



C. U. SHAH UNIVERSITY Wadhwan City

FACULTY OF:- Computer Science
DEPARTMENT OF:- MCA
SEMESTER:- -IV
CODE:- - 5CS04ORT1
NAME:- OPERATIONS RESEARCH

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS04ORT1	Operations Research	4	0	0	4	4	30	1.5	70	3	---	---	---	100

Objectives:-

- To study the numerical methods to solve transcendental equations The course is intended to provide basic understanding of Operation Research Techniques of strategic decision planning for optimum utilization of constraint resources in various span of human life viz. industry, business, commerce, administration, management, service supply, maintenance, agriculture, medicines and healthcare, defense etc.
- The students will learn purpose, importance and applications of optimization techniques of Operation Research and will be able to design and construct suitable optimization models to solve real life strategic problems – issues.
- It is expected to emphasis on the algorithmic approach rather than on theoretical side.
- Mathematical derivations are not included for any topic identified

Prerequisite:- None

Course Outline:-

Sr. No.	Course Content	Hours
1	Introduction to OR Concepts, genesis, Art of modeling, components of model, Types of OR models, effect of data availability on modeling, Computations in OR, Phases of OR study	05
2	Linear Programming Problem (L.P.P.) Linear Programming Problem (L.P.P.), Mathematical definition of a L.P.P. with its components: objective function and constraints, optimal solution, slack, surplus and artificial variables, Graphic method, Simplex method, Big – M method, Primal & Dual problem definition	07



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3	Transportation & Assignment problems: Concepts, formulations of models, Solution procedures, Optimality checks, Balanced/Unbalanced, Maximum/Minimum problems, Prohibited case –degeneracy	06
4	Theory of Games Introduction, Two – Person Zero Sum game, Pure strategies (Minimax & Maximin principles) Games with saddle point, Rules to determine saddle point.	04
5	Theory of Queues Introduction, Queuing system and problem, transient and steady states, traffic intensity, probability distributions in queuing systems, single service queuing model.	04
6	Network Analysis : Network Definition, Minimal spanning tree problem, Shortest route problem, Maximal flow problem concepts and solution algorithm as applied to problems. Project planning and control by CPM network, Probability assessment in PERT network.	07
7	Simulation Introduction, applications, Monte-Carlo Method, Simulation using Computers	02
8	Management of Replacement Definition, replacement of items that deteriorates, replacement of item that fails completely	04
9	Production scheduling (job sequencing) Introduction, Johnson’s algorithm for n jobs 2 machines, Johnson’s algorithm for N jobs m machines, 2 jobs m machines using graphical method.	04
10	Management of Inventory Introduction and terminology of the inventory management Single Item Inventory Control Models without Shortages Model –I : EOQ model with constant rate of demand Model – II : EOQ model with different rate of demand.	05

Learning Outcomes:

- Proficiency with tools from optimization, probability, statistics, simulation, and engineering economic analysis, including fundamental applications of those tools in industry and the public sector in contexts involving uncertainty and scarce or expensive resources.
- Facility with mathematical and computational modeling of real decision-making problems, including the use of modeling tools and computational tools, as well as analytic skills to evaluate the problems.
- Facility with the design, implementation, and analysis of computational experiments.

Teaching & Learning Methodology:

- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.



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Books Recommended:

- “Operations Research – Theory and Application”, **J. K. Sharma**, 4th Edition, Macmillan Publishers India Ltd.
- “Quantitative Techniques in management”, **N.D. Vora** – Tata McGraw Hill
- “Operations Research – An Introduction – Fifth edition”, **Hamdy A Taha**- Prentice Hall of India
- “Principles of Operations Research: With Applications to Management Decisions”, **Wagner, H.M.** , Prentice-Hall of India, New Delhi, 1982.



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FACULTY OF:- Computer Science
DEPARTMENT OF:- MCA
SEMESTER:- IV
CODE:- 5CS04WAD1
NAME:- WEB APPLICATIONS DEVELOPMENT

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS04WAD1	WEB APPLICATIONS DEVELOPMENT	4	-	-	4	4	30	1.5	70	3	---	---	---	100

Objectives

- The internet has drastically changed the way we communicate. As web technology dissolves the world's borders, a new "global community" has emerged.
- The course will focus on methods of using interconnected networks to effectively distribute text and information.
- Students will learn and implement HTML to construct a website with consideration to course topics.
- We seek an advanced mastery of web-development techniques that use databases to create content—HTML form objects, database connections, and server-side programming. We will use open-source MySQL as our database, structured query language (SQL), and PHP for programming.

