

January 2021	<p>UNIT I Introduction: Embedded Systems and general purpose computer systems, history, classifications, applications and purpose of embedded systems [Group Discussion] Core of embedded systems: microprocessors and microcontrollers, RISC and CISC controllers, Big endian and Little endian processors, Application specific ICs, Programmable logic devices, COTS, sensors and actuators, communication interface, embedded firmware, other system components. Characteristics and quality attributes of embedded systems: Characteristics, operational and non-operational quality attributes. [Group Discussion]</p> <p>UNIT II Embedded Systems – Application and Domain Specific: Application specific – washing machine, domain specific - automotive. [Group Discussion]</p>
February 2021	<p>UNIT II Embedded Hardware: Memory map, i/o map, interrupt map, processor family, external peripherals, memory – RAM , ROM, types of RAM and ROM, memory testing, CRC ,Flash memory. Peripherals: Control and Status Registers, Device Driver, Timer Driver - Watchdog Timers.</p> <p>UNIT III The 8051 Microcontrollers: Microcontrollers and Embedded processors, Overview of 8051 family. 8051 Microcontroller hardware, Input/output pins, Ports, and Circuits, External Memory. 8051 Programming in C: Data Types and time delay in 8051 C, I/O Programming, Logic operations, Data conversion Programs.</p>
March 2021	<p>UNIT IV Designing Embedded System with 8051 Microcontroller: Factors to be considered in selecting a controller, why 8051 Microcontroller, Designing with 8051. [Practical Demonstration] Programming embedded systems: structure of embedded program, infinite loop, compiling, linking and debugging. [Practical Demonstration]</p> <p>UNIT V Real Time Operating System (RTOS): Operating system basics, types of operating systems, Real-Time Characteristics, Selection Process of an RTOS. Design and Development: Embedded system development Environment – IDE, types of file generated on cross compilation, disassembler/ de-compiler, simulator, emulator and debugging, embedded product development life-cycle, trends in embedded industry. [Group Discussion]</p>



Teacher Signature



Co-ordinator Signature

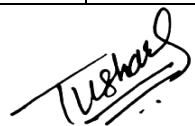


Principal Signature

B. Sc.	Semester – IV
Course Name:	Course Code: USIT404
Month	T
January	<p><u>Unit 1:</u> Introduction: What is software engineering? Software Development Life Cycle, Requirements Analysis, Software Design, Coding, Testing, Maintenance etc. Software Requirements: Functional and Non-functional requirements, User Requirements, System Requirements, Interface Specification, Documentation of the software requirements. Software Processes: Process and Project, Component Software Processes. Software Development Process Models. Waterfall Model. Prototyping. Iterative Development. Rational Unified Process. The RAD Model Time boxing Model. Agile software development: Agile methods, Plan-driven and agile development, Extreme programming, Agile project management, Scaling agile methods.</p> <p><u>Unit 2:</u> Socio-technical system: Essential characteristics of socio technical systems, Emergent System Properties, Systems Engineering, Components of system such as organization, people and computers, Dealing Legacy Systems. Critical system: Types of critical system, A simple safety critical system. Dependability of a system. Availability and Reliability. Safety and</p>
February	<p><u>Unit 2:</u> Requirements Engineering Processes: Feasibility study, Requirements elicitation and analysis, Requirements Validations, Requirements Management. System Models: Models and its types, Context Models, Behavioural Models, Data Models, Object Models, Structured Methods.</p> <p><u>Unit 3:</u> Architectural Design: Architectural Design Decisions, System Organisation, Modular Decomposition Styles, Control Styles, Reference Architectures. User Interface Design: Need of UI design, Design issues, The UI design Process, User analysis, User Interface Prototyping, Interface Evaluation. Project Management Software Project Management, Management activities, Project Planning, Project Scheduling, Risk Management. Quality Management: Process and Product Quality, Quality assurance and Standards. Quality Planning. Quality Control. Software Measurement and</p>

March	<p>Unit 4: Verification and Validation: Planning Verification and Validation, Software Inspections, Automated Static Analysis, Verification and Formal Methods. Software Testing: System Testing, Component Testing, Test Case Design, Test Automation. Software Measurement: Size-Oriented Metrics, Function-Oriented Metrics, Extended Function Point Metrics Software Cost Estimation: Software Productivity, Estimation</p>
	<p>Algorithmic Cost Modelling, Project Duration and Staffing</p> <p>Unit 5: Process Improvement: Process and product quality, Process Classification, Process Measurement, Process Analysis and Modeling, Process Change, The CMMI Process Improvement Framework. Service Oriented Software Engineering: Services as reusable components, Service Engineering, Software Development with Services.</p>
A p ri l	<p>Unit 5: Distributed software engineering: Distributed systems issues, Client-server computing, Architectural patterns for distributed systems, Software as a service . TM: Talk, PPTs,</p>

