

PROGRAM / COURSE FRAME FOR B.Sc COMPUTER SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
CHOICE BASED CREDIT SYSTEM
Batch 2019-2020 onwards

Sem	Part	Course No.	Course Title	Hrs	Credit	Marks
1	I	TAS/FRS/H IN XXXX	Language	3	2	30
1	II	ENS XXXX	English – I	3	2	30
1	III C	COS 1581	Programming in C	5	5	75
1	III C	COS 1483	Problem Solving Using C Programming Lab	4	4	60
1	III C	COS 1485	System Software	4	4	60
1	III S	COS 1497	Digital Principles and Computer Organization	5	4	60
1	IV E	COS 1291	PC Hardware and Troubleshooting	3	2	30
1	IV LS	COS 1283	Image Designing(TL)	3(2+1)	2	30
Total				30	25	375
2	I	TAS/FRS/H IN XXXX	Language	3	2	30
2	II	ENS XXXX	English – II	3	2	30
2	III C	COS 1582	Object Oriented Programming using C++	5	5	75
2	III C	COS 1484	C++ Programming Lab	4	4	60
2	III C	COS 1486	Computer Graphics	4(2+2)	4	60
2	III S	MAS XXXX	Discrete Mathematics	5	4	60
2	IV E	COS 1292	Introduction to Database Concepts	3	2	30
2	IV LS	COS 1284	Animation Technology(TL)	3(2+1)	2	30
2	V		PED/NSS/SLP		1	15
Total				30	26	390
3	I	TAS/FRS/H IN XXXX	Language	3	2	30
3	II	ENS XXXX	English – III	3	2	30
3	III C	COS 2581	Java Programming	5	5	75
3	III C	COS 2483	Java Programming Lab	4	4	60
3	III C	COS 2585	Operating Systems	5	5	75
3	III C	COS 2587	Data Structures using C++	5(3+2)	5	75

3	III S	MAS XXXX	Graph Theory and its Applications	5	4	60
Total				30	27	405
4	I	TAS/FRS/H IN XXXX	Language	3	2	30
4	II	ENS XXX	English – IV	3	2	30
4	III C	COS 2582	Relational Database Management Systems	5	5	75
4	III C	COS 2484	Oracle Lab	4	4	60
4	III C	COS 2586	Computer Networks	5	5	75
4	III C	COS 2588	Microprocessors and Micro Controllers	5	5	75
4	III S	COS 2498	Cloud Computing	5	4	60
4	V		PED/NSS/SLP		1	15
Total				30	28	420
5	III C	COS 3681	Web Programming(TL)	6(3+3)	6	90
5	III C	COS 3685	Software Engineering	6	6	90
5	III C	COS 3587	Enterprise Resource Planning	5	5	75
5	IV VE	VAL	Value Education	4	2	30
5	IV LS	COS 3285	Audio / Video Editing(TL)	3(2+1)	2	30
5	III C	COS 3691	Python Programming (TL)	6(3+3)	6	90
Total				30	27	405
6	III C	COS 3682	.NET Programming(TL)	6(3+3)	6	90
6	III C	COS 3684	Project Development Lab(TL)	6(2+4)	6	90
6	III C	COS 3686	Mobile Technologies(TL)	6(3+3)	6	90
6	III C	COS 3588	Business Intelligence and Data Analytics	5	5	75
6	IV EVS	COS 3200	Environmental Studies	4	2	30
6	IV LS	COS 3286	Network Security	3	2	30
Total				30	27	405
Grand Total (Semester I – VI)				180	160	2400

C: MAJOR CORE

E: NON MAJOR ELECTIVE

S: MAJOR SUPPORTIVE

VE:VALUE EDUCATION

LS: LIFE SKILL

Part III Supportive

Sem	Course No.	Course Title	Hours	Credits	Marks
3	COS 2481	Introduction to Programming in C (TL)	5 (3+2)	4	60
4	COS 2482	Introduction to Object Oriented Programming (TL)	5 (3+2)	4	60
		Total	10	08	120

Part IV Non-Major Electives

Sem	Course No.	Course Title	Hours	Credits	Marks
1	COS 1291	PC Hardware and Troubleshooting	3	2	30
2	COS 1292	Introduction to Database Concepts	3	2	30
		Total	6	4	60

Part IV Life Skill Courses

Sem	Course No.	Course Title	Hours	Credits	Marks
1	COS 1283	Image Designing(TL)	3(2+1)	2	30
2	COS 1284	Animation Technology(TL)	3(2+1)	2	30
5	COS 3285	Audio and Video Editing(TL)	3(2+1)	2	30
6	COS 3286	Network Security	3	2	30
		Total	12	8	120

Program Specific Outcomes

After completing this program the student will be able to

1. Understand the principles and working of Computer System.
2. Understand the role of components of System Software.
3. Understand the principles and development methodologies of application software and acquire Problem Solving Skills.
4. Study various algorithms in building the Software Products.
5. Apply mathematical methods to solve Computation Problems.
6. Apply Software Development Life Cycle principles to build Software Products.
7. Adapt the State-of-the-art technological changes.
8. Pursue higher studies in the Computer Science domain.
9. Become a Software Engineer to fulfill the IT industry requirements.
10. Design creative and dynamic Multimedia Content.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes (PSOs)

Courses	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10
COS1581			✓	✓	✓		✓	✓	✓	
COS1483			✓	✓	✓		✓	✓	✓	✓
COS1485	✓	✓		✓			✓	✓	✓	
COS1497	✓	✓	✓		✓		✓	✓		
COS1291	✓	✓	✓				✓	✓	✓	✓
COS1283	✓	✓				✓	✓	✓	✓	
COS1582			✓	✓	✓	✓		✓	✓	
COS1484			✓	✓	✓	✓		✓	✓	
COS1486	✓	✓	✓	✓				✓	✓	
COS1292	✓		✓			✓		✓	✓	✓
COS1284	✓	✓					✓	✓	✓	✓
COS2581			✓	✓		✓	✓	✓	✓	
COS2483			✓	✓		✓	✓	✓	✓	
COS2585	✓	✓			✓	✓		✓	✓	
COS2587			✓	✓	✓			✓	✓	✓
COS2582			✓	✓	✓			✓	✓	✓
COS2484			✓	✓	✓			✓	✓	✓
COS2586	✓	✓					✓	✓	✓	✓
COS2588	✓	✓			✓		✓	✓	✓	

Mapping of Course Outcomes (COs) with Programme Specific Outcomes (PSOs)

Courses	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10
COS2498	✓	✓					✓	✓	✓	✓
COS3681			✓			✓	✓	✓	✓	✓
COS3685			✓			✓	✓	✓	✓	✓
COS3587			✓			✓	✓	✓	✓	✓
COS3285			✓			✓	✓	✓	✓	✓
COS3691			✓			✓	✓	✓	✓	✓
COS3682					✓	✓	✓	✓	✓	✓
COS3684			✓			✓	✓	✓	✓	✓
COS3686	✓	✓					✓	✓	✓	✓
COS3588			✓			✓	✓	✓	✓	✓
COS3200					✓	✓	✓	✓	✓	✓
COS3286	✓	✓					✓	✓	✓	✓
COS2481			✓	✓	✓			✓	✓	✓
COS2482			✓	✓	✓			✓	✓	✓

Mapping Program Specific Outcomes(PSO) with Program Outcomes(PO)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
PSO1	✓	✓		✓	✓	✓	✓	✓		
PSO2	✓	✓		✓	✓	✓	✓	✓		
PSO3	✓	✓	✓	✓	✓	✓	✓	✓		
PSO4	✓	✓	✓	✓	✓	✓	✓	✓		
PSO5	✓	✓		✓	✓	✓	✓	✓		
PSO6					✓	✓	✓	✓	✓	✓
PSO7	✓	✓				✓	✓	✓	✓	✓
PSO8				✓	✓	✓	✓	✓	✓	
PSO9	✓	✓		✓	✓	✓	✓	✓		
PSO10				✓	✓	✓		✓	✓	✓

Objective

This subject will enable the student to understand the concepts of C programming language and gain knowledge on algorithms, flowcharts and logical thinking. On successful completion of this course the student will have the programming ability in C Language, and develop software application using C.

Course Outcomes

At the end of the course the student will be able to:

- i. Recognize the basic data types and control statements in C.
- ii. Summarize the concept of arrays and strings in C.
- iii. To create efficient program using functions to implement reusability.
- iv. Apply the structures in making application software
- v. Generate files and use preprocessor for real world application.

UNIT I

History of C – The C Character Set – Tokens – Identifiers – Keywords – Data Types – Constants - Variables – Operators – Structure of a C program – Formatted input/output functions – Unformatted input/output functions – Data Type Conversions – Control statements – Looping statements.

UNIT II

Arrays – Declaring Arrays – Accessing array elements – Initializing Arrays – Types of Arrays – Strings – String Library Functions.

UNIT III

Functions – Function Prototyping – Return statement – Nested functions – Types of functions – Recursion – Storage classes – Command line arguments – Pointer – Initialization of Pointers – Pointer Arithmetic – Pointers and Arrays – Pointers to Functions – Pointers to Pointers – Passing values to functions – Passing arrays to functions – Memory allocation.

UNIT IV

Structures – Declaration – Definition – Initialization – Nested Structures – Array of Structures – Structures and functions – Structures and pointers – Bits field – Unions.

UNIT V

Files – fscanf() and fprintf() – Character I/O from files –String I/O from files – Error Handling during I/O – Random Access – The Preprocessor.

