requirements, which will satisfy users' needs and proper software design.
CO4	Handle the complexity of design process effectively.
CO5	Understand the concept of project management and various estimation techniques.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	3	2	2	3	3	2	1
CO2	2	3	3	3	1	3	3	2	1
CO3	2	2	2	3	1	2	2	1	1
CO4	3	3	3	3	2	3	2	2	2
CO5	3	2	2	3	1	3	3	2	1

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Introduction to software engineering, Software: objectives, needs, Applications, Characteristic and Components	08
	2. Process models	Need for a Software Life Cycle, Process Models.	08
	3.Requirement Gathering	Introduction to Requirement Engineering, Requirements Gathering and Analysis, Design Concepts.	08
Unit-2	4.Design principles	Objective of software design, Software Architecture and architectural style, Basic GUI.	08
	5.Testing Strategies	Objectives of Software testing, Introduction to various Testing techniques, Test case.	08

	6.Project Management	Project management concepts, Configuration and Release Management, Version Control, Release Planning, Change Management, Software Maintenance, Project Metrics.	08
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Total=48

Recommended Books:

1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach", McGraw Hill
2. Jalote, Pankaj, "Software Engineering", Narosa
3. Schaum's Series, "Software Engineering", TMH
4. Alexis, Leon and Mathews Leon, "Fundamental of Software Engineering", Vikas Publications.
5. Sommerville, Ian, "Software Engineering", AWL, 2000
6. Bell, "Software Engineering for students", Pearson Education

Title of the course : Operating System

Subject Code : OECS202C

Weekly load : 3Hrs

LTP 3-0-0

Credit : 3

Course Outcomes: At the end of the course, the student will be able to:

CO1	Learn fundamentals of Operating System and its various classifications.
CO2	Understand architecture of UNIX/LINUX along with concept of Kernel and system calls.
CO3	Know about processes, scheduling queues, various operation on processes and process management.
CO4	Understand how operating system manages primary memory and moves processes back and forth between main memory and disk during execution.
CO5	Acquire knowledge of I/O system and OS security.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	1	1	1	1	2	2	2
CO2	2	2	3	2	1	2	3	2	2
CO3	2	2	2	3	2	2	3	1	1
CO4	2	2	2	2	1	3	3	2	2
CO5	3	3	3	1	2	1	3	2	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Introduction to Operating system, Operating System: Functions, Features, advantages, and Disadvantages, basic concepts, UNIX/LINUX Architecture, Kernel, services and systems	08
	2. Process Management	Process concepts, operations on processes, IPC, Process Scheduling.	08
	3. Memory Management	Memory allocation and, Swapping, Paging, Segmentation, Virtual Memory, Page Fault, Memory Management techniques.	08

Unit-2	4. File Management	Concept of a file, access methods, types of File systems, file system mounting, file sharing and protection, freespace management.	08
	5. I/O System	Mass storage structure - overview, disk structure, disk attachment, disk scheduling algorithms	08
	6. OS Security	Authentication, Access Control, Access Rights, System Logs	08

Total=48

Recommended Books:

1. Silberschatz A & Galvin, Operating System Concepts, John Wiley & Sons.
2. W. Stallings, Operating Systems: Internals and Design Principles, Pearson Pub.
3. Andrew S Tanenbaum, Operating Systems - Design and Implementation, PHI.
4. Dietel, An Introduction to Operating System, Addison Wesley.

Title of the course : Object Oriented Programming Lab

Subject Code : PCCS-208

Weekly load : 2 Hrs

LTP 0-0-2

Credit : 1

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the basic concepts of writing a program in object-oriented programming.
CO2	Solve different real-world problems using the concept of classes and objects.
CO3	Implement the concept of inheritance and polymorphism.
CO4	Utilize the concept of friend and virtual functions to solve real world problems.
CO5	Develop solutions related to real world problems using various object-oriented features.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	0	0	0	0	2	3	2
CO2	3	0	3	2	1	0	3	3	2
CO3	3	0	3	2	1	0	3	3	1
CO4	3	0	3	2	1	0	2	3	1
CO5	3	0	3	2	1	0	3	3	2

LIST OF PRACTICALS

1. WAP to get the two numbers from user and find addition, subtraction, multiplication, division.
2. WAP to find the area and volume of sphere. Formulas are $\text{Area} = 4 \times \text{PI} \times R \times R$
 $\text{volume} = \frac{4}{3} \times \text{PI} \times R \times R \times R$
3. WAP to convert the degree to radian using the formula $\text{Radian} = \text{degree} \times \text{PI} / 180$.
4. WAP to convert the Fahrenheit into Centigrade. Formula is $C = (F - 32) / 1.8$
5. WAP to swap the values of two variables A and B without using another variable.
6. WAP to check whether given number is positive or negative.
7. WAP to determine whether a number entered by the user is odd or even.
8. Study about functions. Write a program using add(), sub(), mul(), and div() for addition, subtraction, multiplication and division respectively.
9. Write a program to create an array and find the sum of all the elements.
10. WAP to create 2-dimensional array and print the list of its elements.
11. WAP to add, subtract, multiply and division of two matrices.
12. WAP to print numbers from 1 to 10 and also print the squares of these numbers in front of them.
13. WAP to find the $1 - 2 + 3 - 4 + 5 - \dots + N$.
14. WAP to print day of week using switch case.

15. Write about polymorphism. Write a program to illustrate operator overloading.
16. Write about inheritance. Write a program for single inheritance.
17. Create a class MyArith having member functions: add(), sub(), mul(), div() which performs the arithmetic operations.
18. WAP using class to generate mark sheet using multiple inheritance.
19. WAP to show the concept of function overloading.
20. WAP to illustrate the use of constructors using classes.
21. WAP to illustrate the use of friend function.
22. WAP to illustrate the use of virtual function.
23. WAP to illustrate the use of pure virtual function.