S.Y.B.Sc.IT (A) Sem – IV (2020-21)		Subject: - Software Engineering
Jan 2021	<p>Unit-I - Introduction: What is software engineering? Software Development Life Cycle, Requirements Analysis, Software Design, Coding, Testing, Maintenance etc. Software Requirements: Functional and Non-functional requirements, User Requirements, System Requirements, Interface Specification, Documentation of the software requirements. Software Processes: Process and Project, Component Software Processes. Software Development Process Models. Waterfall Model. • Prototyping. • Iterative Development. • Rational Unified Process. • The RAD Model • Time boxing Model. Agile software development: Agile methods, Plan-driven and agile development, Extreme programming, Agile project management, Scaling agile methods. Unit-II - Socio-technical system: Essential characteristics of socio technical systems, Emergent System Properties, Systems Engineering, Components of system such as organization, people and computers, Dealing Legacy Systems. (PPT)</p>	
Feb 2021	<p>Critical system: Types of critical system, A simple safety critical system, Dependability of a system, Availability and Reliability, Safety and Security of Software systems. Requirements Engineering Processes: Feasibility study, Requirements elicitation and analysis, Requirements Validations, Requirements Management. System Models: Models and its types, Context Models, Behavioural Models, Data Models, Object Models, Structured Methods. Unit-III - Architectural Design: Architectural Design Decisions, System Organisation, Modular Decomposition Styles, Control Styles, Reference Architectures. User Interface Design: Need of UI design, Design issues, The UI design Process, User analysis, User Interface Prototyping, Interface Evaluation. Project Management Software Project Management, Management activities, Project Planning, Project Scheduling, Risk Management. (PPT – Simulation videos for practical)</p>	
Mar 2021	<p>Quality Management: Process and Product Quality, Quality assurance and Standards, Quality Planning, Quality Control, Software Measurement and Metrics. Unit-IV- Verification and Validation: Planning Verification and Validation, Software Inspections, Automated Static Analysis, Verification and Formal Methods. Software Testing: System Testing, Component Testing, Test Case Design, Test Automation. Software Measurement: Size-Oriented Metrics, Function-Oriented Metrics, Extended Function Point Metrics Software Cost Estimation: Software Productivity, Estimation Techniques, Algorithmic Cost Modelling, Project Duration and Staffing Unit-V- Process Improvement: Process and product quality, Process Classification, Process Measurement, Process Analysis and Modeling, Process Change, The CMMI Process Improvement Framework. Service Oriented Software Engineering: Services as reusable components, Service Engineering, Software Development with Services. Software reuse: The reuse landscape, Application frameworks, Software product lines, COTS product reuse. Distributed software engineering: Distributed systems issues, Client–server computing, Architectural patterns for distributed systems, Software as a service (PPT)</p>	