Text Books:

Balagurusamy.E, ” Programming in ANSI C”, Eighth Edition, Tata McGraw Hill-2019.

References:

1. Kanetkar Y, “Let us ‘C’ “, 16th edition BPB publications, 2017.
2. Ashok N.Kamthane , “Programming in C” , Pearson Education, 2012.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3						6
CO4			3			
CO5						6

Mean : $18/5 = 3.6$

Objective

This course enables the student to gain knowledge in the basic principles of programming concepts in C and to develop skills for writing program using ‘C’.It also helps the student to build applications using C concepts and there by improve problem solving ability.

Course Outcomes

At the end of the course the student will be able to:

- i. Identify the basic Programming skills.
- ii. Extend the skills to write C program and to solve different problems.
- iii. Carry out top down approach for implementing function
- iv. Utilize dynamic memory allocation concept in program.
- v. Generate file program for creating application software.

- 1. C operators
- 2. If structure
- 3. Loops and GOTO
- 4. Arrays
- 5. Functions
- 6. Recursion
- 7. String Handling
- 8. String handling library function
- 9. Call by value and Call by reference
- 10. Pointers
- 11. Memory allocation
- 12. Structures
- 13. unions, Bitfield , Typedef and enumerated data type
- 14. File operations and file functions
- 15. Random file and command line argument

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4			3			
CO5						6

Mean : $15/5 = 3$

Objective:

This course aims at giving a detailed understanding of various system software like assembler, loader, linker, compiler, debugging system and text editor. It enable the student to get sufficient knowledge on various system resources.

Course Outcomes:

At the end of the course the student will be able to:

- i. Recall the basic structure of Machine architectures by introducing the organization of SIC and SIC/XE.
- ii. Distinguish between various machines architectures and understand its purposes.
- iii. Explain the functioning of assemblers and its passes.
- iv. Apply the loading and linking process.
- v. Categorize the working of compiler and identify its application in debugging systems.

UNIT I

Introduction to system software and machine structure - Instruction set - Operation codes and addressing modes for various systems like SIC machine Architecture - SIC/XE Machine Architecture

UNIT II

Traditional machines – VAX Architecture – Pentium pro Architecture – RISC machines – Ultra SPARC Architecture – Power PC Architecture – Implementation examples

UNIT III

Assembler - Basic assembler functions - One pass assembler - Two pass assembler - Machine dependent and independent assembler features - Multi pass assembler - Implementation examples.

UNIT IV

Loader - Basic loader functions - Machine dependent and independent loader features - Loader design - Linker - Linkage editors - Dynamic linking - Bootstrap loaders - Implementation examples.

UNIT V

Compilers - Basic compiler functions - Phases in a compiler - Machine dependent and machine independent compiler features - Compiler design options -Division in to passes - Implementation examples - Software utilities - Text editors, interactive debugging systems.

Text Book

1. L.L.Beck, “System Software: An Introduction to system programming”, Addison Wesley Co, 3rd edition, 2013.

Reference Book

- 1.LelandL.Beck P. Manjula “System Software”, Darling Kindersley (INDIA)pvt.LTD3rdedition 2013
- 2.Damhere, “Introduction to System Software”, Tata McGraw Hill, 3rd edition 2013.
3. Alfred V .Aho Monica S.Lam Ravi Sethi .Jeffrey D.Ullman “Compilers Principles Techniques and Tools”, 2nd edition, 2013.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2				4		
CO3		2				
CO4			3			
CO5				4		

Mean : 18/6 = 3

COS 1497 DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION 5 Hrs/ 4Cr

Objective:

This course will enable the student to understand the fundamentals of digital principles, the basics of computer organization and gain knowledge on computer architecture and its design. This will also familiarize the student in the concepts of gates, Boolean Algebra, Processor and Memory.

Course Outcomes:

At the end of the course the student will be able to:

- I. Identify different types of number systems, Logic Gates, Boolean laws & theorems.
- II. Formulate different theorems for simplification of basic digital electronics circuits and able to build arithmetic operations using logic circuits.
- III. Carry out the basics of Flip-flop, shifts register, counters and Semiconductor memory for data Processing circuits.
- IV. Recognize the basic structure of computer and control unit operations.
- V. Extend the learning of memory organization.

UNIT: I

Number Systems and Codes: Binary, Octal and Hexadecimal number systems – Conversion between number systems – Binary Arithmetic - Binary codes – BCD - Arithmetic. Boolean Algebra and Logic Gates: AND, OR, NOT, NAND, NOR, XOR and XNOR gates – Truth tables Applications of XOR Gate Fundamentals of Boolean Algebra – Laws and theorems of Boolean Algebra – Demorgan's theorem.

UNIT: II

Simplification of Boolean Expressions: Canonical SOP and POS forms – Algebraic Simplification – Karnaugh Maps – NAND / NOR Implementation of Boolean Expressions – Combinational Logic Circuits: Half and Full Adders – Half and Full Subtractors – BCD adder – Parallel Binary Adder – Multiplexer & Demultiplexer – Encoder & Decoder.

UNIT: III

Sequential Logic circuits: NAND Latch – SR Flipflop – JK Flipflop – Edge Triggering – PRESET and CLEAR inputs, Shift Register, Universal Shift Register – Asynchronous and Synchronous Counters – BCD counter.

UNIT: IV

Basic Computer Organization and Design: Instruction Codes – Computer Register – Computer Instructions – Timing and Control – Instruction Cycle – Memory Reference Instruction – Input Output and Interrupt - CPU: General Register Organization – Stack Organization – Instruction

Formats – Addressing Modes – Data Transfer Manipulation – Program Control - Reduced Instruction Set Computer (RISC).

UNIT: V

Memory Organization: Main memory - Memory Hierarchy – Main memory – Auxiliary memories – Associative Memory – Cache memory – Virtual Memory – Memory Management Hardware.

Text Book:

1. MorisMano, "Digital logic and computer design" –Pearson India, 1st edition,2014.
2. Carl Hamacher, "Computer Organization", 5th edition, Tata McGraw Hill, 2014.

References:

- 1.A. P. Malvino, "Digital Principles and Applications"- McGraw Hill 8th editions, 2015.
- 2.Morris Mano, "Computer System Architecture", 3rd edition, Prentice Hall, 2014.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2						6
CO3			3			
CO4	1					
CO5		2			5	

Mean : 18/6 = 3

Objective:

This course will enable the student to gain knowledge about the I/O components of the computer and various troubleshooting techniques to overcome the problems faced in it. It will also help the student to identify various types of graphic adapters, printers, modems and soundboards.

Course Outcomes:

At the end of the course the student will be able to:

- i. Identify the main components of PC, power supplies and various ports.
- ii. Explain the function of motherboard and working mechanisms of Keyboard and mouse.
- iii. Illustrate the types of Monitors, Printers, graphic adapters and their mechanisms.
- iv. Categorize various modems, soundcards and their working.
- v. Solve the problems faced in PC by applying the troubleshooting methods.

UNIT I

CPU: Layout of a typical desktop PC – Layout of typical tower PC. Power supply: Connecting the power supply – AT style power connections – Drive power connections – Voltage tolerances. Parallel port – Serial port – Accelerated graphics port.

UNIT II

Motherboards: Socket 7, Socket 8 – Layout and connector pin outs of Intel motherboard. Input Devices: Keyboard – Construction – Interfaces. Mouse: Construction – Mechanical and optical - Mechanical sensors – Trackball.

UNIT III

Printers: Dot matrix printers – Ink jet printers – Laser/LED printers – Monitors – Types of monitor – CRT – Laser – LED – Graphics adapter – VGA – SGA – Digital Visual Interface (DVI) – Video In Video Out (VIVO)

UNIT IV

Basic modem construction and operation: The internal modem – The external modem – Advanced modem features. Sound boards: Recording and playback process – MIDI.

UNIT V

Troubleshooting the CPU, Troubleshooting memory–Motherboard Controllers and system resources, Power supply function and operation. OS Installation and preventive maintenance– Troubleshooting tools and Techniques–Basic data recovery and Disaster recovery

BOOKS:

1. Stephen J. Bieglow, “Troubleshooting, Maintaining and repairing PCs”, Tata Mc - Graw5th edition 2013.

References:

2. Craig Zacker& John Rourke, “PC Hardware: The complete reference”, Tata Mc - Graw hill, 1st edition 2012.
3. Govindarajulu. B, “IBM PC and clones: Troubleshooting and maintenance”, Tata Mc - Graw hill, 2nd edition 2012.
4. www.pcguides.com
5. www.pccomputernotes.com

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3		2				
CO4				4		6
CO5			3			

Mean : $18/6 = 3$

Objective:

This course helps the student to design 2D images. It also enables them to be familiar with the basics of Adobe Illustrator, CorelDraw and InDesign. On completion of this course the student will be able to create, draw and design their own images and publish it.

Course Outcomes:

At the end of the course the student will be able to:

- i. Recognize the basic tools and its purpose in Illustrator.
- ii. Translate the objects into 3D Format by applying effects and shades.
- iii. Compare and contrast illustrator and Coreldraw Workspace.
- iv. Apply a different shapes in an image.
- v. Develop a document and export it into PDF format.

Unit – I

Illustrator Workspace: Customizing the Workspace, Tools, Using multiple artboards, Rulers, grids, guides and Crop marks - Drawing: Drawing Basics, Drawing with Pencil tool, Drawing with Pen tool, Perspective Drawing - Symbols, Painting: Painting with fills and Strokes, Brushes, Transparency and blending modes, Gradients, Meshes, Patterns.