Title of the course : Data Structures Lab

Subject Code : PCCS-210

Weekly load : 2 Hrs

LTP 0-0-2

Credit : 1

Course Outcomes: At the end of the course, students will be able to

CO1	Understand the basic problem-solving concept.
CO2	Familiar with different types of data structures.
CO3	Develop and understand the algorithms for linear data structures.
CO4	Implement and analyze the algorithms for non-linear data structures.
CO5	Understand and implement different search and sorting algorithms.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	0	0	0	0	3	3	1
CO2	3	0	0	0	0	0	2	3	1
CO3	3	0	3	2	1	0	2	3	2
CO4	3	0	3	2	1	0	2	2	1
CO5	3	0	3	2	1	0	3	3	2

LIST OF PRACTICALS

1. WAP to generate Fibonacci Series using recursion.
2. Write a function that interchanges the first element with last element, second element with second last element and so on.
3. WAP to perform addition and multiplication on two Matrices.
4. Write a Function that removes all duplicate elements from an Array.
5. WAP to insert an element in beginning of Linear Link List.
6. WAP to insert an element from the end of the Linear Link List.
7. WAP to insert an element after a given element of the given Linear Link List.
8. WAP to delete an element from the beginning of the Linear Link List.
9. WAP to delete an element from the end of the Linear Link List.
10. WAP to delete an element after a given element of the given Linear Link List.
11. WAP to reverse the element of the Linear Link List.
12. WAP to implement Stack (its operations: insertion and deletion) using array.
13. WAP to implement Stack (its operations: insertion and deletion) using linked list(pointers).
14. WAP to implement Queue (its operations: insertion and deletion) using array.
15. WAP to implement Queue (its operations: insertion and deletion) using linked list (pointers).
16. WAP to sort an array of integer in Ascending Order using Bubble Sort.

17. WAP to sort an array of integer in Ascending Order using Insertion Sort.
18. WAP to sort an array of integer in Ascending Order using Selection Sort.
19. WAP to search an element using Linear Search Method.
20. WAP to search an element using Binary Search Method.
21. WAP to implement the tree traversal methods.

Title of the course : Database Management System Lab

Subject Code : PCCS-212

Weekly load : 2 Hrs **LTP** 0-0-2

Credit : 1

Course outcomes: At the end of the course, students will be able to:

CO1	Design a database for a database-based applications and understand the critical role of database system in designing several information system-based software systems or applications.
CO2	Devise SQL queries using DDL, DML, DCL commands.
CO3	Familiar with different types of keys.
CO4	Identify activities/operations that may be performed on the database.
CO5	Familiar with concepts of Joins, normalization.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	3	2	1	1	2	1	2	2
CO2	1	1	2	3	0	2	2	3	3
CO3	1	2	3	2	0	1	0	2	2
CO4	1	2	3	2	0	3	1	2	2
CO5	1	2	3	2	0	2	0	2	3

LIST OF PRACTICALS

1. To implement Data Definition Commands (create, drop, alter).
2. To implement Data Manipulation Commands (insert, delete, update, select)
3. To perform union, intersection, distinct and auto increment operation on a table.
4. To use where, having, order by and group by clauses in SQL queries.
5. To implement Data Control Commands (Commit, revoke, rollback, connect, execute)
6. To different type of Joins i.e., natural, cross, left and outer joins etc.
7. To use various using aggregating functions in SQL with Insertion, Deletion, Update and Retrieval queries.
8. Introduction to various constraints such as Primary key, secondary key, Super key, etc.
9. Case Study-1: Employee database – ‘Create’ employee table, ‘Select’ and display an employee matching a given condition, ‘Delete’ duplicate records, Insert and update records, find net salary, etc.

Case Study-2: Students Academic - Do related activities such as prepare E-R Model, Relational Model, do Normalization, Create Tables with key constraints, Insert data, Delete Data, Query database using join based SQL statements.

Title of the course : IT Helpdesk Attendant

Subject Code : QPCS202

Weekly load : 8 Hrs

LTP 0-0-8

Credit : 1

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the basic concepts of web and internet technology
CO2	Write html code and know the advantages and use of different types of CSS.
CO3	Understand the systematic way of developing a website
CO4	Familiar with the basic concepts of java script, VB script, PHP, and Ajax.
CO5	Design dynamic and interactive web pages by embedding java script code in HTML.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	0	0	0	0	2	3	3
CO2	3	0	3	3	1	0	3	3	2
CO3	3	2	2	3	1	0	3	3	3
CO4	3	0	0	0	0	0	3	3	3
CO5	3	0	3	2	1	0	3	3	2

LIST OF PRACTICALS

Week 1-2: Computer Hardware and Operating System

1. Basic Computer Hardware Identification and Assembly:

- Identify internal components (Motherboard, CPU, RAM, HDD, SSD, SMPS, GPU).
- Learn how to safely open a desktop/laptop.
- Assemble and disassemble a computer system.
- Use antistatic measures (ESD wrist strap, grounding).

Outcome: Understand hardware components and basic assembling skills.

2. Operating System Installation:

- Boot system using bootable USB/DVD.

- Install Windows and Linux (Ubuntu) OS.
- Format and partition hard drives during installation.
- Post-installation setup (drivers, updates, language, time).

Outcome: Ability to clean install and set up operating systems.

Week 3-4: Software Installation and User Account

3. Software Installation and Configuration:

- Install essential software (MS Office, browser, PDF reader, antivirus).
- Set default applications and configure settings.
- Install software using .exe, .msi, or package manager (Linux).

Outcome: Gain experience in everyday software setup and troubleshooting.