Prerequisites

- The course is for advanced students with career or program-related needs for Web applications training.
- Students should be familiar with Windows operating systems and with technology for static web pages

Course Outline

Sr. No.	Course Contents	Hours
1	Introduction to Javascript Introduction to Javascript, Features, Writing Methods in HTML, Data Types, Variable Creations, Array, Operators, Conditional Checking, Looping Structures, UDF, Dialog Boxes, Built-In Objects (String, Math, Date), Cookies.	08
2	Introduction to PHP Introduction to PHP, Features, Installation of IIS, Variable Declaration (Static, Global), Operators and Expressions, Decision Making, Looping Structures, Arrays, UDF (argument function, default function, return function), Variable Functions (Gettype, settype, intval, print_r, strval, floatval, isset, unset) String Functions, Math Functions, Date Functions, Array Functions, Miscellaneous Functions, File Handling Functions.	08



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3	Component of PHP PHP Regular Expression, Cookies, Session, GD Library	05
4	XML with PHP Introduction to XML, XML Document Structure, Creating XML File, Root and Child Node concept, XML Elements and Attributes, The SimpleXML Extension.	05
5	Database Programming Introduction to MySQL (Using PHP MyAdmin), PHP MySQL Connectivity, Basic Connection Functions, Handling Server Errors, Creating Database, Tables, Insert Data into Tables, Retrieving data from MySQL, Retrieving Fields	06
6	Object Oriented Programming Introduction to OOP, Classes, Objects, Inheritance, Constructor, Serialized Object, Overloading, Encapsulation	08
7	AJAX with PHP Introduction to AJAX, Server Side Scripting Technology, Request and Response Concept, Creating Web Page with AJAX, AJAX with Database	08

Learning Outcomes:

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

- Write server-side scripts in the PHP language that process data from online forms and access MySQL databases to create dynamic Web pages.
- Design and create 3-tier Web applications using PHP and MySQL.

Teaching & Learning Methodology:

- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.

Books Recommended:

- “Html, Dhtml, Javascript, Perl Cgi”, **Ivan Byros**, Bpb Publication
- “PHP and MySQL Web Development—Fourth Edition”, **Luke Welling and Laura Thomson**. Addison-Wesley.
- “Programming with Java”, **Bhave**, Pearson Education
- “PHP for the Web: Visual QuickStart Guide”, **Ullman**, Pearson Education



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FACULTY OF:- Computer Science

DEPARTMENT OF:- MCA

SEMESTER:- -IV

CODE:- - 5CS04ADB1

NAME:- – ADVANCED DATABASE MANAGEMENT SYSTEM (ADBMS)

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme								
		Th	Tu	Pr	Total		Theory				Practical (Marks)				Total
							Sessional Exam		University Exam		Internal		University		
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr		
5CS04ADB1	ADVANCED DATABASE MANAGEMENT SYSTEM	4	0	0	4	4	30	1.5	70	3	---	---	---	100	

Objectives:

- This course is designed to make student aware about advanced areas and concepts related to DBMS for designing and implementing database systems using the capabilities of PLSQL.

Prerequisites:

- Familiar with fundamental concepts of DBMS.
- Database designing and retrieving using SQL.

Course Outline

Sr. No.	Course Contents	Hours
1	Database Architecture and Managing Data Storage Database User and Administrators, DBMS Component Modules Database System Utilities, Memory Hierarchy and Storage Devices Storage of Databases, Buffering of Blocks, Placing File Record on Disk Files of Ordered Records and Unordered Records	08
2	Indexing and Database Security Types of Single Level Ordered Indexes, Primary Index, Cluster Index, Secondary Index, Multilevel Index, Database Security and its Issues, Granting and Revoking Privileges using SQL, Encryption , Public Key Infrastructure (PKI)	12
3	Transaction Concepts and Concurrency Introduction to transaction, overview of transaction execution, Transaction States, Transaction Properties, Transaction Log (Transaction Journal), Concurrency Control Transaction Execution and Problems of Concurrency, Transaction Execution and Control with SQL	10



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4	Transaction Processing and Execution Concurrent Execution of Transaction (Reasons of Concurrent Execution, Schedule, Serial and Non Serial Schedule), Serializability (Conflict and View Serializability) Recoverability of Schedules (Recoverable Schedule and Cascade-less Schedule) Locking: Lock Granularity, Levels of Locking, Types of Locking, Two-Phase Locking Protocol (2PL), Deadlock: Definition, Deadlock Prevention, Deadlock Detection and Deadlock Avoidance	10
5	Database backup and Recovery Need of Database backup, Database backup techniques, Types of Database failures Types of Database recovery (Forward recovery, Backward recovery, Media recovery), Recovery techniques (Deferred Update, Immediate update, Shadow Paging, Checkpoints)	08

Learning Outcomes:

- To familiarize the students with advance concepts of DBMS.
- To give overview of emerging database technologies.
- Knowledge of handing multiple transactions effectively.
- Database backup and recovery techniques.

Teaching & Learning Methodology:

- Class room and laboratory teaching using teaching and learning tools like multimedia projector, overhead projectors etc.

Books Recommended:

- “Fundamentals of Database Systems”, **Elmsari, Navathe**, 5th Edition, Pearson Education (2008)
- “Database System Concepts”, **Silberschatz, Korth, Sudarshan**, 5th Edition, McGraw Hill Publication

Additional Reference Book(s)

- “An Introduction to Database Systems”, **C J Date, A Kannan, S Swaminathan**, 8th Edition, Pearson Education (2006)
- Database Management Systems, **Ramakrishnan, Gehrke**, , McGraw Hill, Third Edition.