Unit – II

Selecting and arranging Objects: Selecting objects, Grouping and expanding objects, Locking hiding and Deleting objects – Reshaping Objects: Transforming objects, Scaling, Shearing and Distorting objects, Blending Objects, Creating 3D objects: Importing, Exporting and saving - Importing files, saving artwork, Exporting artwork

Unit – III

CorelDraw workspace: Workspace, Working with Dockers, Using the Toolbox - Importing, Exporting, and Saving Design Work, Opening Documents, Saving and closing documents, working with Templates, Importing and Exporting Files

Unit – IV

Creating Basic Shapes: Rectangle Tool, Ellipse Tool, Polygons, Spiral Tool, Graph paper Tool, Perfect Shape tool.

Unit – V

InDesign Workspace: Setting Up the Document – Toolbox – Organizing the document: Column Specifications, Rulers, Guides – Inserting/Formatting Text - Type Menu – Working

with Objects: Links, Placing Images, Enabling Text Warps, Grouping, Locking – Saving – Exporting to PDF

Text Book:

1. “Adobe Illustrator CS5 Classroom in a book”, Adobe Systems Incorporated and its Licensors, 2018
2. “Adobe InDesign CS6 Classroom in a book”, Adobe Systems Incorporated and its Licensors, 2018

References:

1. Gary David Button, “CorelDraw X5 The Official Guide”, The McGraw-Hill Companies, 2012
2. http://help.adobe.com/archive/en_US/illustrator/cs5/illustrator_cs5_help.pdf
3. <http://www.itc.edu.kh/bib/ebook/storage/AdobeInDesignCS6.pdf>

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3				4		
CO4			3			
CO5			3			6

Mean : $19/6 = 3.17$

COS 1582 OBJECT ORIENTED PROGRAMMING USING C++ 5 Hrs/ 5 Cr

Objective:

This course aims at enabling students to understand the basic knowledge of object oriented programming concepts and to understand the idea of C++ streams, templates and error handling concepts. On completion of this course the student will be able to create application software with minimum complexity and more reusability.

Course Outcomes:

At the end of the course the student will be able to:

- i. Compare the procedural and object oriented paradigm.
- ii. Identify the solution for the problems by using OOP.
- iii. Apply the inheritance and polymorphism concept for developing application software.
- iv. Develop programs using file concepts for real world software projects.
- v. Create robust applications using exception handling and templates.

UNIT I

Introduction to OOP: Object oriented paradigm – OOPs Features – Applications of OOP – Classes and Objects: Accessing class members – Defining member function – Passing objects as arguments – Returning objects from functions – Friend Function – Static data member - Static member functions - Inline Function - Function Overloading.

UNIT II

Constructor and Destructor functions: Types of Constructors – Characteristics of Constructor and Destructor - Operator overloading: Overloading unary and binary operators – Overloading with friend function – Rules for overloading operator.

UNIT III

Inheritance: Types of Inheritance - Advantages and Disadvantages of Inheritance – Run time Polymorphism - Virtual Function - Pure Virtual Functions – Virtual Base Class – The this pointer – New and Delete Operator.

UNIT IV

C++ Streams: – Unformatted I/O Operations – Formatted Console I/O Operations - I/O Manipulators – File Handling – Error Handling Function - EOF – File Modes – Command line argument.

UNIT V

Exception Handling: List of Exceptions – Handling Uncaught Exceptions – Templates: Class Templates - Function Templates - Member function Templates - Class Templates and Inheritance.

Text Book:

1. Balagurusamy.E, “Object Oriented Programming with C++ “, Seventh Edition -Tata McGraw Hill – 2017.

References:

1. Kanetkar Y, “Let us ‘C’ “, 16th edition BPB publications, 2017,
2. Ashok N.Kamthane, “Object Oriented Programming with ANSI & Turbo C++”, Pearson Education, 2012.

	K1	K2	K3	K4	K5	K6
CO1		2				
CO2	1					
CO3			3			
CO4			3			
CO5						6

Mean : $15/5 = 3$

Objective:

This course provides knowledge on Object Oriented Programming concept. By utilizing the lab components, the student can create application software.

Course Outcomes:

At the end of the course the student will be able to:

- i. Identify the problem solving ability by applying the characteristics of object oriented approach
- ii. Classify algorithms in object oriented approach for developing applications with minimum complexities.
- iii. Apply reusability concept in implementing inheritance for developing software application.
- iv. Build secured programs using data hiding features in OOP.
- v. Create robust program using exception handling.

1. C++ environment
2. Functions
3. Classes and objects
4. Friend functions
5. Constructor and Destructor
6. Operator Overloading
7. Type conversion
8. Inheritance
9. Pointers
10. Files
11. Templates
12. Exception Handling

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4						6
CO5						6

Mean : $16/5 = 3.2$

This course has an objective to impart the details about the building blocks of computer graphics algorithms for output primitives, filling, clipping, 2D and 3D transformation. It includes the principles of various graphics devices. On completion of this course the student will know the basics of multimedia programming.

Course Outcomes:

At the end of the course the student will be able to:

- i. Identify the CG applications and understand the working of different output systems (Raster and Random).
- ii. Generate lines, circle, ellipse and fill polygons using different algorithms.
- iii. Apply transformations to geometric figures.
- iv. Illustrate 2D viewing and clipping concepts.
- v. Relate the previously learned concepts of viewing, transformations in 2D with 3D and apply them.

UNIT I:

Introduction : Application areas of Computer Graphics, overview of graphics systems, video - display devices, and raster scan systems, random scan systems, graphics monitors and workstations and input devices.

UNIT II:

Input devices- Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary fill and flood - fill algorithms

UNIT III:

2 - D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

UNIT IV:

2 - D viewing: The viewing pipeline, viewing coordinate reference frame, window to view - port coordinate transformation, viewing functions, point clipping - Cohen - Sutherland and Cyrus - beck line clipping algorithms, Sutherland -Hodgeman polygon clipping algorithm.

UNIT V:

3 - D viewing concepts - 3 - D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

Text Book:

1. By Donald D. Hearn, M. Pauline Baker, Warren Carithers, “Computer Graphics with Open GL”, 4TH edition, Pearson, 2013

Reference Book :

1. Donald Hearn and M.Pauline Baker, “Computer Graphics”, second Edition, PHI/Pearson Education, 2013.

Lab Component

1. Line Drawing – DDA, Bresenham’s algorithm, Drawing a cuboid
2. Mid-point Circle drawing
3. Mid-point ellipse drawing
4. Drawing an object involving line, circle and ellipse
5. Polygon filling
6. Line clipping
7. Polygon clipping
8. Basic Transformation: Translation, Scaling, Rotation
9. Composite Transformation
10. Animating an object

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2						6
CO3			3			
CO4		2				
CO5		2				6

Mean : $20/6 = 3.33$

Objective

This course helps the student acquire knowledge in Database Management Systems. It also helps them to understand the relational model and to familiarize the students with design tools. In completion of this course the student will be able to create and maintain the databases of their own.

Course Outcomes:

At the end of the course the student will be able to:

- i. Identify the database requirements and the entities involved in the applications
- ii. Apply relational expressions for queries.
- iii. Examine the database design by normalization.
- iv. Build a table and manipulate the data using SQL Commands.
- v. Summarize the transactions, its properties and the concurrency controls.

UNIT I

Introduction– Purpose of Database System – Views of data – Data Models – Database Languages – Database System Architecture – Database users and Administrator– Entity– Relationship model (E-R model) – E-R Diagrams – Introduction to relational databases

UNIT II

The relational Model – The catalog- Types– Keys - Fundamental operations -Relational Algebra – Additional Operations- Integrity .

UNIT III

Database Design– Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form-Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT IV

SQL Standards - Data types - Database Objects – DDL – DML – DCL – TCL- Embedded SQL-Static Vs Dynamic SQL - QUERY OPTIMIZATION: Query Processing and Optimization-Introduction to NoSQL.

UNIT V

Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery –Media Recovery – Two Phase Commit - Save Points – SQL Facilities for recovery –Concurrency – Need for Concurrency.

Text Book

1. Korth. H and Abraham SilberSchatz, “Database Management Systems”, McGraw Hill,Sixth Edition ,2013.

References:

1. HioKumar Singh, “Database Systems Concepts, Designs and Application”, Pearson Education, Second Edition, 2012.
2. Pramod J. Sadalage and Martin Fowler ,”NoSQL Distilled:A Brief Guide to the Emerging World of Polyglot Persistence ”, Pearson Education,2012.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2			3			
CO3				4		
CO4			3			6
CO5		2				

Mean : $19/6 = 3.17$

Objective:

The aim of this course is to enable the students to create animation and cartooning using Flash and to familiarize the students with various approaches, methods and techniques of Animation Technology. On completion of this course the student will be able to develop flash animation and write Action Script of their own.

Course outcomes:

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

- i. Recognize Flash tools and create Objects with colors and text.
- ii. Illustrate key frames for animations like Tweening, Masking and Guide layers.
- iii. Build basic programs using Action Script.
- iv. Develop programs with functions and parameters.
- v. Create animation using various Objects.

UNIT I

Introduction to Animation - How flash works - Flash tool box - Creating Objects - Drawing characters for cartooning Editing objects - colors and texts - symbols and Instances - Bitmaps.

UNIT II

Frames and layers - Animations in Flash - Key frame animations, Tweened Animations - Motion tween, Shape tween - Guide Layers - Masking - Publishing Flash movies.