4. User Account and Permission Management :

- Create, delete, and modify user accounts (Admin/Standard).
- Set and reset passwords.
- Use Control Panel and `netplwiz` to manage users.
- Set folder/file permissions and sharing access.

Outcome: Learn user account control and file security basics.

Week 5-6: Troubleshooting

5. Troubleshooting Hardware Problems :

- Troubleshoot RAM errors, power issues, no display, beep codes.
- Use diagnostic software (e.g., MemTest86).
- Test PSU, cables, and drives.
- Replace faulty components safely.

Outcome: Develop skills to identify and fix hardware issues.

6. Troubleshooting Hardware Problems:

- Resolve slow boot, software crashes, and update failures.

- Use Safe Mode, System Restore, and Task Manager.
- Use Event Viewer and logs for diagnosis.
- Reinstall problematic software.

Outcome: Troubleshoot common software problems efficiently.

Week 7-8: Network and Network Troubleshooting

7. Basic Network Setup:

- Configure IP addresses (Static and DHCP).
- Connect multiple systems in a LAN.
- Share files and folders over the network.
- Use switch or router for network setup.

Outcome: Understand networking basics and system interconnectivity.

8. Network Troubleshooting:

- Use `ipconfig`, `ping`, `tracert`, `nslookup`, and `netstat` commands.
- Troubleshoot common issues like no connectivity, limited access, IP conflict.
- Check cable and port connections.

Outcome: Gain hands-on practice with network issue resolution.

Week 9-10: Peripheral devices and Remote desktop

9. Printer and Peripheral Device Setup:

- Install a printer (USB and Network).
- Configure printer sharing across LAN.
- Troubleshoot printer queue, driver, and paper jam issues.
- Setup and test webcam, keyboard, mouse, scanner.

Outcome: Develop experience in installing and managing peripherals.

10. Remote Desktop and Support Tools:

- Use AnyDesk or TeamViewer for remote support.
- Establish remote desktop connections in Windows.

- Learn remote file transfer, system control, and safety protocols.

Outcome: Ability to assist users remotely and securely.

Week 11-12: Backup and Antivirus

11. Data Backup and Recovery:

- Perform full and incremental backups.
- Use Windows Backup, File History, or third-party tools.
- Restore deleted or lost files.
- Clone a hard drive using tools like Macrium Reflect or Clonezilla.

Outcome: Understand data protection and recovery methods.

12. Virus and Malware Removal:

- Detect threats using antivirus software (Windows Defender, Avast, etc.).
- Run full system scans and quarantine/remove malware.
- Use boot-time scans and safe mode cleanup.
- Update virus definitions.

Outcome: Learn how to secure systems against malware and viruses.

Week 13-14: Ticketing and Optimization

13. Helpdesk Ticketing System Us:

- Use an open-source or simulated ticketing system (e.g., osTicket).
- Log user complaints with proper issue categorization.
- Assign priorities and track status.
- Close tickets with resolution documentation.

Outcome: Understand helpdesk operations and service tracking.

14. System Optimization:

- Use built-in tools (Disk Cleanup, Defragment, Task Manager).
- Disable unnecessary startup apps and services.

- Clear temporary files and optimize performance.
- Monitor system health using performance tools.

Outcome: Learn techniques to maintain and improve system efficiency.

Week 15: Final Practical Assessment – Simulated Helpdesk Scenario

15. Deploy Full Stack App to the Web:

- Simulate a real helpdesk call or ticket: receive issue, troubleshoot, document solution.
- Perform steps like system check, driver fix, network test, and remote support.
- Complete all procedures with proper documentation.

Outcome: Demonstrate full-cycle IT helpdesk skills in a real-world scenario.

SEMESTER-V

Title of the course : Java Programming

Subject code : PCCS301

Weekly load : 2 Hrs

LTP 2-0-0

Credit : 2

Course Outcomes: At the end of the course, the student will be able to:

CO1	Acquire knowledge of the features and object-oriented concepts in JAVA programming.
CO2	Analyze the working of bitwise operators in JAVA.
CO3	Develop simple programs based on polymorphism and inheritance.
CO4	Describe the concepts of importing packages and exception-handling mechanisms.
CO5	Develop programs for handling I/O and file stream.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	2	2	1	0	0	0	3	3
CO2	1	2	2	0	0	0	0	3	2
CO3	0	1	1	1	0	0	1	3	3
CO4	1	2	2	1	0	0	1	3	3
CO5	1	1	1	1	0	0	0	3	2

Theory

Unit	Main Topics	Course Outline	Lectures
Unit-1	Introduction	Object-Oriented Programming, Structure of Java program, Control Statements, Java Class Libraries, Data Types, Variables, and Arrays, Type Conversion and Casting, Automatic Type Promotion in Expressions, Arrays, and Strings.	06
	Operators	Arithmetic Operators, Bitwise Operators, Relational Operators, Boolean Logical Operators, Assignment Operators, Operator Precedence, Inheritance and multithreaded programming.	06

	Classes	Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Methods, Constructors, this Keyword, Garbage Collection, finalize() Method, Stack Class, Overloading Methods, Objects as Parameters, Argument Passing, Returning Objects, Recursion.	04
Unit-2	Exception Handling & Applets	Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java Built-in Exceptions, Chained Exceptions. Java applet, Wrapper classes, Graphics programming in java.	06
	Streams & File Handling	Streams, I/O operations with user defined methods.	04
	Packages and Interfaces	Packages, Access Protection, Importing Packages, Interfaces, JDBC, basics of servlet technology & Java beans, Java server pages.	06

Total=32 hrs

Recommended Books:

1. Mahesh Bhavde and Sunil Patekar, "Programming with Java", First Edition, Pearson Education, 2008, ISBN: 9788131720806.
2. Rajkumar Buyya, S Thamaraiselvi, Xingchen chu, "Object oriented Programming with java", Tata McGraw Hill education private limited.
3. E Balagurusamy, "Programming with Java A primer", Tata McGraw Hill companies.
4. Anita Seth and B L Juneja, "JAVA One step Ahead", Oxford University Press, 2017.