Teacher Sign



Coordintor

S.Y.B.Sc.IT-SEM IV	
SUBJECT: Computer Graphics and Animation	
Month (2021)	Topics to be Covered
JANUARY	<p>UNIT I: Introduction to Computer Graphics: Overview of Computer Graphics, Application and Software, some graphics devices, Input Devices for Operator Interaction, Active and Passive Graphics Devices, Display Technologies, Storage Tube Graphics Displays, Calligraphic Refresh Graphics Displays, Raster Refresh Graphics Displays, CRT Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, Random-Scan Display Processor, LCD displays.</p> <p>Scan conversion – Digital Differential Analyzer (DDA) algorithm, Bresenham's Line drawing algorithm. Bresenham's method of Circle drawing, Midpoint Circle Algorithm, Midpoint Ellipse Algorithm, Mid-point criteria, Problems of Aliasing, end-point ordering and clipping lines, Scan Converting Circles, Clipping Lines algorithms– Cyrus-Beck, Cohen-Sutherland and Liang-Barsky, Clipping Polygons, problem with multiple components.</p> <p>UNIT II: Two-Dimensional Transformations: Transformations and Matrices, Transformation Conventions, 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Translations and Homogeneous Coordinates, Rotation, Reflection, Scaling, Combined Transformation, Transformation of Points, Transformation of The Unit Square, Solid Body Transformations, Rotation About an Arbitrary Point, Reflection through an Arbitrary Line, A Geometric Interpretation of Homogeneous Coordinates, The Window-toViewport Transformations. [TM:PPT,VIDEO]</p>
FEBRUARY	<p>UNIT II: 3D Transformations: 3D Scaling, 3D Shearing, 3D Rotation, 3D Reflection, 3D Translation, Multiple Transformation, Rotation about an Arbitrary Axis in Space, Reflection through an Arbitrary Plane, Matrix Representation of 3D Transformations, Composition of 3D Transformations, Affine and Perspective Geometry, Perspective Transformations, Techniques for Generating Perspective Views, Vanishing Points, the Perspective Geometry and camera models, Orthographic Projections, Axonometric Projections, Oblique Projections, View volumes for projections.</p> <p>UNIT III: Viewing in 3D: Stages in 3D viewing, Canonical View Volume (CVV), Specifying an Arbitrary 3D View, Examples of 3D Viewing, The Mathematics of Planar Geometric Projections, Combined transformation matrices for projections and viewing, Coordinate Systems and matrices, camera model and viewing pyramid.</p> <p>Light: Radiometry, Transport, Equation, Photometry</p> <p>Color: Colorimetry, Color Spaces, Chromatic Adaptation, Color Appearance.</p>

	[TM:PPT,VIDEO]
MARCH	<p>UNIT IV: Visible-Surface Determination: Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (depth sorting), Area sub-division method, BSP trees, Visible-Surface Ray Tracing, comparison of the methods.</p> <p>Plane Curves and Surfaces: Curve Representation, Nonparametric Curves, Parametric Curves, Parametric Representation of a Circle, Parametric Representation of an Ellipse, Parametric Representation of a Parabola, Parametric Representation of a Hyperbola, Representation of Space Curves, Cubic Splines, , Bezier Curves, B-spline Curves, B-spline Curve Fit, B-spline Curve Subdivision, Parametric Cubic Curves, Quadric Surfaces. Bezier Surfaces.</p> <p>UNIT V:Computer Animation: Principles of Animation, Key framing, Deformations, Character Animation, Physics-Based Animation, Procedural Techniques, Groups of Objects.</p> <p>Image Manipulation and Storage: What is an Image? Digital image file formats, Image compression standard – JPEG, Image Processing - Digital image enhancement, contrast stretching, Histogram Equalization, smoothing and median Filtering</p> <p>[TM:PPT,Video]</p>

Course Outcome

COMPUTER GRAPHICS AND ANIMATION— [S.Y.B.Sc.IT SEM-IV]

1. To list the basic concepts used in computer graphics.
2. To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
3. To describe the importance of viewing and projections.
4. To define the fundamentals of animation, virtual reality and its related technologies.
5. To understand a typical graphics pipeline
6. To design an application with the principles of virtual reality

S.Y.B.Sc.IT-SEM IV	
SUBJECT: Introduction to Embedded Systems Practical	
Month	Topics to be Covered
JANUARY 2021	<p>1: Design and develop a reprogrammable embedded computer using 8051 microcontrollers and to show the following aspects.</p> <ul style="list-style-type: none"> a. Programming b. Execution c. Debugging. <p>2: A- Configure timer control registers of 8051 and develop a program to generate given time delay. B- To demonstrate use of general purpose port i.e. Input/ output port of two controllers for data transfer between them.</p> <p>3: A-Port I / O: Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on LED's B- To interface 8 LEDs at Input-output port and create different patterns. C- To demonstrate timer working in timer mode and blink LED without using any loop delay routine</p>
FEBRUARY 2021	<p>4: A- Serial I / O: Configure 8051 serial port for asynchronous serial communication with serial port of PC exchange text messages to PC and display on PC screen. Signify end of message by carriage return. B- To demonstrate interfacing of seven-segment LED display and generate counting from 0 to 99 with fixed time delay. C- Interface 8051 with D/A converter and generate square wave of given frequency on oscilloscope.</p> <p>5: A-Interface 8051 with D/A converter and generate triangular wave of given frequency on oscilloscope. B- Using D/A converter generate sine wave on oscilloscope with the help of lookup table stored in data area of 8051.</p> <p>6: Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clock wise direction.</p>
MARCH 2021	<p>7: Generate traffic signal.</p> <p>8: Implement Temperature controller.</p> <p>9: Implement Elevator control.</p> <p>10: Using Flash Magic A -To demonstrate the procedure for flash programming for reprogrammable embedded system board using Flash Magic B -To demonstrate the procedure and connections for multiple controllers programming of same type of controller with same source code in one go, using flash magic</p>