UNIT III

Action Script Basics - Constructing Action Script - Using Variables, Expressions and Operators, Bitwise Color, Flag variables.

UNIT IV

Working with functions - Passing parameters, Scope, Predefined functions.

UNIT V

Predefined Objects - Movie Clip and Button Objects, Math Objects, Stage Objects, Mouse and Key Objects, Sound Object - UI components.

Textbook:

1. "Adobe Flash professional CS6 Classroom in a Book", Adobe Creative Team, Adobe Systems Incorporated and its Licensors, Pearson Education, 2012.

References:

1. Sathish Jain , Madhulika Jain , “Adobe Flash professional CS5 Training Guide” , BPB Publications, 2011.
2. http://help.adobe.com/en_US/flash/cs/using/flash_cs5_help.pdf

Lab Component

1. Creating Objects, Colors and Text.
2. Frame-by-Frame Animation.
3. Usage of layers.
4. Symbols
 - a. Insertion
 - b. Editing
5. Tweened Animation
 - a. Motion Tween
 - b. Shape Tween
6. Animation using Guide layer.
7. Masking
8. Buttons
9. Sounds
10. Action Script.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4			3			
CO5						6

Mean : $15/5 = 3$

Objective:

The objective of this course is to train the students to build software development skills using Java programming concepts in real world applications. This course helps to understand applet, swings, database interaction through JDBC and JSP. On completion of this course the student will be able to create interactive website.

Course Outcomes:

At the end of the course the student will be able to:

- i. Identify the various features of Object Oriented Programming.
- ii. Illustrate OOP concept using Java application programs.
- iii. Apply reusability using inheritance, interfaces and packages.
- iv. Constructs Java programs to implement error handling technique and to create application software using JDBC.
- v. Build dynamic web application using JSP.

UNIT I

Fundamentals of Object oriented Programming: Basic Concept of Object Oriented Programming. Java features – Java Program Structure - JVM- Constants, Variable and Data types - Operators and Expression – Control Structures and Looping – Garbage Collection.

UNIT II

Classes, Objects and Methods: Constructors - Method Overloading – Nesting of Methods - Recursion – Access control - Static Function – Command line arguments - Inheritance: Types of Inheritance.

UNIT III

Method Overriding - Abstract class - Arrays and Strings. Interfaces: Extending Interfaces - Implementing interfaces Packages: Creating and using Packages – Accessing a Package.

UNIT IV

Managing Errors and Exception: Introduction – Types of Errors – Exceptions: Types of Exceptions. Multithreading – Applets: Life cycle of applet - AWT - Event handling - Managing I/O Files - Swings – JDBC.

UNIT V

JSP – Basics of JSP – Scripting elements – Implicit objects – Directive elements – Action elements – JSP processing model - Developing simple server page.

Text Books:

1. Balagurusamy “Programming with Java 5e A Primer”, Tata McGraw Hill 6th edition 2015.
2. Patrick Naughton and Herbert Schildt, “Java 2 The Complete Reference”, Tata McGraw Hill 7th edition 2014.

References

1. <https://www3.ntu.edu.sg/home/ehchua/programming/java/JavaServerPages.html>.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4						6
CO5						6

Mean : $18/5 = 3.6$

Objective:

The aim of this course is to enable the student to understand the fundamental techniques of java. It also helps them to use advanced concepts of java to build an application on their own.

Course Outcomes:

At the end of the course the student will be able to:

- i. Classify a simple application using Java programming.
- ii. Develop robust program using Exception Handling.
- iii. Implement many application software and enhance problem solving ability.
- iv. Create client server application using JDBC.
- v. Design a Dynamic web page using JSP.

Lab Components

1. Working with Array and flow control statement.
2. Demonstrate the concept of command line arguments.
3. Implementation of Inheritance.
4. String Manipulation using Char Array.
5. Creating program using Interface.
6. Implementing Thread based applications & Exception Handling.
7. Implementing File concept.
8. Creating application using Userdefin ed exception.
9. Database Creation
10. Creation of applet and passing parameter to Applet.
11. Creating client/server application using JDBC and Applet.
12. Creating client/server application using JDBC and Swings.
13. Creating Form using JDBC.
14. Working with Panel and Layout control.
15. Dynamic web site using JSP.
16. Mail web page using JSP.

	K1	K2	K3	K4	K5	K6
CO1		2				
CO2			3			
CO3			3			
CO4						6
CO5						6

Mean : $20/5 = 4$

Objectives:

This course will enable the student to have an overview on the components of the Operating systems. It will also provide knowledge on the principles of deadlock, design issues related to processor scheduling, process management, storage management and file management.

Course outcomes:

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

- i. Identify the components of operating systems, process and threads.
- ii. Summarize the process management concept for the given situation.
- iii. Relate the different memory management for the given situation.
- iv. Choose the page replacement algorithms and storage structure concepts.
- v. Categorize the file structures, and I/O systems.

UNIT I

Introduction: Views- Goals - OS Structure – Types of OS - Components - Services – System Calls - System Structure - System Design and Implementation. Process Management: Introduction - Process - Process Scheduling – Operations on processes – Co-operating Process – Inter-Process Communication. Threads: Multicore Programming - Multithreading Models.

UNIT II

Process Synchronization: The Critical-Section Problem - Mutex Locks -Semaphores - Classic Problems of Synchronization – Monitors. CPU Scheduling: Scheduling Criteria - Scheduling Algorithms. Deadlocks: Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

UNIT III

Memory Management: Introduction- Address Binding - Dynamic Loading and Linking - swapping - Contiguous Memory Allocation - Internal & External Fragmentation. Non-Contiguous Allocation: Paging and Segmentation Schemes.

UNIT IV

Virtual Memory: Demand Paging - Page Replacement - Page Replacement Algorithms - Thrashing. Mass Storage Structure: Disk Structure - Disk Scheduling - Disk Management- RAID Structure.

UNIT V

File System Structures - Access Methods - I/O System: Introduction - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Security: Protection, Access Matrix, and Access Control

Text Book:

1. Silberschatz Abraham, Galvin Baer Peter and Gagne Greg, "Operating System Concepts", Ninth Edition, 2012, John Wiley & Sons Pvt. Ltd.

References:

1. Tanenbaum S. Andrew, "Modern Operating Systems", Third Edition, 2011, Prentice-Hall, Inc
2. Stallings William, "Operating Systems", Seventh Edition, 2011, Pearson Education.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3		2				
CO4			3			
CO5				4		6

Mean : $18/6 = 3$

Objective:

This course enables the student to build simple and complex data structures by applying Object Oriented concepts. It also enables them to develop algorithms and write programs using Structures, Stacks, Queues, Lists and Trees. On completion of this course the student will be able to develop real time application.

Course Outcome:

At the end of the course, students will be able to

- i. Identify the storage mechanisms of data using Array and Stack.
- ii. Demonstrate the operation of Queue and Circular Queue using Array and Linked list.
- iii. Summarize the operations of single Linked list and double Linked list.
- iv. Apply traversal of Binary tree and Binary search tree in various applications.
- v. Analyze various sorting techniques to arrange data.

UNIT I

Introduction – Arrays – Strings – Stacks – Operations on Stack –Representation of Stacks using Array and Linked list - Infix - Prefix and Post fix notations - Evaluation of Post fix - Infix- Prefix expression- Applications of Stacks

UNIT II

Queues – Operations on queue -Representation of Queue using array and linked list –Circular Queue – Operation on Circular queue - Representation of Circular Queue using array and linked list

UNIT III

Linked List – Operations on linked list- Types of Linked List- Single Linked List- Operation on Single linked list - Double Linked list – Operations on Double Linked List

UNIT IV

Trees – Binary tree – Traversal of a Binary tree – Applications of Binary Tree - Binary Search Tree- Operations on Binary search tree – Applications of Binary search tree

UNIT V

Sorting - Bubble sort - Selection sort - Insertion sort - Quick sort - Merge sort –Search – Linear Search – Binary Search.

Text Book:

1. YashavantKanetkar “Data structures using C++”, BPB publications 2nd edition ,2016

References

1. “Data Structures using C”, P. Sudharsan and J. John Manoj Kumar, 3rd edition 2009.
2. SahniSartaj, “Data Structures using C++”, TMH 2nd edition 2012.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3		2				
CO4			3			6
CO5				4		

Mean : $18/6 = 3$

Objective:

This course will enable the student to understand RDBMS concepts using Oracle SQL and PL/SQL. It will also help them to understand the fundamentals of Transaction Processing, Query Processing and gain knowledge on Oracle Programming techniques. On completion of this course the student will be able to create their own database application.

Course Outcomes:

At the end of the course the student will be able to:

- i. Identify the database requirements and determine the entities involved in the system and their relationship to one another.
- ii. Summarize the relational algebra, functional dependencies and database normalization.
- iii. Build the database tables and make DML operations, functions and joins.
- iv. Create PL/SQL program for creating client server applications.
- v. Apply the Procedures, Functions, Packages, and Triggers for creating application software.

UNIT-I

Introduction to DBMS: Database System - System Application - Purpose of Database Systems- View of data - Instances and Schemas - Data models - Database languages - Data Independence - DBMS Architecture: Data models - Database System Architecture – Database users and Administrator – Entity–Relationship model – E-R Diagrams

UNIT-II

Introduction to Relational Model: Relational Algebra and Calculus: Relation Algebra - Selection and Projection - Set Operations – Renaming – Joins – Division - Relational Calculus - Codd Rules - Functional Dependencies – Normalization: 1NF, 2NF, 3NF, BCNF, 4NF – Denormalization.