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FACULTY OF:- Computer Science

DEPARTMENT OF:- MCA

SEMESTER:- -IV

CODE:- - 5CS04SEN1

NAME:- – SOFTWARE ENGINEERING (SE)

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS04SEN1	SOFTWARE ENGINEERING (SE)	4	0	0	4	4	30	1.5	70	3	---	---	---	100

Objectives:

- To be able to understand the concepts of Designing Software.

Prerequisites:

- Knowledge of Basic System Analysis and Design

Course outline:-

Sr. No.	Course content	No. of Hours
1	Introduction to Software Engineering, Process and Process Models Introduction to Software Engineering, Evolving Role of Software, Legacy Software. A Layered Technology, A Process Frame Work, The Process Pattern. Prescriptive Models, The Waterfall Model, V-Model, The RAD Model, Incremental Model , Spiral Model , Prototype Model , Component-Based Development model	10
2	Requirements Engineering Problem Recognition, Requirement Engineering tasks, Processes, Requirements Specification, Use cases and Functional specification, Requirements validation, Requirements Analysis, Modeling – Data Modeling, Behavioral Modeling	10
3	Object Oriented Analysis and Design Object Oriented Analysis Concept, Domain Analysis, Generic Concept of Object Oriented Analysis Model, Object Oriented Analysis Process, Object Relationship Model, Object Behavior Model. Design of Object Oriented System, The System Design Process, Object Design and System Design Process	10
4	Testing Strategies and Tactics A Strategic Approach to Software Testing (Verification and Validation) Strategic Issues, Validation Testing (Criteria, Configuration Review, alpha and beta Testing), The art of Debugging (Debugging Process, Strategies, Correcting the Error) , Software Testing Fundamentals, Black Box and White Box Testing, Object Oriented Testing Methods.	10



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5	Clean Room Software Engineering and Component Base Software Engineering The Clean Room Approach, Functional specification, Clean room specification, Clean room design, Clean room testing, Engineering of component based systems, The component based software engineering process, Domain engineering, Component based development Classifying and Retrieving Components	08
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Learning Outcomes:

- He/She should be able to understand and appreciate the Web Technology.
- He/She should be aware of the working and architectural Web Site.
- He/She should be able to solve problems given to him/her using PHP efficiency.

Books Recommended:

- “Software Engineering – A practitioner’s Approach”, **Roger S. Pressman**. 6th Edition.
- “Object Oriented Analysis and Design” **Gooch**
- “Fundamentals of Software Engineering”, **Rajib Mall**.



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FACULTY OF:- Computer Science
DEPARTMENT OF:- MCA
SEMESTER:- IV
CODE :- 5CS04PYP1 (MAJOR ELLECTIVE – I)
NAME – PYTHON PROGRAMMING

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme								
		Th	Tu	Pr	Total		Theory				Practical (Marks)				Total
							Sessional Exam		University Exam		Internal		University		
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr		
5CS04PYP1	PYTHON PROGRAMMING	4	0	2	6	5	30	1.5	70	3	10	---	40	150	

Objectives:

- To able to develop, automate, and test applications and systems using one of the open source programming language.

Pre-requisites:

- Students should have prior programming experience and be familiar with basic concepts such as variables/scopes, flow-control, and functions.
- Prior exposure to object-oriented programming concepts is not required, but definitely beneficial.

Course outline:-

Sr. No.	Course Contents	Number of Hours
1	The Python Language: Lexical Conventions and Syntax, Types and Objects, Operators and Expressions Flow Control and Exceptions, Modules	12
2	Python's Programming Paradigms: Imperative/Procedural/Scripting, Functional Programming, Object Oriented Programming	15
3	Working with Python: Tools and Environment	10
4	The Python Library: String and Text Handling, Data Structures and Algorithms, Graphical Programming	11



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List of Practical:

Sr. No.	Course Contents
1	Write a program in Python to define a list.
2	Write a program in Python to add elements to a list.
3	Write a program in Python to access sub lists.
4	Write a program in Python to search within lists.
5	Write a program in Python to delete elements from a list.
6	Write a program in Python to use mathematical Operators and lists.
7	Open a terminal. What directory are you in? List the files in your current directory. Make the following new directories - 'folder1/folder2/folder3'. Navidgate to folder2 and create a file "catted.txt" using cat with the words "I made this!." Delete folder1, folder2 and folder3.
8	Create a list of cubes for all the positive inteters less than 10 (i.e. [1,8,27,...,729]) using a) a for loop and b) a list comprehension.
9	Find all the characters that are used exactly once in the sentence "A person who never made a mistake never tried anything new". Ignore case, so 'A' and 'a' would be counted as 2 occurrences of 'a'.
10	Find the second largest number in this list [9, 61, 2, 79, 58, 87, 68, 83, 61, 13]
11	Write a program that generates this list [0,1,2,3,4,5,5,4,3,2,1,0]. Your program should only contain a single integer.
12	Write a program that uses while and raw_input and simply repeats the question "who wins?" until you type the words "you win".
13	Write a program that produces these 2 lines of output from range(1,11): 0001 0002 0003 0004 0005 6.00 7.00 8.00 9.00 10.00
14	Write a program that starts with range(1, 6) and ends up with this string '1-one-thousand-2-one-thousand-3-one-thousand-4-one-thousand-5', using a list comprehension, the str() function and a string join.
15	Write a function that returns the cumulative sum of numbers in a list. For example, if the function is given the list [1,2,3,4,5], it should return the list [1, 3, 6, 10, 15].
16	Write a function fib that generates the first n Fibonacci numbers. The Fibonacci numbers are the sequence [1,1,2,3,5,8,13,...], where each successive number is the sum of the two preceding numbers.