Title of the course : **Multimedia Technologies**

Subject code : **PCCS303**

Weekly load : **2 Hrs**

LTP 2-0-0

Credit : **2**

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand various aspects of Multimedia
CO2	Understand the current and future issues related to multimedia technology
CO3	Understand both theoretical and practical aspects in designing multimedia content
CO4	Implement a range of concepts, techniques and tools for creating and editing the interactive multimedia applications
CO5	Deliver multimedia content over the Internet through web applications and mobile applications

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	0	0	0	0	0	2	3	3
CO2	0	0	0	2	1	0	1	3	2
CO3	0	0	0	0	2	0	1	3	3
CO4	0	0	0	2	1	0	0	3	3
CO5	0	0	0	1	1	0	0	3	2

Theory

Unit	Main Topics	Course Outline	Lectures
Unit 1	1.Multimedia overview	Design Processes, Hypertext, Links, Frames, Files, HTML, HGML, Morphing, and Media Control interfaces. Multimedia Tools, Elements of Multimedia, Sound Input, Video Input, Data Automation, General Devices.	4
	2.Multimedia Hardware	Multimedia PC configuration, features and specifications of sounds and video interfaces, OCR, touch screens, scanners	4
	3.Multimedia devices	Digital cameras, speakers, printers, plotters, optical disks and drives such as CD-ROM, DVD, multimedia networks	4

	4.Multimedia Software	Image and sound file formats, multimedia file formats, compression, standards and techniques, features of software to read and write such files	4
Unit 2	5.Image Processing	Photoshop workshop, image editing tools, specifying and adjusting colors, using gradient tools	4
	6.Image Processing Tools Options	Selection and move tools, transforming path drawing and editing tools, using channels, layers, filters and actions	4
	7.Multimedia Authoring tools	Types of authoring programs- Icon based, Time based, story, boarding/scripting and object oriented working in multimedia flash	4
	8.Additional Features of multimedia tools	Working with drawing and painting tools, applying colour viewing and manipulating time line, animating, processing, guiding layers	4

Total 32

Recommended Books:

1. William Casanova and Molina, Multimedia An Introduction, Prentice Hall of India, New Delhi
2. Hillman, Multimedia Technology and Application, Galgotia Publications, New Delhi
3. Flash 5 Bible by Rein Hardit, IDG Books India Pvt. Ltd.
4. Flash 5 in easy steps, Vandome IDG Books India Pvt. Ltd.
5. Li and Drew, Fundamentals of Multimedia, Pearson Publications.

Title of the course : Internet of Things

Subject Code : PECS301A

Weekly load : 4 Hrs

LTP 3-1-0

Credit : 4 (Lecture 3, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Know about of IoT and its characteristics
CO2	Acquire knowledge of design of IoT
CO3	Understand various models of IoT
CO4	Implement IoT in real-life applications
CO5	Get knowledge of various sensors used in IoT

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	3	2	2	1	2	3	3	3
CO2	3	2	3	3	1	3	2	3	2
CO3	2	2	2	1	2	1	3	3	3
CO4	3	2	2	1	1	1	2	3	3
CO5	2	3	3	2	3	2	3	3	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction to IoT	Defining IoT, Overview of IoT, Characteristics of IoT	08
	2. IoT design	Physical design of IoT, Logical design of IoT, Functional blocks of IoT,	08
	3. IoT models	Basics of IoT networking, Communication models & API's	08
Unit 2	4. Applications of IoT	Home automation, Industry applications, Surveillance applications, other IOT applications	08
	5. Sensors in IoT	Role of sensors in IoT, Sensing, Actuation, Communication protocols, Integration of sensors	08
	6. Case Study	Challenges in IoT and case studies related to Agriculture, Healthcare, Activity monitoring	08

Total=48

Recommended Books:

1. SAMuel Greengard, "the Internet of Things".
2. Internet of Things: Architecture and design principles, Raj Kamal, McGraw Hill
3. Klaus Schweb, "The Fourth Industrial revolution".
4. CunoPfister, "Getting Started with Internet of Things"
5. Peter Wahel, "Learning Internet of Things.
6. Internet of Things by Dr. Jeeva Jose, Khanna Publication house.

Title of the course : Fundamentals of Artificial Intelligence
Subject Code : PECS301B
Weekly load : 4 Hrs **LTP** 3-1-0
Credit : 4 (Lecture 3, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Demonstrate the use of Artificial intelligence to solve real-life problems.
CO2	Apply AI Techniques for knowledge representation and search strategies.
CO3	Use Artificial intelligence for Game playing, Natural Language processing, and speech recognition.
CO4	Use AI branches to solve different problems.
CO5	Develop systems using techniques and tools in the field of Artificial Intelligence.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	2	2	0	0	0	1	3	3
CO2	1	2	2	0	0	0	0	3	2
CO3	1	1	1	1	0	1	2	3	3
CO4	1	2	2	1	0	0	1	3	3
CO5	1	1	1	2	0	0	1	3	2

Theory

Unit	Main Topics	Course Outline	Lectures
Unit-1	1.Introduction	Artificial Intelligence, Intelligence, Intelligent behavior, Understanding AI, Hard or Strong AI, Soft or Weak AI, Cognitive Science. Goals of AI General AI Goal, Engineering-based AI Goal, Science-based AI Goal.	8
	2. AI Approaches	Cognitive science, Laws of thought, Turing Test, and Rational agent.	6
	3. AI Techniques	Techniques that make the system behave as Intelligent, Describe and match, Goal reduction, Constraint satisfaction, Tree Searching, Generate and test, Rule-based systems, Biology-inspired AI techniques: Neural Networks, Genetic Algorithms, and Reinforcement learning.	10