UNIT - III

Introduction to SQL: DDL, DML, and DCL statements, Constraints, Various forms of SELECT: Simple, Using Special Operators for Data Access. Functions, Joins - Set Operations - Views.

UNIT IV

PL/SQL: Introduction to PL/SQL: PL/SQL blocks, Variables, Constants, Arrays - Control Structures – Nested Blocks – SQL in PL/SQL. Data Manipulation – Transaction Control

statements. PL/SQL Cursors Implicit & Explicit Cursors and Attributes – Cursor FOR loops-
Cursor with Parameters

UNIT V

Exceptions: – Types of Exceptions– Named Blocks Procedures – Functions – Packages –
Triggers –Data Dictionary Views.

Text Books

1. Korth. H and Abraham SilberSchatz, “Database Management Systems”, McGraw Hill, Sixth Edition, 2011.
2. Ivan Bayross, “SQL,PL/SQL, The programming language of Oracle” ,4th edition, BPB Publications, 2010.

References:

1. NileshShah ,” DATABASE SYSTEMS USING ORACLE”, 2nd edition, PHI. 2004.
2. ArunMajumdar&Pritimoy Bhattacharya, “DATABASE MANAGEMNET SYSTEMS” – 2007, TMH.
3. P. S. Deshpande, “SQL/PL SQL for Oracle 9i”, Reprint Edition, Dream Tech Press, 2008.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4						6
CO5			3			

Mean : $15/5 = 3$

Objective:

The Objective of this course is to train the student to create database using Oracle concepts. It also helps them to build database for real life application.

Course Outcomes:

At the end of the course the student will be able to

- i. Develop database using SQL.
- ii. Examine queries in SQL to retrieve any type of information from a data base.
- iii. Classify various functions available in SQL
- iv. Construct programming structure using PL/SQL.
- v. Build programs using Cursor and Procedure.

Lab Components:

1. Creating database tables and using data types.
Create table, Modify table, Drop table.
2. Practical Based on Data Manipulation.
Adding data with Insert, Modify data with Update, Deleting records with Delete.
3. Practical Based on Implementing the Constraints.
NULL and NOT NULL, Primary Key and Foreign Key Constraint, Unique, Check and Default Constraint
4. Practical for Retrieving Data Using following clauses.
Simple select clause, Accessing specific data with Where, Ordered By, Distinct and Group By
5. Practical Based on Aggregate Functions.
AVG, COUNT, MAX, MIN, SUM.
6. Practical Based on implementing all String functions.
7. Practical Based on implementing Date and Time Functions.
8. Practical Based on implementing use of union, intersection, set difference.
9. Implement Nested Queries & JOIN operation.
10. Practical Based on implementing use of triggers, cursors & procedures in PL/SQL.

	K1	K2	K3	K4	K5	K6
CO1			3			
CO2				4		
CO3		2				
CO4						6
CO5						6

Mean : $21/5 = 3.5$

Objective:

This course will enable the student to understand the various issues in constructing networks and to perceive what is important in the architecture design of networks. It also helps the student to understand the role of different layers of OSI and TCP/IP reference models, applications of network and also the different standards used between networks.

Course Outcomes:

At the end of the course the student will be able to:

- i. Identify the terminology and concepts of the basic communication and networking technologies.
- ii. Outline how communication works in data networks on both wired and wireless network.
- iii. Examine the role of protocols in networking and choose between various error detection and correction codes.
- iv. Interpret Ethernet types and various network hardware components, their roles and working.
- v. Utilize the role of network layer and modify different security and ethical issues in computer networking.

UNIT – I

Introduction to Computer Communications and Networking Technologies; Uses of Computer Networks; Network Devices – Nodes and Hosts; Types of Computer Networks and their Topologies; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; Network Applications and Application Protocols; Network Architecture and the OSI Reference Model; TCP/IP reference model

UNIT – II

Analog and Digital Communications Concepts: Representing Data as Analog Signals, Representing Data as Digital Signals; Digital Carrier Systems; Guided and Wireless Transmission Media; Switching and Multiplexing;

UNIT – III

Data Link Layer: Framing - Flow Control - Error Control; Error Detection and Correction; Media Access Control: Random Access Protocols - Token Passing Protocols; Token Ring; Introduction to LAN technologies:

UNIT – IV

Ethernet: Switched Ethernet – VLAN - Fast Ethernet - Gigabit Ethernet; Token ring; Wireless LANs; Bluetooth; Network Hardware Components: Connectors – Transceivers – Repeaters – Hubs - Network Interface Cards and PC Cards – Bridges – Switches – Routers – Gateways.

UNIT – V

Network Layer and Routing Concepts: Virtual Circuits and Datagrams; Routing Algorithms; Congestion Control Algorithms; Internetworking; Network Security Issues: Security threats; Encryption Methods; Authentication; Symmetric Key Algorithms; Public-Key Algorithms.

Text Book :

1. Andrew S. Tanenbaum, “Computer Networks”, Pearson Education, 5th edition, 2013.

References:

1. James F. Kurose, Keith W. Ross “Computer Networking : a top-down approach” ,7th edition, 2016.
2. Behrouz A Forouzan, “Data Communications and Networking”, McGraw Hill,5th edition, 2017

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3				4		
CO4					5	
CO5			3			

Mean : $15/5 = 3$

COS 2588 MICROPROCESSORS AND MICROCONTROLLERS 5Hrs/5 Cr

Objective:

This course is helps to familiarize the student with the basic Architecture of 8 bit and 16 bit microprocessors, addressing modes & instruction set of 8086 & 8051 and to introduce the need & use of Interrupt structure 8086 & 8051 and other microprocessors. It enables the student to develop skill on simple application development with programming 8086 and provides knowledge on commonly used peripheral / interfacing.

Course outcomes:

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

- i. Recognize 8086 microprocessor, its structure and registers.
- ii. Compare the software aspects of 8086 microprocessor with its pin configuration & signals.
- iii. Outline the multiprocessor configuration and certain I/O processors.
- iv. Analyze I/O interfacing, timers, programmable interrupt Controller and its Applications.
- v. Utilize the basics of 8051 microcontroller signals, instructions and interfacing with 8051.

UNIT I

THE 8085 AND 8086 MICROPROCESSORS: Introduction to Micro computer evolution of microprocessor - Software model – Data types –registers: Segment registers – Pointer and index registers-Status registers –Generating a memory address.

UNIT II

8086 SOFTWARE ASPECTS: Intel 8086 microprocessor - Architecture – Signals- Instruction Set-Addressing Modes-Assembler Directives- Assembly Language Programming – Procedures – Macros-Interrupts and Interrupt Service Routines-BIOS function calls.

UNIT III

MULTIPROCESSOR CONFIGURATIONS: Coprocessor Configuration – Closely Coupled Configuration – Loosely Coupled Configuration –8087 Numeric Data Processor – Data Types – Architecture –8089 I/O Processor –Architecture –Communication between CPU and IOP.

UNIT IV

I/O INTERFACING :Memory interfacing and I/O interfacing with 8085 – parallel communication interface –serial communication interface – timer-keyboard/display controller – interrupt controller –DMA controller (8237) – applications – stepper motor – temperature control.

UNIT V

MICROCONTROLLERS: Architecture of 8051 Microcontroller – signals – I/O ports – memory – counters and timers – serial data I/O – interrupts-Interfacing -keyboard, LCD,ADC &DAC.

Textbook:

1. Ramesh S. Gaonkar ,”Microprocessor – Architecture, Programming and Applications with the 8085”, Penram International Publisher , 5th Ed.,2006.

Reference Books:

1. Kenneth J.Ayala, “The 8051 microcontroller Architecture, Programming and applications” Penram international, third edition , 2012.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2				4		6
CO3		2				
CO4				4		
CO5			3			

Mean : $20/6 = 3.33$

Objective:

This course will enable the student to learn about cloud computing services, its types and architecture. It also helps them to gain knowledge on cloud computing applications, managing and working with cloud security. On completion of this course the student will be able to create an account and utilize various Cloud Services.

Course Outcomes:

At the end of the course the student will be able to:

- i. Understand the benefits of Cloud and its standards for deploying an application.
- ii. Provides the appropriate cloud computing services required to build and deploy the application.
- iii. Utilize the knowledge to manage and deploy virtual servers in an organization.
- iv. Examine the core issues such as security, privacy, and interoperability of cloud computing.
- v. Create applications by utilizing cloud platforms such as Google and Amazon Web Services.

UNIT I

Defining Cloud Computing: Definition - Cloud Types - Characteristics of Cloud Computing - Role of Open standards - Cloud Architecture.

UNIT II

Cloud Computing Stack: Composability - Infrastructure - Platforms - Virtual Appliances - Communication protocols - Applications – Connecting to the cloud - Cloud Services: Infrastructure as a Service - Platform as a Service - Software as a Service.

UNIT III

Identity as a Service - Compliance as a Service - Platforms: Load Balancing and Virtualization–Understanding Hypervisors - Cloud Security: Securing the Cloud.

UNIT IV

Securing the data - Moving applications to the cloud - Cloud Storage: Definition –Cloud storage - Cloud Backup solutions – Introducing Business Continuity and disaster Recovery – Understanding the threats

UNIT V

Moving applications to the Cloud - Case Study: Google Web Services, Amazon Web Services -Microsoft Cloud Services.

Text Book:

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley India Pvt. Ltd., 2012.