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17	Write a program that takes two arguments, your first name, and your age, and then prints out your name and the year you were born.
18	Write a program that takes a number on the command line and calculates the log, square, sin and cosine, and writes them out in a csv file.

Learning Outcomes:

- Open source software programming language

Books Recommended:

- “Exploring Python”, **Timothy Budd**, Tata McGraw Hill Publication.
- “Practice of Computing using Python 2nd Edition”, **William F. Punch & Richard Enbody**, Pearson Publication.
- “Introduction to Computing and Programming using Python 3rd Edition”, **Guzdial & Ericson**, Pearson Publication.
- “Object-Oriented Programming in Python, 1/E”, **Goldwasser & Letscher**, Prentice Hall



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FACULTY OF:- Computer Science
DEPARTMENT OF:- MCA
SEMESTER:- -IV
CODE :- 5CS04DIP1 (MAJOR ELLECTIVE – I)
NAME – DIGITAL IMAGE PROCESSING

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS04DIP1	DIGITAL IMAGE PROCESSING	4	0	2	6	5	30	1.5	70	3	10	---	40	150

Objectives:

- The objective of this course is to the objective of this course is to introduction to fundamentals concepts and algorithms for image processing and to can be utilized the knowledge for further research in study.
- To understand enhancing image characteristics, filtering, reducing, blurring, effects of noise, and image representations.

Pre-requisites:

- Fundamentals knowledge to implement mathematical functions for computer graphics.

Course outline:-

Sr. No.	Course Contents	Number of Hours
1.	Fundamentals of Image Processing Image Acquisition, Image Model, Sampling, Quantization, Relationship between pixels, distance measures, connectivity , Image Geometry, Photographic film. Histogram: Definition, decision of contrast basing on histogram, operatio ns basing on histograms like image stretching, image sliding, Image classification. Definition and Algorithm of Histogram equalization.	06
2.	Image Transforms A detail discussion on Fourier Transform, DFT,FFT, properties. A brief discussion on WALSH Trans form , WFT, HADAMARD Transform, DCT.	08



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3.	<p>Image Enhancement</p> <p>Arithmetic and logical operations, pixel or point operations, size operations, Smoothing filters-Mean, Median, Mode filters – Comparative study. Edge enhancement filters – Directorial filters, Sobel, Laplacian, Robert, KIRSCH Homogeneity & DIFF Filters, prewitt filter, Contrast Based edge enhancement techniques. – Comparative study, Low Pass filters, High Pass filters, sharpening filters. – Comparative Study, Comparative study of all filters, Color image processing.</p> <p>Image enhancement : (By FREQUENCY Domain Methods) -esign of Low pass, High pass, EDGE Enhancement, smoothening filters in Frequency Domain. Butter worth filter, Homomorphic filters in Frequency Domain Advantages of filters in frequency domain, comparative study of filters in frequency domain and spatial domain.</p>	10
4.	<p>Image compression</p> <p>Definition: A brief discussion on – Run length encoding, contour coding, Huffman code, compression due to change in domain, compression due to quantization Compression at the time of image transmission. Brief discussion on:- Image Compression standards.</p>	10
5.	<p>Image Segmentation: Definition, characteristics of segmentation.</p> <p>Detection of Discontinuities, Thresholding Pixel based segmentation method. Region based segmentation methods – segmentation by pixel aggregation, segmentation by sub region aggregation, histogram based segmentation, spilt and merge technique. Use of motion in segmentation (spatial domain technique only)</p>	08
6.	<p>Morphology</p> <p>Dilation, Erosion, Opening, closing, Hit-and-Miss transform, Boundary extraction, Region filling, connected components, thinning, Thickening, skeletons , Pruning Extensions to Gray – Scale Images Application of Morphology in I.P</p>	06

List of Practical:

Sr. No.	Course Contents
1	Getting started with image processing software
2	Understanding digital image
3	Image Sampling and Quantization
4	Understanding basic relationship between pixel
5	Image Geometric Corrections
6	Image radiometric correction
7	Image atmospheric correction
8	Image Enhancement
9	Image spatial filtering & intensity transformation



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10	Image Filtering in the frequency domain (introduction)
11	Image Transformation, Band ratio, NDVI, NDWI
12	PCA, Arithmetic operation on images
13	Image Classification
14	Supervised Classification
15	Training data set / ROIs
16	Un-supervised Classification
17	Taking output from image processing software in generic & specific format

Learning Outcomes:

At the end of the work student will be able to

- Use histogram processing techniques and its applications.
- Can able to deal with frequency domain and data compressing.