Unit-2	4. Branches of AI	Logical AI, Search in AI, Pattern Recognition, Knowledge Representation, Inference, Common sense knowledge and reasoning, Learning, Planning, Epistemology, Ontology, Heuristics, and Genetic programming.	10
	5. Applications of AI	A game playing, Speech Recognition, Understanding Natural Language, Computer Vision, Expert Systems.	8
	6. Latest trends	Latest trends in AI approaches	6

Total=48

Recommended Books:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd edition, Prentice Hall.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill.
3. Trivedi, M.C., "A Classical Approach to Artificial Intelligence", Khanna Publishing House, Delhi.
4. Saroj Kaushik, "Artificial Intelligence", Cengage Learning India, 2011.
5. David Poole and Alan Mackworth, "Artificial Intelligence: Foundations for Computational Agents", Cambridge University Press 2010.

Title of the course : Cyber Crime

Subject Code : PECS301C

Weekly load : 4 Hrs

LTP 3-1-0

Credit : 4 (Lecture 3, Tutorial 1)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Get knowledge of various aspects of cyber world
CO2	Know about cyber crime and its types
CO3	Acquire knowledge about criminals and their objectives
CO4	Understand cyber laws and IT ACT 2000
CO5	Familiarize with penalties and safety tips to cyber crime

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	3	2	3	1	3	3	3
CO2	3	3	2	3	3	2	3	3	2
CO3	2	2	2	2	2	3	2	3	3
CO4	3	1	3	2	3	1	3	3	3
CO5	2	2	3	1	3	2	3	3	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction to Cyber World	Overview of cyber world including cyber space, cyber ethics, cyber law and cyber security.	06
	2. Cyber Crime	Introduction to cyber-crime, Categories of cyber-crime, Distinction between Cyber Crime and Conventional Crime.	06
	3. Types of cyber-crime against individuals	E-mail spoofing and online frauds, Phishing and its forms, Spamming, Cyber-defamation, Cyberstalking, Cyber Bullying and harassment, Computer Sabotage, Pornographic offenses, Password Sniffing, Keyloggers and Screenloggers. Cyber Crimes against Women and Children, forgery and fraud, crime related to IPRs, Cyber terrorism, computer vandalism, social media, ATM, online and banking frauds etc.	08
	4. Cyber Criminals	Cyber Criminals and their Objectives.	04

Unit-2	5. Cybercrime against organization	Unauthorized access of computer, Password Sniffing, Denial-of-service (DOS) attack, Backdoors and Malwares and its types, E-mail Bombing, Salami Attack, Software Piracy, Industrial Espionage, Intruder attacks. Security policies violations.	06
	6. Laws	Overview of IT ACT 2000.	06
	7. Penalties	Penalties and offenses related to IT Act 2000, causes, punishments, etc.	06
	8. Safety tips	Case studies and safety tips to cyber crime.	06

Total=48

Recommended Books:

1. The Information Technology Act, 2000. by Universal's Concise Commentary.
2. Cyber Crime And Information Technology Act 2000 by Shweta Jaswal Vikram Singh Jaswa.
3. Atul Jain; "Cyber Crime: Issues, Threats and Management".
4. Majid Yar; "Cybercrime and Society", Sage Publications.
5. Michael E Whiteman and Herbert J Mattord; "Principles of Information Security", Vikas Publishing House, New Delhi

Title of the course : Object Oriented Programming

Subject Code : OECS-301A

Weekly load : 3 Hrs

LTP 3-0-0

Credit : 3

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the concept of classes and objects.
CO2	Apply object-oriented approach to design the programs.
CO3	Familiar with the reusability of code using inheritance.
CO4	Analyse polymorphic and virtual behaviour of functions.
CO5	Use stream classes in file-handling.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	0	0	0	0	2	3	2
CO2	3	1	3	0	1	0	3	3	2
CO3	3	0	2	2	1	0	3	3	1
CO4	3	0	0	3	1	0	2	3	2
CO5	3	0	2	2	1	0	3	3	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Introduction to Problem Solving (computational way of thinking), Procedure Oriented Programming (POP) versus Object-Oriented Programming (OOP), Basic Concepts of OOP, Object-oriented programming languages, Applications of OOP, Characteristics of OOPs, C versus C++, Basic program construction, Simple C++ program.	04
	2. Basic concepts	Variables, operators, basic data types, user defined data types, type casting, loops, decisions making and control statements	04
	3. Structures and Functions	Structure and unions, functions, passing arguments to functions and returning values from functions, function overloading.	05
	4. Classes and Objects	Introduction, specifying a class, access specifiers, defining member functions, creating objects, memory allocations for objects, accessing class members, private vs public, concept	06

		of constructor and destructor. Types of constructors, multiple constructors in a class	
Unit-2	5. Member Functions	Method definition, Inline functions implementation, static data members, static member functions, friend functions and friend classes.	06
	6. Inheritance	Introduction to inheritance, defining a derived class, accessing modes: protected, private and public, types of inheritance: single, hierarchical, multiple, multilevel and hybrid. virtual base class, abstract class, constructors and destructors in derived classes, order of invocation,	07
	7. Concept of pointer and Polymorphism in OOPs	Introduction to pointer, pointer declaration, pointer to object, this pointer, pointer to derived class, Introduction to polymorphism, types of polymorphism: compile time and run time polymorphism, function overloading, operator overloading, Need and rules for operator overloading, overloading of unary and binary operators, virtual function, need and rules for virtual functions, pure virtual functions	08
	8. File and Streams	File and Streams components of a file, Classes for file stream operations, opening files, closing files, reading and writing into files, updating of file, detection of end of file, different file modes.	08

Total=48

Recommended Books:

1. SB Lippman and J Lajoie, C++ Primer, Addison Wesley, New Delhi
2. KR Venugopal, Mastering C++, TMH Publishing, New Delhi
3. E. Balaguruswamy, Object Oriented Programming in C++, TMH Publishing, New Delhi.
4. Robert Lafore, C++, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi.