References:

1. Toby Velte,AnthonyVelte,RobertElsenpeter," Cloud Computing, A Practical Approach",McGraw Hill Education,2017.
2. Ray J Rafaels , "Cloud Computing: From Beginning to End",2015.

Web Resources:

- 1.<http://www.mb.net/resources/cloud-computing-resources.aspx>
- 2.<http://www.mastertheboss.com/cloud-computing/in-the-cloud-computing-a-beginners-tutorial>
- 3.<http://www.south.catttelecom.com/technologies/cloudcomputing/index.aspx>

	K1	K2	K3	K4	K5	K6
CO1		2				
CO2			3			
CO3			3			
CO4				4		
CO5						6

Mean : $18/5 = 3.6$

Objective:

The objective of this course is to enable the student to develop web pages using Mark up languages, PHP and MySql. It also gives exposure to maintain the websites developed. In completion of this course the student will be able to develop Dynamic Websites.

Course Outcomes:

At the end of the course, students will be able to

- i. Identify the basics of Internet programming using HTML and CSS.
- ii. Build webpages using client side scripting language like Javascript.
- iii. Explain functional elements of PHP.
- iv. Create Dynamic web page using PHP
- v. Design interactive web page using PHP and MYSQL

UNIT - I

Introduction to HTML : Document type, sections of HTML document, creating a HTML page –Tables – Links and Images: Adding Links, Adding Images –CSS: Introduction, Connecting CSS to a page, Targeting Styles, changing fonts, Adding borders, Creating Page layouts – Web Forms: Using Web Forms, Creating a form.

UNIT - II

Introduction to Javascript: Adding the JavaScript tag, Adding JavaScript to HTML pages, Using external JavaScript - Building a JavaScript program: JavaScript Programming, Functions, Objects – Adding jQuery: Introduction, Installing jQuery, Adding jQuery to a page, Working with HTML using jQuery.

UNIT - III

Introduction to PHP: Structure of PHP script, Syntax, Variables, Constants, Data types, Arrays – Building PHP scripts: Setting up conditions, Conditional Statements, Repeating Actions with Loop, Using Functions, Organizing Scripts.

UNIT - IV

PHP and Your Operating System: Managing Files, USING FTP, Reading and Writing Files – Object-Oriented Programming: Introduction, Developing object-oriented script, class, Using a

class, Handling Errors with Exceptions, PHP security: Securing the Server, Handling Errors Safely.

Unit – V

Introduction to MySQL: Understanding Database Structure, Communicating with MySQL, Administrating MySQL: Controlling Access to your Data, Backing Up your Database, Restoring Your Data – Designing and Building a Database: Designing a Database, Building a Database – Using the Database : Data Manipulations– Communicating with the Database from PHP scripts: PHP functions that Communicate with MySQL, Communicating with MySQL.

Text Book

1. Steve Suehring, Janet Valade, “PHP, MySQL, JavaScript & HTML5 All-in-One for Dummies”, John Wiley and Sons, Inc, 1st edition, 2013.

Reference Book

1. <https://www.w3schools.com/js/default.asp>
2. <https://www.w3schools.com/php/default.asp>
3. https://www.tutorialspoint.com/web_development_tutorials.htm

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2			3			
CO3		2				
CO4						6
CO5						6

Mean : $18/5 = 3.6$

Objective:

This course enables the student to analyze, estimate and design new software with quality standards. Exploring the Concepts of Software Engineering, software processes, paradigms, analysis and design strategies of requirements engineering provides the student management skills to work on real time applications. In completion of this course the student can be able to develop software products by using SDLC Models.

Course Outcomes:

At the end of the course the student will be able to:

- i. Recall the basic concepts of software engineering and will be able to analyze, estimate and design new software with quality standards.
- ii. Explain various concepts of requirement engineering and its validation provide better management skills for real time management.
- iii. To create a detailed system design through the system analysis for various designing purposes.
- iv. Design UML diagrams for better understanding of software system.
- v. Applying various types of testing concepts and implementation procedures with maintenance for quality assurance.

UNIT I

Software Characteristics – Introduction to Software Engineering – Factors Influencing quality and productivity – Software Process – CMM – PSP – TSP – Software Engineering Models – Cost Estimation – Feasibility Analysis – Software Project Management

UNIT II

System Engineering – Requirement Engineering – Requirements Documentation – Requirement Elicitation – Requirement Analysis and Negotiation – Requirement validation – Requirement Management

UNIT III

System Analysis – Information Flow Analysis – DSSD – OOA – Use Case Modelling – Class Modelling – Design Engineering — Creating Architectural Design – Modelling Component level design – User Interface design – Transform and Transaction Analysis – OOD

UNIT IV

Introduction - UML - Goals - Types of UML diagrams – Object Class diagram - Object diagram - Use case diagram - Sequence diagram - Collaboration diagram - Activity diagram - State chart diagram - Deployment diagram - Component diagram.

UNIT V

Testing principles- Testing strategies – Unit testing – Integration testing – White Box Test - Black Box Testing – OOTM – Domain Testing – Implementation – Software Maintenance – Issues in Maintenance – Software Quality and Quality Assurance .

Text Books:

1. Roger S.Pressmen, “Software Engineering A PractionersApproach”,Tata McGraw Hill, 7th Edition, 2017

References:

2. Richard Fairley, “Software Engineering”, Tata McGraw – Hill Education Private limited, 2nd edition, 2008
3. William Henry, “Effective Methods Of Software Testing”, International book house Pvt.Ltd, 2nd Edition, 2008
4. Richard Fairley, “Software Engineering Concepts” , Tata McGraw – Hill Education Private limited, 2012-Edition .

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3						6
CO4						6
CO5			3			

Mean : $18/5 = 3.6$

Objective:

This course aims at enabling the students to understand the streamlining of business processes and makes it easier and more efficient for companies to collect data and access information. It also covers the components of ERP technologies and benefits. In completion of this course the student will be able to understand the role of modern ERP tools in real life application.

Course Outcomes:

At the end of the course, students will be able to

- i. Illustrate data integrated model for any organization
- ii. Utilize the concept of ERP technologies and manufacturing perspective
- iii. Analyze the benefits of ERP modules and various ERP market tools
- iv. Assess the various phases in ERP implementation lifecycle.
- v. Elaborate the ERP procurement issues and analyze case studies of companies

UNIT I

Introduction to ERP- Its Evolution, its Growth, Its Advantages , Its need, Integrated Management information, Business Modeling, Integrated Data Model. Chain – Supply and demand chain -Extended Supply chain.

UNIT II

ERP and Related Technologies- BPR, MIS, DSS, EIS, Data Warehousing, Data Mining, OLAP . A Manufacturing Perspective-MRP, BOM, Closed Loop MRP,MRP-II,DRP,JIT and Kanban, CAD/CAM, PDM, Data Management, Benefits of PDM,MTO and MTS,ATO,CRM.

UNIT III

Benefits of ERP,ERP Modules – Finance, Plant Maintenance, Quality Management, Materials Management. ERP Market: SAP AG, People Soft, BAAN and ORACLE, JD Edwards.

UNIT IV

ERP Implementation Life Cycle – Pro-evaluation Screening, package Evaluation, Project planning phase, Gap – Analysis, reengineering, Configuration, implementation team-Training, Testing ,Going Live, END-User Training .Post implementation, Business Models and BAPIs. Convergence on Windows NT, Application platforms, New Business segment and Features

UNIT V

ERP Procurement Issues – Market Trends – Outsourcing ERP – Economics – Hidden Cost Issues – ROI – Analysis of cases from five companies.

Text Books:

1. Alexis Leon , “Enterprise Resource Planning” – Third Edition Tata McGraw-Hill, New Delhi, 2017
2. Alexis Leon, “ERP Demystified”, Tata McGraw Hill,2014

References:

1. Rahul V. Altekar “Enterprisewide Resource Planning”, Tata McGraw Hill,2013
2. Vinod Kumar Garg and Venkitakrishnan N K, “Enterprise Resource Planning – Concepts and Practice”, PHI,2012

	K1	K2	K3	K4	K5	K6
CO1		2				
CO2			3			
CO3				4		
CO4					5	
CO5				4		

Mean : $18/5 = 3.6$

Objective

This course aims at introducing various formats and components of audio and video. It also trains the student to enhance and edit a movie using different editing tools. On completion of this course the student will be able to create an effective audio and video with their own creativity.

Course Outcomes:

At the end of the course the student will be able to:

- i. Identify various formats of audio and video and design and create a simple video.
- ii. Infer an effective video by adding music, various video Effects and other editing effects.
- iii. Develop 3D text and other transition effects and mix audio and video files.
- iv. Choose different editing techniques by authoring tools for enhancing audio and video.
- v. Generate Titles, Labels for Video, Overdubs and Superimpose images.

UNIT I

Introduction to audio and video file formats – Loading clips – Creating a storyboard – Adding text to storyboard – Adding clips in the timeline – Adding video effects

UNIT II

Obtaining Music – Video editing – Video forms – Storyboards and music concepts

UNIT III

Creating 3D text effects and importing into a movie – Adding effects – Mixing audio and video files

UNIT IV

Adding digital effects – Using authoring tools for Audio and video enhancements

UNIT V

Adding titles – Sound overdubs – Narration – Superimposing images

Text Book:

1. “Adobe Premiere Pro CS6 Classroom in a Book”, 2013 by Adobe Creative Team, Adobe press

References:

2. http://help.adobe.com/archive/en/premiere-pro/cs6/premiere_pro_reference.pdf
3. <http://helpx.adobe.com/in/premeire-prp/user-guide.html>

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4					5	
CO5						6

Mean : $17/5 = 3.4$

Objective:

The objective of this course is to enable the student to understand the program concept such as functions, modules, files I/O, Exceptions, OOP concepts and My SQL database. It helps the student to create real world IOT application using Python.