Books Recommended:

- “Digital Image Processing Using MATLAB”, **Rafael C. Gonzalez, Richard E. Woods and Steven L. Eddins**, 2nd Edition, Tata McGraw Hill Education
- “Digital Image Processing”, **Rafael C. Gonzalez and Richard E. Woods**, 3rd Edition, Pearson Education.



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FACULTY OF:- Computer Science
DEPARTMENT OF:- MCA
SEMESTER:- IV
CODE :- 5CS04CNS1 (MAJOR ELLECTIVE – I)
NAME – COMPUTER NETWORK SECURITY

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS04CNS1	COMPUTER NETWORK SECURITY	4	0	2	6	5	30	1.5	70	3	10	---	40	150

Objectives:

- The objective of this course is to learn all the aspects related to protect the information over network.

Pre-requisites:

- Knowledge of Computer Network, TCP/IP architecture.

Course outline:-

Sr. No.	Course Contents	Number of Hours
1	Introduction to security attacks, services and mechanism, introduction to cryptography. Conventional Encryption: Conventional encryption model, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block ciphers. Modern Block Ciphers: Block ciphers principals, Shannon’s theory of confusion and diffusion, fiestal structure, data encryption standard(DES), strength of DES, differential and linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption, strength of IDEA, confidentiality using conventional encryption, traffic confidentiality, key distribution,	14
2	Principals of public key crypto systems, RSA algorithm, security of RSA, key management, Diffie-Hellman key exchange algorithm, introductory idea of Elliptic curve cryptography, Elganel encryption.	8
3	Message Authentication and Hash Function Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions and MACS, MD5 message digest algorithm, Secure hash algorithm(SHA).	10



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4	Digital Signatures Digital Signatures, authentication protocols, digital signature standards (DSS), proof of digital signature algorithm. Authentication Applications: Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP), S/MIME.	8
5	IP Security Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management. Web Security: Secure socket layer and transport layer security, Secure Electronic Transaction (SET). System Security: Intruders, Viruses and related threads, firewall design principals, trusted systems.	8

List of Practical:

Sr. No.	Course Contents
1	Write a Program in C++ to encrypt & decrypt a text message using stream cipher.
2	Write a Program in C++ to encrypt & decrypt a text message using block cipher.
3	Write a Program in C++ to encrypt & decrypt a text/document file.
4	Write a Program in C++ to implement fiestel Cipher model.
5	Write a Program in C++ to implement Diffie- Hellman Key Exchange
6	Write a Program in C++ to implement Hashing Techniques
7	Write a Program in C++ to implement RSA Algorithm.
8	Write a Program in C++ to implement enveloping of keys.
9	Write a Program in C++ to implement Digital Signature.
10	Write a Program in C++ to implement Secure Electronic Transaction model (SET).

Learning Outcomes:

- Define information security and outline its major components.
- Identify the major types of threats to information security and the associated attacks.
- Develop strategies to protect organization information assets from common attacks.
- Understand how security policies, standards and practices are developed.

Books Recommended:

- “Cryptography and Network Security”, **Atul Kahate**, TMH
- “Cryptography and Network Security”, **William Stallings**, Prentice Hall /Pearson Education



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FACULTY OF:- Computer Science
DEPARTMENT OF:- MCA
SEMESTER:- -IV
CODE:- - 5CS04CGC1 (MAJOR ELLECTIVE – I)
NAME – COMPUTER GRAPHICS

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS04CGC1	COMPUTER GRAPHICS	4	0	2	6	5	30	1.5	70	3	10	---	40	150

Objectives:

- To know and be able to describe the general software architecture of programs that use 2D computer graphics.
- Know and be able to discuss hardware system architecture for computer graphics. This includes, but is not limited to: graphics pipeline, frame buffers, and graphic accelerators/co-processors.

Pre-requisites:

- Knowledge of Computer Programming, algorithms and mathematical method to implement graphics logic through the programming.

Course outline:-

Sr. No.	Course Contents	Number of Hours
1	Introduction: Computer Graphics, Elements of a Graphics, Application of Computer Graphics, I/O Devices, Display System, Color Monitors, Display Processors, Resolution	12
2	Scan Conversion Techniques : Image representation, Simple Line drawing Algorithm, DDA Line Drawing Algorithm, Bresenham's Line Drawing Algorithm, Simple Circle drawing Algorithm, Mid point Circle Drawing Algorithm,. Bresenham's Circle Drawing Algorithm	10
3	2D & 3D Transformation : Translation, Rotation, Scaling, Reflection, Curves, Bezier curve, B-spline curve, viewing Transformation, Parallel and Perspective Projections	10
4	Graphics Operations : Clipping, Window Port & Viewport Clipping, Line Clipping Algorithms, Sutherland Cohen Line Clipping algorithms, Introduction to Hidden Surface elimination, Basic illumination model, diffuse reflection, specular reflection, phong shading, Gourand shading ray tracing, color models like RGB, YIQ, CMY, HSV etc.	08