S Y.B.Sc.IT – SEM-IV**Subject: Computer Oriented Statistical Techniques**

Month	Topic to be covered
January	<p>Unit:1- The Mean, Median, Mode, and Other Measures of Central Tendency: Index, or Subscript, Notation, Summation Notation, Averages, or Measures of Central Tendency ,The Arithmetic Mean , The Weighted Arithmetic Mean ,Properties of the Arithmetic Mean ,The Arithmetic Mean Computed from Grouped Data ,The Median ,The Mode, The Empirical Relation Between the Mean, Median, and Mode, The Geometric Mean G, The Harmonic Mean H ,The Relation Between the Arithmetic, Geometric, and Harmonic Means, The Root Mean Square, Quartiles, Deciles, and Percentiles, Software and Measures of Central Tendency.</p> <p>The Standard Deviation and Other Measures of Dispersion: Dispersion, or Variation, The Range, The Mean Deviation, The Semi-Interquartile Range, The 10–90 Percentile Range, The Standard Deviation, The Variance, Short Methods for Computing the Standard Deviation, Properties of the Standard Deviation, Charlie’s Check, Sheppard’s Correction for Variance, Empirical Relations Between Measures of Dispersion, Absolute and Relative Dispersion; Coefficient of Variation, Standardized Variable; Standard Scores, Software and Measures of Dispersion. (CHALK & TALK , PPT)</p>
March	<p>Statistical Decision Theory: Statistical Decisions, Statistical Hypotheses, Tests of Hypotheses and Significance, or Decision Rules, Type I and Type II Errors, Level of Significance, Tests Involving Normal Distributions, Two-Tailed and One-Tailed Tests, Special Tests, Operating-Characteristic Curves; the Power of a Test, p-Values for Hypotheses Tests, Control Charts, Tests Involving Sample Differences, Tests Involving Binomial Distributions.</p> <p>Statistics in R: mean, median, mode, Normal Distribution, Binomial Distribution, Frequency Distribution in R. (CHALK & TALK , PPT)</p> <p>Unit:4- Small Sampling Theory: Small Samples, Student’s t Distribution, Confidence Intervals, Tests of Hypotheses and Significance, The Chi-Square Distribution, Confidence Intervals for Sigma , Degrees of Freedom, The F Distribution. The Chi-Square Test: Observed and Theoretical Frequencies, Definition of chi-square, Significance Tests, The Chi-Square Test for Goodness of Fit, Contingency Tables, Yates’ Correction for Continuity, Simple Formulas for Computing chi-square, Coefficient of Contingency, Correlation of Attributes, Additive Property of chi-square. (CHALK & TALK , PPT)</p>
April	<p>Unit:5 Curve Fitting and the Method of Least Squares: Relationship Between Variables, Curve Fitting, Equations of Approximating Curves, Freehand Method of Curve Fitting, The Straight Line, The Method of Least Squares, The Least-Squares Line, Nonlinear Relationships, The Least-Squares Parabola, Regression, Applications to Time Series, Problems Involving More Than Two Variables.</p> <p>Correlation Theory: Correlation and Regression, Linear Correlation, Measures of Correlation, The Least-Squares Regression Lines, Standard Error of Estimate, Explained and Unexplained Variation, Coefficient of Correlation, Remarks Concerning the Correlation Coefficient, Product-Moment Formula for the Linear Correlation Coefficient, Short Computational Formulas, Regression Lines and the Linear Correlation Coefficient, Correlation of Time Series, Correlation of Attributes, Sampling Theory of Correlation, Sampling Theory of Regression. (CHALK & TALK , PPT)</p>

Name: Ms. Sujata Rizal Kotian

Class: SYBSCIT

Subject: CORE JAVA

Program Outcome:

PO-1 To develop problem-solving abilities using a computer.

PO-2 To build the necessary skillset and analytical abilities for developing computer-based solutions for real-life problems.

PO-3 To imbibe quality software development practices.

PO-4 To create awareness about the process and product standards

PO-5 To train students in professional skills related to Software Industry.