Course Outcomes:

At the end of the course, students will be able to

- i. Identify python identifiers, data types, operators and expressions.
- ii. Explain tuples, list and dictionary concept.
- iii. Build application using functions, strings and date.
- iv. Create files, modules and user defined exceptions in applications.
- v. Generate innovative IOT application using oop concept with databases.

UNIT I

Introduction to Python: Introduction - Python overview - comments – Identifiers – Reserved keywords – Variables – Data types – Operators – Statements and Expressions – String operations – Boolean expressions- Control statements – Iteration statements – Input from keyword.

UNIT II

Tuple: Creating tuple – Accessing tuple – Tuple assignment – Tuple as return value – Basic tuple operators and functions – Lists: value & Accessing elements – Deleting elements from list – Built in list operators and methods Dictionaries : Accessing values in dictionary - Updating dictionary – Deleting elements from dictionary – Properties of dictionary keys – Built in dictionary functions and methods

UNIT III

Function: Built in Functions – User defined Functions – Python Recursive Function – Writing Python Scripting – Strings : Introduction – String handling functions – String formatting operator and functions - Date & time: Tick – Calendar module – Time module

UNIT IV

Files: Text file – Reading and writing files – Renaming and deleting files- Directories-File close – Flush – Exceptions: Exception with arguments – Assertions in python-User defined exceptions- Modules : import – from import – dir () functions – packages in python

UNIT V

Internet of things : Infrastructure – Applications –OOP:Classes& Objects: Introduction-Class Definition-creating Objects-Objects as a Arguments-Object as Return Values-Built in Class Attributes— MySQL: Database connection and manipulation statement.

Text Book:

1. Balagurusamy, “Introduction to Computing & Problem Solving Using Python”, McGraw Hill Education, 2016.
2. Ovidiuvermesan, Peter Friess “ Internet of Things – Converging technologies for smart environments and Integrated Eco systems”, River Publishers, 2013.

References:

1. Ashok namdevkamthane, Amitamthane “Programming and problem solving with python” McGraw hill 2017.
2. <https://www.tutorialspoint.com/python>
3. <https://www.w3schools.com/python>

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4						6
CO5						6

Mean : $18/5 = 3.6$

Objective:

This course enables the Students understand the fundamental concepts of .NET framework, Visual Basic.Net, ADO.NET to develop application e programs. This course also presents the detailed description of ASP.NET, Web service and ADO.NET and helps the student develop Dynamic Web Application.

Course Outcomes:

At the end of the course the student will be able to:

- i. Identify the fundamental concepts of .net framework.
- ii. Develop programs using VB.NET forms and controls.
- iii. Organize the procedures and structures of OOP to build forms.
- iv. Illustrate the concepts of database and its connections for program outputs.
- v. Create interactive web application including web services.

UNIT I

Introduction to .NET Evolution - .NET platform – advantage of .NET – working of .NET, - .NET framework – common language runtime (CLR) – Basic Architecture of .NET framework – common language specification

UNIT II

Introduction to VB.NET – Data types and operators – control statement – Arrays

UNIT III

Procedures and structures – OOPs in VB.NET – Delegates – Event Handling – Exception Handling – Working with forms

UNIT IV

Concept of Database – database models – overview of ODBC – Introduction to ADO.NET - ADO.NET component model - ADO.NET Architecture – windows application using ADO.NET – Advantages of using ADO.NET – Data access with XML – Crystal Report

UNIT V

Introduction ASP.NET – Features of ASP.NET, Structure of an ASP.NET webpage – using common web controls – Creating simple web applications – creating web application using database connectivity – web services

Text Book:

1. P. Radhaganesan, “VB.NET”, SCITECH Publication (India) Pvt. Ltd. 3rd Edition,2008.

References:

2. ShirishChavan, “Visual Basic .Net”, Dorling Kindersley(India)Private limited, 3rd Edition, 2009
3. Vikas Gupta, “.Net Programming”, Kogent Solutions Inc. 2007- edition
4. Mac Donald, Dan Mabbutt, Adam “ASP.NET “,Springer (INDIA) Private limited, 3rd Edition, 2011

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2			3			
CO3	1					
CO4		2				6
CO5						6

Mean : $19/6 = 3.17$

Objective

This course enables the student to understand the methodology for solving problem and preparing a report using the steps of software engineering. The course also aims at improving the project developments skills of the student by giving required lab practices. It helps to motivate them to work in emerging/latest technologies. It can also helps the student to develop ability, to apply theoretical and practical tools/techniques to solve real life problems.

Course Outcomes:

At the end of the course the student will be able to:

- i. Demonstrate the practical knowledge on the programming concepts studied.
- ii. Build innovative idea focusing on application oriented concepts.
- iii. Analyze in solving complex challenging problem.
- iv. Estimate windows and web application software with minimum complexities.
- v. Create quality application software using SDLC.

Based on case study the following lab components need to be done by student

1. Planning a problem
2. Analyzing the problem
3. Requirement analysis
4. Designing prototype
5. Table Design
6. Data Flow Diagram
7. Coding
8. Testing
9. Implementation
10. Maintenance

Suggested Case study topics:

Student has to take any one of the topic listed below other than he/she selected in Project Development lab I

1. Client/server application
2. Network Security
3. Embedded System
4. Image Processing

5. Data Mining
6. Distributed Networks
7. Software Engineering
8. Mobile Computing
9. Parallel And Distributed Systems
10. Grid Computing

Evaluation pattern

It adopts the evaluation pattern of a lab course of our college which contains 75% mark allotment for the continuous assessment using objective tests and 25%marks allotment for final case study report submission.

	K1	K2	K3	K4	K5	K6
CO1		2				
CO2			3			
CO3				4		
CO4					5	
CO5						6

Mean : $20/5 = 4$

Objective:

This course will enable the student to learn the basics of Wireless voice and data communications technologies. It also enables the student to gain knowledge about android OS and iOS applications. On completion of this course the student will be able to develop their own mobile application.

Course Outcomes:

At the end of the course the student will be able to:

- i. Identify the concept of wireless transmission, signal propagation and different multiplexing techniques.
- ii. Summarize different wireless technologies such as CDMA, GSM, GPRS and Bluetooth.
- iii. Explain the android platform, its architecture and features.
- iv. Develop Android application and organize user interface and activity for Android app.
- v. Design and Implement basic iPhone Application and improve the environmental setup, app contents and compilations of Phone Gap.

UNIT I

Introduction – Wireless transmission – Frequencies for radio transmission, Signals, Signal propagation, Multiplexing, Modulation, Spread spectrum.

UNIT II

Medium Access Control: Motivation for a specialized MAC - SDMA – FDMA – TDMA – CDMA. Wireless Technologies: GSM – GPRS – Bluetooth.

UNIT III

Overview of Android OS: Features of Android, Android Applications - Environment Setup: Setup JDK, SDK, Eclipse IDE, ADT, Create Android Virtual Device – Architecture: Linux Kernel, Libraries, Android Runtime, Application Framework, Applications

UNIT IV

Application Components: Activities, Services, Broadcast Receivers, Content Providers, Additional Components – Hello World Example: Create Android Application, Anatomy of Android Application, The Main Activity File, The Manifest File, The Strings File, The R File, The Layout File, Running the Application.

UNIT V

Getting Started: Registering as an Apple Developer, Apple iOS Developer Program – Environment Setup: Interface Builder, iOS simulator – Objective C: Interface and implementation, Object Creation, Methods, Important data types in Objective C, Printing logs, Control Structures, Properties, Categories, Arrays, Dictionary – First iPhone Application, PhoneGap Overview: Introduction, Environment Setup, App Contents – App Compilation

Text Book:

1. Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, Second Edition, 2009.

References:

- 1.http://www.tutorialspoint.com/android/android_tutorial.pdf
- 2.http://www.tutorialspoint.com/ios/ios_tutorial.pdf
- 3.http://www.tutorialspoint.com/phonegap/phonegap_tutorial.pdf

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3		2				6
CO4			3			
CO5						6

Mean : $20/6 = 3.33$

COS3588 BUSINESS INTELLIGENCE AND DATA ANALYTICS 5Cr/5Hrs

Objective:

This course enables the student to learn the basics of Data mining, Data warehouse concepts and Big data. It aims at improving the timeliness and quality of information. On completion of this course the student will be able to develop business skill such as globally access information, Easy-to-use reporting, the ability to respond with speed and agility to change business condition.

Course Outcomes:

At the end of the course, students will be able to

- i. Classify steps in data mining process, functionalities and data mining techniques.
- ii. Apply association rule mining in various data mining application.
- iii. Examine multidimensional model to create data warehouse.
- iv. Appraise data warehouse implementation and map data house to multiprocessor architecture.
- v. Utilize the concept of big data to predict analysis and report.

UNIT I

Databases - Data Mining Functionalities - Steps in Data Mining Process - Architecture of a Typical Data Mining System - Classification of Data Mining Systems - Overview of Data Mining Techniques.

