

Second Semester

Course Code:	SCCSC-451	Computer Graphics and Multimedia	Credits: 4	Hours required
Course pre-requisite:				
Knowledge of Computer graphics				
Course Objectives:				
1. To develop an understanding and awareness how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.				
Course Outcome:				
1. Design two dimensional graphics. 2. Apply two dimensional transformations. 3. Understood Different types of Multimedia File Format				
Unit-1:	Basics of Graphics			
1.1	Light sources - basic illumination models – halftone patterns and dithering techniques; Properties of light - Standard primaries and chromaticity diagram; Intuitive colour concepts - RGB YIQ CMY HSV HLS colour model; Colour selection. Output primitives – points and lines, line drawing algorithms, loading the frame buffer, line function; circle and ellipse generating algorithms; Pixel addressing and object geometry, filled area primitives			08
Unit-2:	2D and 3D Graphics			
2.1	Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing – viewing pipeline, viewing coordinate reference frame; window-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.			08
2.2	Three dimensional concepts; Three dimensional object representations – Polygon surfaces Polygon tables- Plane equations - Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations – Bezier curves and surfaces -BSpline curves and surfaces.			08
2.3	Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations; Three dimensional viewing – viewing pipeline, viewing coordinates, Projections, Clipping; Visible surface detection methods.			08
Unit-3:	Multimedia basics			
3.1	Multimedia applications, Multimedia system architecture, Evolving technologies for multimedia – Defining objects for multimedia systems – Multimedia data interface standards – Multimedia databases.			08
3.2	Compression and decompression – Data and file format standards – Multimedia I/O technologies – Digital voice and audio – Video image and animation – Full motion video – Storage and retrieval technologies.			08
Unit-4:	Hypermedia			
4.1	Multimedia authoring and user interface - Hypermedia messaging -Mobile messaging – Hypermedia message component – Creating hypermedia message – Integrated multimedia message standards – Integrated document management – Distributed multimedia systems.			08
4.2	CASE STUDY: BLENDER GRAPHICS Blender Fundamentals – Drawing Basic Shapes – Modelling – Shading & Textures			04
Text Book				
1.	Donald Hearn and Pauline Baker M, —Computer Graphics", Prentice Hall, New Delhi, 2007			

Course Code:	SCCSC-452	Database Essentials	Credits: 4	Hours required
Course pre-requisite:				
Understanding of data storages in computers				
Course Objectives:				
1. To understand the features of Relational database. 2. To describe data models and schemas in DBMS. 3. To use SQL- the standard language of relational databases for database				
Course Outcome:				
1. Confidence in creating own dataset and modeling their applications				
Unit-1:	Basics of Databases			
1.1	General Architecture of DBMS, Roles of DBA, Data Dictionary, Advantages and Disadvantages of DBMS.			08
1.2	Data modeling using Entity Relationship model, Discussions on data modeling using Relational Model, E-R to Relational Conversion.			08
1.3	Basics of Relational Algebra, selection, projection, division, cross product Operators Set Operators, Join and its types, writing Relational Algebra notations for user queries.			08
Unit-2:	Normalization			
2.1	Introduction to attributes, Keys, relationships and their types, Anomalies in databases, understanding Functional Dependencies(Determinant, partial, full, transitive, multi valued, etc),			08
2.2	Normalization process, First Normal form, Second Normal Form, Third Normal Form etc. , Boyce-Codd Normal Form, Fourth Normal Form, Fifth Normal Form.			08
Unit-3:	SQL Essentials			
3.1	Introduction to data retrieval languages, Discussions on SQL, Table , building blocks of SQL including data types, operators, expressions			04
3.2	DDL Statements, DML Statements, DCL Statements , TCL statements , SQL Functions ,			04
Unit-4:	Advanced SQL			
4.1	Introduction to Views, writing basic PL/SQL codes, table partitions,			04
4.2	Introduction to constraints, types of constrains, Integrity constraints, Data administration issues			04
Text Book				
1.	Database System Concepts- Silber Schatz Korth, Tata McGraw Hill.			
Reference Books				
1.	Introduction to Database management System- Bipin Desai, Galgotia P			