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5	Visibility: Character Generation, Generation of Bar Chart, Generation of Pie Chart, Stack Based Seed Fill Algorithm, Scan Line Seed Fill Algorithm, Z- buffer algorithms	08
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List of Practical:

Sr. No.	Course Contents
1	Implement all graphics function
2	Write a program to draw a flag
3	Draw a smiley using in built functions
4	Draw a rainbow using in built functions
5	Write a program to draw a clock
6	Write a program to draw a line using DDA Line Algorithm
7	Write a program to draw a line using Bresenham's Line Algorithm
8	Write a program to draw a lines of attributes using DDA Line Algorithm
9	Write a program to draw a Circle using Mid Point Circle Algorithm
10	Write a program to draw a Rubber Band Line using Mouse
11	Write a program to generate character using bitmap method
12	Write a program to draw polygon using graphics function
13	Write a program to fill polygon using flood fill algorithm
14	Write a graphics program to scale a polygon in which values of polygon edges and translation points will be given by user
15	Write a graphics program to rotate a polygon by using pivot-point in which values of polygon edges, pivot-point and rotation angle will be given by user
16	Write a graphics program for composite transformation which include translation, rotations and scaling
17	Write a program which reflects a polygon on different direction
18	Write a graphics program which translates a point from window-to-view port coordinate transformation
19	Write a graphics program for point clipping algorithm
20	Write a graphics program for Cohen-Sutherland Line clipping algorithm



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Learning Outcomes:

- Be able to design and implement models of surfaces, lights, sounds, and textures (with texture transformations) using a 2D graphics API.
- Be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
- Be able to discuss future trends in computer graphics and quickly learn future computer graphics concepts and APIs.

Books Recommended:

- “Mathematical Elements for Computer Graphics”, **D.Rogers and J. Adams**, McGraw –Hill International Edition.
- “Procedural Elements for Computer Graphics”, **David F. Rogers**, McGraw Hill
- “Computer Graphics (Schaum Series)”, **Lipschutz**, McGraw Hill.
- “Computer Graphics”, **Dr. N. N. Jani**, Akshat Publication.



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FACULTY OF:- Computer Science

DEPARTMENT OF:- MCA

SEMESTER:- IV

CODE:- 5CS04WAD2

NAME:- PROGRAMMING TECHNIQUE-VII (WAD)

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS04WAD2	PROGRAMMING TECHNIQUE-VII (WAD)	----	----	04	04	02	----	----	----	----	20	---	80	100

Objectives:-

- To develop proficiency in creating web pages using PHP language.
- To enhance the facility to make dynamic web page using JAVA script concept.
- To be able to develop dynamic web application using AJAX toolkit.

Prerequisites:-

- Basic knowledge of HTML tag.
- Basic knowledge of programming concepts.

List of Practical:-

Sr. No	Content
1.	Write a JavaScript to convert Celsius to Fahrenheit.
2.	Write a JavaScript program to print two lines in alert box Hello Hi
3.	Write a JavaScript that gets three numbers from user and print minimum and maximum number using conditional operator.
4.	Write a JavaScript program to print following pyramids: <div style="display: flex; justify-content: space-around; align-items: center;"> <pre style="margin: 0;"> * * * * * * * * * * * * * * * </pre> <pre style="margin: 0;"> 1 1 2 1 1 2 3 2 1 </pre> </div>



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	<pre> * * * * * * * * * * * * * * *</pre>	
5.	Write a JavaScript that performs the addition of given digits upto the total is single digit. For example, the given number is 1247 then it should display the answer 5. $1+2+4+7 = 14 \implies 1+4 = 5$	
6.	Write a JavaScript using cookies print how many times the page is visited.	
7.	Write a JavaScript that creates a clock with two radio buttons ON and OFF. When ON button is selected the clock should start working and when OFF is selected the clock stops working	
8.	Write a PHP program that gets character from user and determine whether it is uppercase character or lowercase character.	
9.	Write a PHP program that gets character from user and determine whether it is character or number or whitespace or special using regular expression	
10.	Write a PHP program that takes two arrays from user and then swaps two arrays as given below without using third variable. Eg: array1: 1, 2, 3, 4 Array2: 6,7, 8, 9,10 Swapping: Array1: 6,7,8,9 Array2: 1,2,3,4,10	
11.	Write a PHP program to check whether given number is prime or not, even or odd and palindrom or not using concept of dynamic function call	
12.	Write a PHP program that takes a string as input and prints the output as given below. The string should be given in alphabetical order I/P: aaaabbbccddddd O/P: a4b3c2d4	
13.	Write a PHP program that takes input as a single word in capital letters and the output should be as follow: I/P: THE O/P the The tHe thE	
14.	Write a PHP program that counts digits of given number and also reverses the given number using recursion concept.	
15.	Write a PHP program that creates a database application for insert and display records	
16.	Write a PHP program that creates database application for insert, update, delete, search and navigation of records using ajax(Address booklet)	
17.	Write a PHP program that accepts a string from user and displays the occurrence of each character in given string using ajax and php.	
18.	Write a PHP program that accepts number from user and determine whether number is even or odd without using conditional statements and using recursion concept.	