Title of the course : Computer Graphics

Subject Code : OECS301B

Weekly load : 3 Hrs

LTP 3-0-0

Credit : 3

Course Outcomes: At the end of the course, the student will be able to:

CO1	Provide comprehensive introduction about computer graphics system and design algorithms.
CO2	Understand the concept of two-dimensional transformations.
CO3	Make the students familiar with techniques of clipping.
CO4	Understand the concept and applications of parallel and perspective projections.
CO5	Describe various hidden surface removal and shading techniques.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	3	3	1	3	1	2	1
CO2	2	2	1	2	2	2	3	2	1
CO3	2	2	2	3	1	2	2	2	1
CO4	2	2	2	2	2	1	1	2	1
CO5	3	3	3	2	2	3	2	2	1

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Overview of graphics systems	Introduction to Computer Graphics and its components, Display devices and its classification, physical input and output devices.	06
	2. Output Primitives	Point plotting, Line Drawing algorithms – Slope Line Method, DDA algorithms, Bresenham's Line drawing algorithm	06
	3. Two-dimensional Transformations	Basic transformations-translation, scaling, rotation, Reflection, Shearing, Matrix representation and homogenous coordinates, composite transformations.	06
	4. Windowing and Clipping Techniques	Windowing concepts, Point and Line clipping algorithms	06

Unit 2	5. Projections	Parallel projections, perspective projections	06
	6. Hidden-Surface and Hidden-Line Removal	Back face removal method, Depth-buffer method, Scan-line method	06
	7. Illumination concepts	Concept of lighting and Illumination models.	06
	8. Shading Overview	Introduction to various Shading Techniques.	06

Total=48

Recommended Books:

1. Computer Graphics, Hearn & Baker, PHI
2. Principles of Interactive Graphics, Newman & Sproul, Mcgraw Hill
3. Computer Graphics-A Programming Approach, Steven Harrington, Mcgraw Hill
4. Computer Graphics, Sinha & Udai, Mcgraw Hill

Title of the course : Computer Networks

Subject Code : OECS-301C

Weekly load : 3 Hrs

LTP 3-0-0

Credit : 3

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the Basics of Data Communication System, Networking System, Various component and to Identify the Different Type of Network Topologies, Transmission Mediums.
CO2	Analyze the Services and Features of Various Layers of OSI and TCP/IP Models & Understand the Basic Network topologies used in Network.
CO3	Understand the Importance of LAN Components, Protocols and Addressing Schemes.
CO4	Learn the Basic concepts of WAN Connectivity and Its Devices.
CO5	Understand Different Addressing Techniques and their Working.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	3	3	1	3	1	2	1
CO2	2	2	1	2	2	2	3	2	1
CO3	2	2	2	3	1	2	2	2	1
CO4	2	2	2	2	2	1	1	2	1
CO5	3	3	3	2	2	3	2	2	1

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction to data Communication	Components, Data representation, Data flow, Networks – Categories of networks, Analog and Digital Signals, Wavelength, Bit-rate, Bit-length, Transmission Impairment, Performance metrics, Transmission Modes.	08
	2. Introduction to Networking & Topologies	Overview of Networking, Need for Networking, Hardware and Software components, Network Communication Standards, OSI Reference Model, TCP/IP Model, Network topologies.	08
	3.LAN Components and Protocols	LAN connectors, LAN devices, Lower Layer Protocols, Ethernet, Fault Management and tolerance, Higher Layer Protocols.	08

Unit-2	4.WAN Components and Protocols	WAN Components, WAN Connectivity, WAN Devices, Routers, Routing Table, Tools and Services- Domain Name System.	08
	5.Network addressing	Introduction, TCP/IP addressing scheme- Components of IP addressing, IP address classes	08
	6. Basics of Switching & Multiplexing	Switching and its need, Multiplexing overviews, Analog and digital modulation	08

Total=48

Recommended Books:

1. B. Forouzan, Data Communication And Networking, TMH
2. William Stalling, Data and Computer Communication, Prentice Hall
3. Douglas E. Comer, Internetworking with TCP/IP Volume – I, Prentice Hall India
4. W. Richard Stevens, TCP/IP Illustrated Volume-I, Pub. Addison Wesley
5. Tanenbaum, Computer Network, Prentice Hall India

Title of the course : Cyber Crime

Subject Code : OECS301D

Weekly load : 3 Hrs

LTP 3-0-0

Credit : 3

Course Outcomes: At the end of the course, the student will be able to:

CO1	Get knowledge of various aspects of cyber world
CO2	Know about cyber crime and its types
CO3	Acquire knowledge about criminals and their objectives
CO4	Understand cyber laws and IT ACT 2000
CO5	Familiarize with penalties and safety tips to cyber crime

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	3	2	3	1	3	3	3
CO2	3	3	2	3	3	2	3	3	2
CO3	2	2	2	2	2	3	2	3	3
CO4	3	1	3	2	3	1	3	3	3
CO5	2	2	3	1	3	2	3	3	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction to Cyber World	Overview of cyber world including cyber space, cyber ethics, cyber law and cyber security.	06
	2. Cyber Crime	Introduction to cyber-crime, Categories of cyber-crime, Distinction between Cyber Crime and Conventional Crime.	06
	3. Types of cyber-crime against individuals	E-mail spoofing and online frauds, Phishing and its forms, Spamming, Cyber-defamation, Cyberstalking, Cyber Bullying and harassment, Computer Sabotage, Pornographic offenses, Password Sniffing, Keyloggers and Screenloggers. Cyber Crimes against Women and Children, forgery and fraud, crime related to IPRs, Cyber terrorism, computer vandalism, social media, ATM, online and banking frauds etc.	08
	4. Cyber Criminals	Cyber Criminals and their Objectives.	04