Course Code:	SCCSC-453	Programming in C and Python	Credits: 4	Hours required
Course pre-requisite:				
Knowledge of computer languages				
Course Objectives:				
To give skills for computer programming				
Course Outcome:				
Students will be able to solve problems using C and Python programming languages				
Unit-1:	Introduction to programming paradigms			
1.1	Applications of C Language, Structure of C program, C programming building blocks including Data Types , operators, expressions, evaluation of expressions, Input / Output statements, use of Assignment statements, Decision making statements, Looping statements in programming, Preprocessor directives and Compilation process			08
1.2	Introduction to Arrays, 1D and 2 D array concepts and their use in programming as well as in searching and sorting operations, various string operations			08
Unit-2:	Advanced concepts in C			
2.1	Understanding modular programming, dealing with some standard string and mathematical functions in programming, use of recursion using recursive functions , dealing with pointers, understanding parameter passing concept			08
2.2	Use of abstract data types, understanding use of structures and pointers typedef , dynamic memory allocation concepts, understanding storage classes and visibility.			08
Unit-3:	Introduction to Python			
3.1	Python installation and working of it, get familiar with python variables and data types, operator understanding and its usage, detail study of python blocks			08
3.2	Hands on with conditional blocks using if, else and elif, hands on examples and study of looping with range, list and dictionaries, hands on to organize python code with function, modular approach in python, knowledge of various libraries in python with their research uses			08
Unit-4:	Advanced concepts in Python			
4.1	Handling if exceptions to handle the code cracks, handling and helping file operations, coding with the exceptional handling and testing Anonymous method, Properties, Indexers, Exception Handling			08
4.2	Procedural and Object-Oriented Programming, classes and working with instances, method overloading, polymorphism, importing internal module as well as external modules in the code packages understanding and their usage, hands on with lambda function in python coding with the use of functions, modules and external packages			04
Text Book				
2.	Kernighan, B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education,			
Reference Books				
1.	Starting Out with Python (2009) Pearson , Tonny Gaddis			

Course Code:	SCCSE-451 A Elective	Core and Advanced Java Programming	Credits: 3 Theory and 01 Lab	Hours required
Pre requisite				
1. Basic knowledge of computer programming				
Course Objectives:				
1. Cultivate clear thinking and creative problem solving using Java language .				
Course Outcome:				
1. At the end of the course student will be able to understand basics of core Java and advanced Java and to apply them in problem solving.				
Unit-1:	Introduction to Java			
1.1	Programming language types and paradigms, computer programming hierarchy, how computer architecture affects a language? , why java? ,flavors of java, java designing goal, role of java programmer in industry, features of java language, jvm –the heart of java , java’s magic bytecode.			08
1.2	Installing java, java program development, java source file structure, compilation, executions.			
1.3	Lexical tokens, identifiers, keywords, literals, comments, primitive data types, operators assignments.			
Unit-2:	Basic Java Programming			
2.1	Class and object fundamentals , creating and operating classes and objects , understanding types of classes, code blocks, access control constructor, interfaces defining methods argument passing mechanism , method overloading, recursion, dealing with static members, use of “this “ reference, other aspects related with complete understanding of classes and objects			08
Unit-3:	Core Java			
3.1	Inheritance in JAVA, types of inheritance in java, inheriting data members and methods , role of constructors in inheritance , overriding super class methods ,use of “super”, polymorphism in inheritance ,type compatibility and conversion implementing interfaces.			08
3.2	Organizing classes and interfaces in packages , package as access protection , defining package ,classpath setting for packages , making jar files for library packages import and static import naming convention for packages.			08
3.3	Introduction to threads , exceptions and event handling in Java			
Unit-4:	Advanced Java			
4.1	Utility methods for arrays ,observable and observer objects , date & times ,using scanner regular expression, input/output operation in java(java.io package),streams and the new i/o capabilities ,understanding streams, the classes for input and output, the standard streams, working with file object, file i/o basics, reading and writing to files, buffer and buffer management, read/write operations with file channel, serializing objects .			04
4.2	Introduction to jdbc,jdbc drivers & architecture, curd operation using jdbc,			04