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19.	Write a PHP program that converts given decimal number into binary and binary number into decimal using ajax concept and radio button
20.	Write a PHP program that takes a number from user and determine how many 2 occurs upto the given number..

Learning Outcomes: -

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

- Write scripts in the PHP language that process data from online forms and access MySQL databases to create dynamic Web pages.
- Design and create dynamic Web applications using PHP and MySQL.

Books Recommended:-

- “Html, Dhtml, Javascript, Perl Cgi”, **Ivan Byros**, Bpb Publication
- “PHP and MySQL Web Development—Fourth Edition”, **Luke Welling and Laura Thomson**. Addison-Wesley.
- “Programming with Java”, **Bhave**, Pearson Education
- “PHP for the Web: Visual QuickStart Guide”, **Ullman**, Pearson Education



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FACULTY OF:- Computer Science
DEPARTMENT OF:- MCA
SEMESTER:- -IV
CODE:- - 5CS04ADB2
NAME:- – PROGRAMMING TECHNIQUE-VIII (ADBMS)

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS04ADB2	PROGRAMMING TECHNIQUE-VIII (ADBMS)	----	----	04	04	02	----	----	----	----	20	---	80	100

Objectives:

- This course is designed to make familiarize the student with advanced areas and concepts related to DBMS using the capabilities of PLSQL.

Prerequisites:

- Familiar with fundamental concepts of DBMS.
- Database designing and retrieving using SQL.

List of Practical:-

Sr. No.	Course Contents	Number of Hours
1	<ul style="list-style-type: none"> ▪ Write a program to calculate the AREA and store that value in the table AREAS (RADIUS NUMBER (5), AREA NUMBER (14,2)) ▪ Write a program to calculate the square and cube of the given number 	2
2	<ul style="list-style-type: none"> ▪ Write a program that accepts a value from the user then print that value. ▪ Write a program that accepts 2 numbers from the user and interchange the values of those 2 numbers. 	2
3	<ul style="list-style-type: none"> ▪ Write a program for input your R_NO, NAME, YEAR and name of 5 subjects then print them separately on the screen and also print them in the one line. ▪ Write a program of mark sheet with displays the SEAT_NO, NAME, marks of 5 subjects, total of 5 subjects and percentage, also display the class of student. 	2



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4	Write a program that will accept the a/c no. from the user and debit an amount of Rs.2000 from the a/c. If the a/c has the minimum balance of Rs.500 after the amount is debited. For this problem use ACCOUNT table.	2
5	<ul style="list-style-type: none"> ▪ Write a program that print 1 to 100 numbers using FOR LOOP. ▪ Write a program that prints 1 to 100 number using LOOP Command. ▪ Write a program that prints 1 to 100 number using WHILE LOOP Command. 	2
6	Write a program that displays the use of %TYPE variable. This program stores the values of the columns in the memory variables using %TYPE and %ROWTYPE variables.	2
7	<ul style="list-style-type: none"> ▪ Write a program to find out whether or not the given employee is eligible for bonus or not according to following condition. The bonus is granted if the salary is more than the average total salary of any one employee otherwise the bonus will be not granted. ▪ Write a program that finds the reverse number of inputted number. 	2
8	<ul style="list-style-type: none"> ▪ Write a program that uses a cursor attribute SQL%FOUND to raise the salary of employees by 20% and also display the appropriate message based on the existence to the record in the EMP table. (Use Implicit Cursor) ▪ Write a program that uses a cursor attribute SQL%NOTFOUND to raise the salary of employees by 15% and also display the appropriate message based on the existence to the record in the EMP table. (Use Implicit Cursor) 	2
9	Write a program that uses a cursor attribute SQL%ROWCOUNT to raise the salary of employees by 10% that are working in department number 10 and also display the appropriate message based on the existence to the record in the EMP table. (Use Implicit Cursor)	2
10	Write a program that displays the deletion of records using an IMPLICIT CURSOR. (Use Implicit Cursor)	2
11	Write a program that uses a cursor attribute %ISOPEN and %NOTFOUND to raise the salary of employees of department number 20 by 5% and also display the appropriate message based on the existence to the record in the EMP table. Whenever any such raise is given to the employees, a record for the same is maintained in the emp_update table. (Use Explicit Cursor)	2