UNIT II

Data Mining Functionalities - Association Rule Mining - Mining Frequent Item sets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT III

Data Warehousing - Operational Database Systems vs. Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases – Data Warehouse Architecture

UNIT IV

Data to Multiprocessor Architecture - OLAP Operations – Need - Categorization of OLAP Tools Warehousing Components - Data Warehouse Implementation - Mapping the Data Warehouse

UNIT V

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

Text Book:

1. Jiawei Han and MichelineKamber, “Data Mining Concepts and Techniques” Second Edition, Elsevier, Reprinted 2012

References:

2. BERSON, ALEX & SMITH, STEPHEN J, “Data Warehousing, Data Mining, and OLAP”, TMH Pub.Co. Ltd, New Delhi, 2012.
3. PRABHU “DataWarehousing, PHI Learning Private Limited” New Delhi, 2012.
4. PONNIAH, PAULRAJ, “DataWarehousing Fundamentals”, JohnWiley& Sons, New Delhi, 2011.
5. Michael Minelli, Michele Chambers ,AmbigaDhira, “Big Data, BigAnalytics Emerging Business Intelligence and Analytic Trends for Today's Businesses,”, Wiley Publications,2013.

	K1	K2	K3	K4	K5	K6
CO1		2				
CO2			3			
CO3				4		
CO4					5	
CO5						6

Mean : $20/5 = 4$

Objective:

This course design on environment and sensitizing student of all disciplines to environmental issues presently comes within the mandate of all graduation courses in India. With this mind, this course is designed with an aim to create awareness of environment and pollution to student. This prevention various aspects of environment like ecosystem, methods of protecting environment, bioremediation, biochemical cycles and occupational hazards

Course Outcome:

At the end of the course student will be able to do

- i. Identify the structure of eco system human lives in.
- ii. Categorize different species that lives along in our eco system.
- iii. Assess the importance behind renewable forms of energy and necessity to implement it.
- iv. Discover the role of various technologies that are useful in sensing environmental impacts.
- v. Carry out the disposal and recycling of e-wastes.

UNIT I

Introduction – Terms and Definitions – Scope and history of Ecology - Ecosystem– Types and functions of structural components – Abiotic-atmosphere-lithosphere-hydrosphere – light and temperature – Biotic-Organisms –tropic levels – and interactions among organisms - food chains – food-web-ecological pyramids

UNIT II

Bio diversity: definition –genetics-species and ecosystem diversity-biodiversity at global national and local levels- conservation methods -patents-bio safety protocol.

UNIT III

Energy sources: renewable and non-renewable energy sources renewable: energy from biomass-gobar glass plant-solar-wind-water-tidal energy. On-renewable energy: fossil fuels-coal-crude oil and natural gas-oil - nuclear energy-geothermal energy ocean thermal energy-bio fuels. Role of technology in environmental protection.

UNIT IV

Environmental surveillance: pollution types -air pollution –global warming-ozone hole –rain-smog and CFC –water pollution-BOD-COD-eutrophication-thermal pollution-oil pollution-

noise pollution-sources and effects-nuclear pollution-sources of radiation-biological effects of radiation –solid waste pollution-pollution control. Water treatment and waste management.Computers and environment - remote sensing - maps and environmental impact assessment.

UNIT V

E-waste – toxic constituents – pollution problems – health impact of hazardous waste – reuse and recycling – collection process - separation process - e-waste recycling act – e-waste policy for India.

Text Book:

1. Rana, SVS, Essentials of ecology and environmental sciences, Prentice Hall of India Pvt.Ltd., Edition 5th 2013

Reference Books:

1. Enger, ED and ROSS,F, Concepts in biology, Tta McGraw hill Publishing company limited, 2017.
2. Jogdand.N. Environmental bio technology- industrial pollution management, Himalaya publishing house, Bombay, 2010

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2				4		
CO3					5	
CO4				4		
CO5			3			

Mean : 17/5 = 3.4

Objective:

This course is intended to provide an introduction to firewalls and other network security components that can work together to create an in-depth defensive perimeter around LAN. This course also provides knowledge on other elements like packet filtering, encryption, proxy servers and virtual private networks. In completion of this course the student will be able to secure a network.

Course Outcome:

At the end of the course, students will be able to

- i. Identify various goals of information security, building security policy.
- ii. Interpret Firewall types and its functions.
- iii. Apply various Packet Filtering rules to control network access.
- iv. Classify encryption and decryption techniques to solve problems based on confidentiality.
- v. Assess how a secure connection is established between different users using VPN.

UNIT I

Security Policy : Overview - Goals of security policy – Steps to build security policy

UNIT II

Firewall : Types – Limitations – Architecture – Functions – Advantages and Disadvantages of Firewall

UNIT III

Packet filtering : Approaches – Packet filter rules - Proxy server – Overview – Goals – Choosing proxy server - Authenticating users

UNIT IV

Encryption :Cost of encryption – Preserving data integrity – Maintaining confidentiality - Digital Certificates – Public and Private keys – Encryption schemes

UNIT V

Virtual Private Network : Components – Operations – Advantages and Disadvantages – Types of VPN – VPN setup

Text Book:

1. William Stallings, "Cryptography & Network Security Principles & Practice", 7th Edition, Pearson Education, Incorporated, 2016.

Reference Books

1. Holden, "Guide to firewalls and Network security", Vijay Nicole publications, 2005
2. Christopher M King, Curtis E. Dalton, T. Ertem Osmanoglu, "Security Architecture Design, Deployment & Operations", Osborne/McGraw-Hill, 2001

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4				4		
CO5					5	

Mean : $15/5 = 3$

COS 2581 INTRODUCTION TO PROGRAMMING IN C(TL)

5Hrs/4Cr

Objective

This subject will enable the student to understand the concepts of C programming language and gain knowledge on algorithms, flowcharts and logical thinking. On successful completion of this course the student will have the programming ability in C Language, and develop software application using C.

Course Outcomes

At the end of the course the student will be able to:

- i. Recognize the basic data types and control statements in C.
- ii. Summarize the concept of arrays and strings in C.
- iii. To create efficient program using functions to implement reusability.
- iv. Apply the structures in making application software
- v. Generate files and use preprocessor for real world application.

UNIT I

History of C – The C Character Set – Tokens – Identifiers – Keywords – Data Types – Constants - Variables – Operators – Structure of a C program – Formatted input/output functions – Unformatted input/output functions – Data Type Conversions – Control statements – Looping statements.

UNIT II

Arrays – Declaring Arrays – Accessing array elements – Initializing Arrays – Types of Arrays – Strings – String Library Functions.

UNIT III

Functions – Function Prototyping – Return statement – Nested functions – Types of functions – Recursion – Storage classes – Command line arguments – Pointer – Initialization of Pointers – Pointer Arithmetic – Pointers and Arrays – Pointers to Functions – Pointers to Pointers – Passing values to functions – Passing arrays to functions – Memory allocation.

UNIT IV

Structures – Declaration – Definition – Initialization – Nested Structures – Array of Structures – Structures and functions – Structures and pointers – Bits field – Unions.

UNIT V

Files – fscanf() and fprintf() – Character I/O from files –String I/O from files – Error Handling during I/O – Random Access – The Preprocessor.

Text Books:

Balagurusamy.E, ” Programming in ANSI C”, Eighth Edition, Tata McGraw Hill-2019.

References:

1. Kanetkar Y, “Let us ‘C’ “, 16th edition BPB publications, 2017.
2. Ashok N.Kamthane , “Programming in C” , Pearson Education, 2012.

	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3						6
CO4			3			
CO5						6

Mean : $18/5 = 3.6$

COS 2482 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING USING C++ (TL) 5 Hrs/ 4 Cr

Objective:

This course aims at enabling students to understand the basic knowledge of object oriented programming concepts and to understand the idea of C++ streams, templates and error handling concepts. On completion of this course the student will be able to create application software with minimum complexity and more reusability.

Course Outcomes:

At the end of the course the student will be able to:

- i. Compare the procedural and object oriented paradigm.
- ii. Identify the solution for the problems by using OOP.
- iii. Apply the inheritance and polymorphism concept for developing application software.
- iv. Develop programs using file concepts for real world software projects.
- v. Create robust applications using exception handling and templates.

UNIT I

Introduction to OOP: Object oriented paradigm – OOPs Features – Applications of OOP – Classes and Objects: Accessing class members – Defining member function – Passing objects as arguments – Returning objects from functions – Friend Function – Static data member - Static member functions - Inline Function - Function Overloading.

UNIT II

Constructor and Destructor functions: Types of Constructors – Characteristics of Constructor and Destructor - Operator overloading: Overloading unary and binary operators – Overloading with friend function – Rules for overloading operator.

UNIT III

Inheritance: Types of Inheritance - Advantages and Disadvantages of Inheritance – Run time Polymorphism - Virtual Function - Pure Virtual Functions – Virtual Base Class – The this pointer – New and Delete Operator.

UNIT IV

C++ Streams: – Unformatted I/O Operations – Formatted Console I/O Operations - I/O Manipulators – File Handling – Error Handling Function - EOF – File Modes – Command line argument.

UNIT V

Exception Handling: List of Exceptions – Handling Uncaught Exceptions – Templates: Class Templates - Function Templates - Member function Templates - Class Templates and Inheritance.

Text Book:

1. Balagurusamy.E, “Object Oriented Programming with C++ “, Seventh Edition -Tata McGraw Hill – 2017.

References:

1. Kanetkar Y, “Let us ‘C’ “, 16th edition BPB publications, 2017,
2. Ashok N.Kamthane, “Object Oriented Programming with ANSI & Turbo C++”, Pearson Education, 2012.

	K1	K2	K3	K4	K5	K6
CO1		2				
CO2	1					
CO3			3			
CO4			3			
CO5						6

Mean : $15/5 = 3$