	connecting to non-conventional databases.	
4.3	Web application basics, architecture and challenges of web application, introduction to servlet, servlet life cycle, developing and deploying servlets, exploring deployment , descriptor (web.xml), handling request and response.	08
Lab	Use of Programming language / Packages for actual hands on	
01 Credit Lab	Case studies / experiments leading to independent projects / work out where students implement above core and advanced Java concepts leading to a Lab Book	12
Text Book		
1	Discrete Mathematical Structures- C. L. Liu, Second Edition, McGraw-Hill Book	
Reference Books		
1.	Discrete Mathematical Structures- Y N Singh, Wiley-India Press.	
2.	Discrete Mathematics for Computer Scientists and Mathematicians- J. L. Mott, A.Kandel, Prentice Hall of India.	
3.	Discrete Mathematical Structures with Applications to Computer Science- Discrete Mathematics for Computer Scientists and Mathematicians, Tata Mcgraw-Hill.	

Course Code:	SCCSE-451 B Elective	Design and Analysis of Algorithms	Credits: 3 Theory and 01 Lab	Hours required
Pre requisite				
1. Knowledge of Data structures				
Course Objectives:				
1. Reinforce basic design concepts (e.g., pseudo code, specifications, top-down)				
2. Knowledge of algorithm design strategies				
3. Familiarity with an assortment of important algorithms				
4. Ability to analyze time and space complexity				
Course Outcome:				
1. Ability to analyze algorithm				
2. Ability to propose efficient algorithms				
3. Ability to think on complexity issues				
Unit-1:	Review of Algorithms and elementary data structures			
1.1	Understanding basic data structures and their applications with more emphasis on graphs and trees, knowledge of algorithm and their complexity notations, emphasis on asymptotic notations			08
1.2	Complexity analysis for algorithms on graphs including DFS,BFS , shortest path algorithms like, the Bellman-ford algorithm, the Dijkstra algorithm ,the Floyd-Warshall algorithm, the Johnsons algorithm.			
1.3	Complexity analysis for algorithms on trees including, tree searching, inseartion of node / deletion of nodes in trees, traversing trees, binary search trees trees, AVL trees			
Unit-2:	Divide and conquer mechanism			
2.1	Introduction, general method, algorithm complexity analysis for binary search, merger sort, quick sort, Strassen s matrix multiplication.			08
Unit-3:	Advanced algorithm design methods-1			
3.1	Greedy method, general method, container loading knapsack problem, job sequence, introduction to spanning trees , minimum spanning trees ,growing a minimum spanning tree, the algorithms of Kruskal and Prim.			08
3.2	Dynamic programming, general method, applications 0/1 knapsack problem, travelling sales person problem			08
Unit-4:	Advanced algorithm design methods-2			
4.1	General Backtracking method, Applications- n-queen problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles			04
4.2	Introduction to String matching, Robin – Karp algorithm, Knuth – Morris Pratt algorithm,			04
4.3	Introduction to NP completeness , polynomial time , polynomial time verification , reducibility, NP completeness proofs ,NP completeness problems			08
Lab	Use of Programming language / Packages for actual hands on			
01 Credit Lab	Case studies / experiments leading to independent projects / work out where students implement above analysis of algorithm concepts leading to a Lab Book			12

Text Book		
1	Introduction to Algorithms, Corman , Leiserson and others , 2nd edition , PHI	
Reference Books		
1.	Data Structures, Lipschutz , Tata McGraw Hills	
2.	Design Methods and Analysis of Algorithms , S.K.Basu , PHI.	
3.	The Art of Computer Programming, Vol 1,2,3 , Dr.Kunth , Addison Wesley	