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12	Write a program that uses a cursor attribute %ROWCOUNT to display the name, department and salary of first 10 employees getting the highest salary. (Use Explicit Cursor)	2
13	Write a program using a cursor to raise the salary of employees of department number 20 by 5% and also display the appropriate message based on the existence to the record in the EMP table. Whenever any such raise is given to the employees, a record for the same is maintained in the emp_update table. (Use Cursor For Loop)	2
14	Write a program using a cursor FOR loop to display name and the basic salary of 3 highest paid employees. (Use Cursor For Loop)	2
15	Write a program using a parameterized cursor that displays the department wise salary of each employee and department wise total gross salary. (Parameterized Cursor and Use Cursor For Loop)	2
16	<ul style="list-style-type: none">▪ Write a program that explains the use of NO_DATA_FOUND exception. (Use System Exception)▪ Write a program that explains the use of TOO_MANY_ROWS exception. (Use System Exception)	2
17	<ul style="list-style-type: none">▪ Write a program that explains the use of INVALID_NUMBER exception. (Use System Exception)▪ Write a program that explains the use of ZERO_DIVIDE exception. (Use System Exception)	2
18	Write a program that explains the use of exception trapping functions SQLCODE and SQLERRM.	2
19	Write a program using a cursor to insert the records of employee in EMP_BACKUP table for given DEPT_NO, also raise a user defined exception NO_DEPT_FOUND when no records are found for entered DEPT_NO. . (Use User Defined Exception)	2
20	Write a program using an implicit cursor display the commission of given EMP_NO, also raise a user defined exception NULL_COMMISSION when no value (NULL) is available for commission. (Use User Defined Exception)	2



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21	<ul style="list-style-type: none"> ▪ Write a trigger to insert the existing values of the EMP table into NEWEMP table when the record is deleted from EMP table. ▪ Write a trigger to insert the existing values of the EMP table into NEWEMP table when the record is updated in EMP table. ▪ Write a trigger to insert the values into the NEWEMP table when the records are inserted into the EMP table. 	2
22	<ul style="list-style-type: none"> ▪ Write a trigger for INSERT, UPDATE and DELETE operation in one program ▪ Write a trigger to restrict user form using the table on Sunday. 	2
23	<ul style="list-style-type: none"> ▪ Write a trigger that identifies the gender of the employee and according to the gender sets MR. in front of MALE employees and MS. in front of FEMALE employee. ▪ Write a trigger that restricts the entry of record if salary is greater than 8000 Rs. 	2
24	<ul style="list-style-type: none"> ▪ Write a simple procedure without any parameter that updates the values in the EMP table. ▪ Write a simple procedure that increases by the salary of employees for the given department no by percentage inputted by the user using IN parameter. 	2
25	Write a procedure that search's whether the given employee number is present or not in the table. (Use both IN and OUT mode variables) and also Write a PL/SQL block to call the SEARCH_EMP procedure.	2
26	<ul style="list-style-type: none"> ▪ Write a function that returns the square of the given number. ▪ Write a function that calculates the factorial of the given number. ▪ Execute both the functions using block and without using PL/SQL block. 	2
27	<ul style="list-style-type: none"> ▪ Write a function that calculates the binary value for the given number. ▪ Write a function that check where the given year is leap year or not ▪ Execute both the functions using block and without using PL/SQL block. 	2
28	Write a function that returns balance for given account number.	2
29	Write a package that executes procedures that given in practical no. 24	2
30	Write a package that executes functions that given in practical no. 26	2



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Learning Outcomes:

- To familiarize the students with advance concepts of DBMS.
- Security enabled management of database systems.
- Knowledge of handing multiple transactions effectively.
- Use of procedural language through PLSQL programming.

Teaching & Learning Methodology:

- Class room and laboratory teaching using teaching and learning tools like multimedia projector, overhead projectors etc.

Books Recommended:

- “Database Systems Concepts, Design & Applications”, **S. K. Singh**, Pearson Education
- “SQL/PLSQL, The Programming Language of ORACLE”, **Ivan Bayross**, BPB Publication

Additional Reference Book(s)

- “Database Systems : Design, Implementation and Management”, **Peter Rob, Carlos Coronel**, 7th Edition, Cengage Learning (2007)
- “Database management Systems”, **Leon and Leon**, Vikas Publication.



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FACULTY OF:- Computer Science
DEPARTMENT OF:- MCA
SEMESTER:- IV
CODE:- 5CS04SEM1
NAME:- SEMINAR ON TECH. TOPICS

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS04SEM1	SEMINAR ON TECH. TOPICS	----	----	02	02	01	----	----	----	----	50	---	---	50

Objectives:

- To enhance the students presentation & soft skills.
- To motivate the students to participate in group activities for learning.

General Guidelines:-

Each student will select a topic in the area of Computer Science / Technology preferably keeping track with recent technological trends and development. The topic must be selected in consultation with the institute guide. Each student will make a seminar presentation in the term making use of audio/visual aids for duration of 20 – 25 minutes and submit two copies of the seminar report in a prescribed format provided by the host institution duly signed by the guide and Director / Dean. Attendance for all seminars for all students is compulsory. Staff members of the institute will assess the seminar internally.

- Oral presentation is an important aspect of Computer Science field. The objective of the seminar is to prepare the student for systematic independent study of the art topics in the broad area of his/her specialization.
- Seminar topics can be chosen by the students with the advice from the faculty members.
- Students are the exposed to the following aspects of seminar presentations.
 - Literature survey
 - Organization of the material
 - PPT Presentation
 - Technical writing
- Each student is required to
 - Submit one page of Synopsis of the seminar talk.
 - Give 20 minutes PPT presentation, followed by 10 minutes discussion.
 - Submit a report on the seminar topic with a list of references and slides used within a week.
- The sessional marks will be awarded to the students by at least 2 faculty members on the basis of an oral and written presentation as well as their involvement in the discussion.