Unit 2	5. Cybercrime against organization	Unauthorized access of computer, Password Sniffing, Denial-of-service (DOS) attack, Backdoors and Malwares and its types, E-mail Bombing, Salami Attack, Software Piracy, Industrial Espionage, Intruder attacks. Security policies violations.	06
	6. Laws	Overview of IT ACT 2000.	06
	7. Penalties	Penalties and offenses related to IT Act 2000, causes, punishments, etc.	06
	8. Safety tips	Case studies and safety tips to cyber crime.	06

Total=48

Recommended Books:

1. The Information Technology Act, 2000. by Universal's Concise Commentary.
2. Cyber Crime And Information Technology Act 2000 by Shweta Jaswal Vikram Singh Jaswa.
3. Atul Jain; "Cyber Crime: Issues, Threats and Management".
4. Majid Yar; "Cybercrime and Society", Sage Publications.
5. Michael E Whiteman and Herbert J Mattord; "Principles of Information Security", Vikas Publishing House, New Delhi

Title of the course : Microprocessor

Subject Code : PCCS305

Weekly load : 2 Hrs

LTP 2-0-0

Credit : 2

Course Outcomes: At the end of the course, the student will be able to:

CO1	Learn about the concept of microprocessor and introduction to 8-bit microprocessor.
CO2	Gain knowledge of the internal architecture and bus structure of 8085 microprocessor.
CO3	Study the 8085 instructions set and use it to solve programming problems.
CO4	Gain a perspective of microprocessor interfacing with peripheral devices and use it.
CO5	Understanding about the working of microprocessor and applications of it.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	0	0	0	0	0	1	3	3
CO2	3	0	0	0	0	0	1	3	2
CO3	3	3	3	0	3	0	2	3	3
CO4	3	0	1	0	2	0	2	3	3
CO5	3	0	3	0	2	0	3	3	2

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	History and evolution of Microprocessors, features of 8085, Need and Applications of Microprocessors, Comparison of Microprocessor and Microcontroller.	06
	2. Architecture of 8-bit Microprocess	General 8-bit Microprocessor and its architecture, Pin Configuration, CPU Architecture, Registers, ALU Control Unit, register organization.	05
	3. Bus structure of 8085.	Address bus, data and control bus of 8085, overview of PC range of microprocessors	05

Unit-2	4. 8085 Instruction Set	Addressing modes, instruction set, instruction cycle, fetch cycle, execute cycle and machine language instruction format	06
	5. Programming	Program development steps defining problem, algorithms and flowchart, solving basic problems of assembly language programming using 8085.	05
	6. Interfacing for 8085 Microprocessors	Memory Organization, Interfacing Techniques; Memory mapped I/O and I/O mapped I/O	05

Total=32

Recommended Books:

1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming & Applications with 8085", 5/E, Penram International Publishing (India) Pvt. Ltd., reprint 2006.
2. Douglas V Hall, "Microprocessors and Interfacing: Programming & Hardware", *Tata McGraw Hill Publishing Company*, 3rd Reprint 2007.
3. Mazidi & Mazidi, The 8085 Microcontroller & Embedded system, using Assembly and C, 2nd edi, Pearson edu.
4. Advanced Microprocessors and Interfacing : Badri Ram; TMH
5. Singh, B. P. – Microprocessor Interfacing and Application -New Age International.
6. Brey, Barry B. – INTEL Microprocessor – Prentic Hall (India)-4th Edition.

Title of the course : Java Programming

Subject code : PCCS307

Weekly load : 2 Hrs

LTP 0-0-2

Credit : 1

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the basic concepts of Java.
CO2	Implement different types of loops.
CO3	Implement different methods of thread and graphics.
CO4	Understand the concept of applets.
CO5	Implement multiple inheritance concepts.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	2	2	1	0	0	0	3	3
CO2	1	2	2	0	0	0	0	3	2
CO3	0	1	1	1	0	0	1	3	3
CO4	1	2	2	1	0	0	1	3	3
CO5	1	1	1	1	0	0	0	3	2

LIST OF PRACTICALS

1. Write a Program to create the variables of basic types and also show the effect of type conversions.
2. Write a program to illustrate the behaviour of print () and println () methods.
3. Write a program to convert the given temperature in Fahrenheit to Celsius.
4. Write a program to find all the numbers of and sum of all the integers greater than 100 and less than 200 that are divisible by 7.
5. Write a program to print Floyd's triangle
1
2 3
4 5 6
7 8 9 10
11.....15
.
.

79.....91

6. Write a program to print multiplication table using does-while loop.
7. Write a program to reverse the digits of a number using while loop.
8. Write a program to print the Fibonacci series.
9. Write a program to compute the area of triangle defined by the class.
10. Write a program to illustrate the concept of constructors.
11. Write a program to illustrate the concept of single inheritance.
12. Write a program to illustrate the use of an array for sorting a list of numbers.
13. Write a program to illustrate the use of some commonly used wrapper class methods.
14. Write a program to illustrate the concept of multiple inheritance using interfaces.
15. Write a program to illustrate the use of Thread class for creating and running threads in an application.
16. Write a program to illustrate the use of yield (), sleep (), stop () methods in Thread class.
17. Write a program to show a simple Hellojava Applet.
18. Write an applet which takes two numbers from the user into each text field box displayed in the applet area and computes the sum of these two numbers and displays the result.
19. Write an applet code that draws three lines, a rectangle, a filled rectangle, a rounded rectangle.