Course Code:	SCCSE-451 C Elective	Information System Security	Credits: 3 Theory and 01 Lab	Hours required
Pre requisite				
1. understanding of computer technology, including software, hardware, telecommunications and basics of internet				
Course Objectives:				
1. Identify and prioritize information assets. 2. Identify and prioritize threats to information assets. 3. Define an information security strategy and architecture.				
Course Outcome:				
1. Students will be able to plan for and respond to intruders in an information system. 2. Ability to describe legal and public relations implications of security and privacy issues. 3. Ability to present a disaster recovery plan for recovery of information assets after an incident.				
Unit-1:	Understanding Attacks and Introduction to Security Mechanisms			
1.1	Active attacks, passive attacks, social engineering, denial of service attacks, buffer overflow attacks, malware (viruses, trojan horses, worms)			04
1.2	Cryptosystems, authentication ("who you are, what you have, what you know"), intrusion detection, redundancy, disaster recover, security services, availability integrity, confidentiality authentication, non-repudiation			04
Unit-2:	Terminology and Background of Cryptosystems			
2.1	Cryptosystems, encryption, decryption, plain text and cipher text, encryption algorithms			04
2.2	Hash algorithms, hash concept, description of hash algorithms, message digest algorithms, secure secret key (symmetric) systems			04
2.3	The data encryption standard (DES), advance encryption standard (AES), block cipher operational modes, public key (asymmetric key) encryption systems concept and characteristics of public key encryption system, Rivest-Shamir-Adelman (RSA)			04
2.4	Introduction to digital signature algorithms, the digital signature standard (DSA), introduction to elliptic curve (EC,) cryptography			04
Unit-3:	Key Management issues in security			
3.1	Solving key distribution problem, diffie-hellman algorithm, key exchange with public key cryptography, public key infrastructure (PKI), concept of digital certificate, certificate authorities and it's roles, digital certificates types			06
3.2	Understanding important network security protocols and authentication protocols , knowledge of secure shell (SSH), IP security (IPSec) protocol, VPN, securing wireless networks, intruder detection and prevention, understanding malicious code (virus, worms, zombies etc.), preventing malware attacks, firewalls			06
Unit-4:	The Internet Security			

4.1	Web security, solving privacy problems ,solving authentication problems, secure socket layer (SSL) protocol secure payment protocols, secure electronic mail, pretty good privacy (PGP), secure/multipurpose internet mail extensions, handling spams (hoax, phishing, chain mails, financial) detection and prevention.	06
4.2	Security policy creation of policies (password, internet, e-mail and social network access policies etc.), threat analysis model, security auditing, enforcement legal issues, security awareness issues	06
Lab	Use of Programming language / Packages for actual hands on	
01 Credit Lab	Case studies / experiments leading to independent projects / work out where students implement above information system security concepts leading to a Lab Book / project report	12
Text Book		
1	Security in Computing (Fourth Edition)", Charles P. Pfleeger, Prentice-Hall International,	
Reference Books		
1.	Applied Cryptography Protocols, Algorithms, and Source Code in C (Second edition)", Bruce Schneier, John Wiley & Sons, Inc	
2.	Computer Security: Art and Science, Matt Bishop	

Course Code:	SCCSCP-451	Course Name: Lab-4	Credits: 01
Course Objectives: As per the Lab Manual circulated to students by the concerned Teacher			
Course Outcome: As per the Lab Manual circulated to students by the concerned Teacher			
Experiments As per the Lab Manual circulated to students by the concerned Teacher			

Course Code:	SCCSCP-452	Course Name: Lab-5	Credits: 01
Course Objectives: As per the Lab Manual circulated to students by the concerned Teacher			
Course Outcome: As per the Lab Manual circulated to students by the concerned Teacher			
Experiments As per the Lab Manual circulated to students by the concerned Teacher			

Course Code:	SCCSCP-453	Course Name: Lab 6	Credits: 01
Course Objectives: As per the Lab Manual circulated to students by the concerned Teacher			
Course Outcome: As per the Lab Manual circulated to students by the concerned Teacher			
Experiments As per the Lab Manual circulated to students by the concerned Teacher			

Course Code:	SCCSOJ-451	On Job Training , Internship/ Apprenticeship or Field Project	Credits: 03
Course Objectives: As per the University rules and policy			
Course Outcome: As per the University rules and policy			
Experiments As per the University rules and policy			

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