Note: The above mentioned list of experiments is suggested list. Teacher may add more programs/ experiments as per requirement.

Title of the course : Minor Project

Subject code : PRCS301

Weekly load : 4 Hrs

LTP 0-0-4

Credit : 2

Course Outcomes: At the end of the course, the student will be able to:

CO1	Identify and analyze a real-world problem and propose an appropriate computer-based solution.
CO2	Apply programming, database, networking, and software development concepts for designing and developing a minor project.
CO3	Use modern software tools, technologies, and platforms for implementation and testing of the project.
CO4	Work effectively in a team environment and demonstrate project planning, documentation, and presentation skills.
CO5	Develop a functional prototype/application and evaluate its performance, usability, and reliability.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	2	2	1	1	2	2	3	3
CO2	1	2	2	0	1	2	2	3	2
CO3	0	1	1	1	0	1	1	3	3
CO4	1	2	2	1	1	2	2	3	3
CO5	1	1	1	1	1	1	1	3	2

In this, the student must select an area from emerging technologies and specify the objectives to be achieved. Evaluation criteria will be based on objective stated and achieved.

Title of the course : Media Development

Subject Code : QPCS301

Weekly load : 8 Hrs

LTP 0-0-8

Credit : 1

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the fundamentals of digital media development and multimedia components.
CO2	Create and edit digital graphics, audio, and video content using appropriate tools.
CO3	Design interactive media applications by integrating text, images, sound, animation, and video.
CO4	Familiar with media formats, compression techniques, publishing workflows, and media delivery platforms.
CO5	Develop and publish multimedia projects for web and mobile environments.

	CO/PO Mapping: (Strong(3)/Medium(2)/Weak(1)/ Neutral(0) indicates strength of correlation)								
Cos	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	0	0	0	0	2	3	2
CO2	3	2	3	2	1	0	3	3	2
CO3	3	2	3	3	1	0	3	3	2
CO4	3	0	2	1	0	0	3	3	2
CO5	3	1	3	2	1	0	3	3	2

LIST OF PRACTICALS

Week 1-2: Introduction to Media Development and Digital Graphics

1. Setup of Media Development Environment:

- Install media development tools such as Adobe Photoshop/GIMP, Audacity, Open Shot/ Shotcut, and a modern browser.
- Create project folders for images, audio, video, and assets.
- Understand file organization and workflow management.

Outcome: Student understands the media production environment and project organization.

2. Create Basic Digital Graphics:

- Create posters, banners, and social media graphics.
- Use text tools, layers, shapes, colors, and image adjustments.
- Export graphics in PNG, JPEG, and SVG formats.

Outcome: Student learns basic image creation and editing techniques.

Week 3-4: Advanced Graphics and Animation Basics

3. Image Editing and Manipulation:

- Perform cropping, resizing, color correction, masking, and filters.
- Use layers and blending modes.
- Create a composite image from multiple assets.

Outcome: Student understands image enhancement and editing workflows.

4. Basic 2D Animation:

- Create frame-based or timeline-based animation.
- Add transitions, movement, and opacity effects.
- Export animation as GIF or video.

Outcome: Student learns animation principles and motion design basics.

Week 5-6: Audio Recording and Editing

5. Audio Capture and Editing:

- Record voice clips using microphone input.
- Trim, normalize, and remove background noise.
- Add fade-in, fade-out, and simple sound effects.

Outcome: Student understands digital audio recording and editing.

6. Podcast or Narration Project:

- Create a short narration or podcast.
- Mix multiple tracks including voice and background music.

- Export in MP3 and WAV formats.

Outcome: Student learns audio composition and production workflow.

Week 7-8: Video Editing Fundamentals

7. Basic Video Editing:

- Create form with inputs for name, email, phone, and password.
- Import video clips and arrange them on a timeline.
- Cut, trim, split, and merge clips.
- Add titles and transitions.

Outcome: Student learns essential video editing operations.

8. Create a Short Promotional Video:

- Combine video, audio, and graphics.
- Add captions and background music.
- Export optimized video for web delivery.

Outcome: Student creates a complete short video production.

Week 9-10: Interactive Media and Web Integration

9. Create Interactive Media Content:

- Create interactive image galleries, slideshows, or media cards.
- Embed images, audio, and video into HTML pages.
- Use simple CSS styling.

Outcome: Student understands media integration into web pages.

10. Build a Multimedia Web Page:

- Develop a webpage containing images, audio, video, and navigation.
- Ensure responsive presentation across devices.

Outcome: Student learns multimedia publishing on the web..

Week 11-12: Media Formats and Compression

11. Media File Conversion and Optimization:

- Compare formats such as JPEG, PNG, SVG, MP3, WAV, MP4, and WebM.
- Compress files for efficient storage and delivery.
- Evaluate quality versus file size.

Outcome: Student understands media optimization techniques.

12. Streaming and Delivery Experiment:

- Prepare media for web streaming.
- Test media playback performance on browser and mobile devices.

Outcome: Student learns practical media delivery considerations.

Week 13-14: Mini Project Development

13. Plan and Design Multimedia Project:

- Select project theme (digital story, portfolio, educational module, product promotion).
- Create storyboard and organize assets.
- Define workflow and media requirements.

Outcome: Student understands multimedia project planning.

14. Develop Complete Multimedia Application:

- Integrate graphics, animation, audio, and video.
- Create navigation and interactive elements.
- Test usability and media compatibility.

Outcome: Student develops a complete media application.

Week 15: Publishing and Presentation

15. Publish and Present Final Project:

- Export and publish project on web or local deployment.

- Present project objectives, workflow, tools used, and outcomes.
- Collect feedback and improve final output.

Outcome: Student learns deployment, presentation, and project evaluation.