PO-6 To prepare the necessary knowledge base for research and development in Information Technology.

PO-7 To help students build-up a successful career in Information Technology.

Program Specific Outcome:

PSO 1: Demonstrate an understanding of the principles and working of the hardware and software aspects of computer systems.

PSO-2 Design, implements, test, and evaluate a computer system, component, or algorithm to meet desired needs and to solve a computational problem.

PSO-3 To Enhance skills and adopt new computing technologies for attaining professional excellence and carrying research.

Course Outcome:

CO1. List and use Object Oriented Programming concepts for problem-solving.

CO2. Write programs using Java collection API as well as the java standard class library.

CO3. Solve the inter-disciplinary applications using the concept of inheritance

CO4. Apply the garbage collection for saving the resources automatically

CO5. Write, compile, and execute Java programs that may include basic data types and control flow constructs using J2SE or other Integrated Development Environments (IDEs) such as Eclipse, NetBeans, and JDeveloper().

CO6. Write, compile, and execute Java programs using object-oriented class structures with parameters, constructors, and utility and calculations methods, including inheritance, test classes, and exception handling().

CO7. Write, compile, and execute Java programs using arrays and recursion().

CO8. Write, compile, and execute Java programs manipulating Strings and text documents(). CO9.

Write, compile, execute Java programs that include GUIs and event-driven programming(). CO10:

Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods, etc.

LESSON PLAN

MONTH	TOPICS COVERED
JANUARY	<p>Introduction: History, architecture and its components, Java Class File, Java Runtime Environment, The Java Virtual Machine, JVM Components, The Java API, java platform, java development kit, Lambda Expressions, Methods References, Type Annotations, Method Parameter Reflection, setting the path environment variable, Java Compiler And Interpreter, java programs, java applications, main(), public, static, void, string[] args, statements, white space, case sensitivity, identifiers, keywords, comments, braces and code blocks, variables, variable name</p> <p>Data types: primitive data types, Object Reference Types, Strings, Autoboxing, operators, and properties of operators, Arithmetic operators, assignment operators, increment and decrement operators, relational operators, logical operators, bitwise operators, conditional operators.</p> <p>Data types: primitive data types, Object Reference Types, Strings, Autoboxing, operators, and properties of operators, Arithmetic operators, assignment operators, increment and decrement operators, relational operators, logical operators, bitwise operators, conditional operators.</p> <p>Control Flow Statements: The If...Else If...Else Statement, The Switch...Case Statement Iterations: The While Loop, The Do ... While Loop, The For Loop, The Foreach Loop, Labeled Statements, The Break And Continue Statements, The Return Statement</p>
FEBRUARY	<p>Classes: Types of Classes, Scope Rules, Access Modifier, Instantiating Objects From A-Class, Initializing The Class Object And Its Attributes, Class Methods, Accessing A Method, Method Returning A Value, Method's Arguments, Method Overloading, Variable Arguments [Varargs], Constructors, this Instance, super Instance, Characteristics Of Members Of A-Class, constants, this instance, static fields of a class, static methods of a class, garbage collection.</p> <p>Inheritance: Derived Class Objects, Inheritance and Access Control, Default Base Class Constructors, this, and super keywords. Abstract Classes And Interfaces, Abstract Classes, Abstract Methods, Interfaces, What Is An Interface? How Is An Interface Different From An Abstract Class?, Multiple Inheritance, Default Implementation, Adding New Functionality, Method Implementation, Classes V/s Interfaces, Defining An Interface, Implementing Interfaces.</p> <p>Packages: Creating Packages, Default Package, Importing Packages, Using A Package.</p>

MARCH	Enumerations, Arrays: Two Dimensional Arrays, Multi-Dimensional Arrays, Vectors, Adding Elements To A Vector, Accessing Vector
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	<p>Elements, Searching For Elements In A Vector, Working With The Size of The Vector.</p> <p>Multithreading: the thread control methods, thread life cycle, the main thread, creating a thread, extending the thread class.</p> <p>Exceptions: Catching Java Exceptions, Catching Run-Time Exceptions, Handling Multiple Exceptions, The finally Clause, The throws Clause</p> <p>Byte streams: reading console input, writing console output, reading the file, writing a file, writing binary data, reading binary data, getting started with character streams, writing a file, reading the file.</p> <p>Event Handling: Delegation Event Model, Events, Event Classes, Event listener interfaces, Using the delegation event model, adapter classes, and inner classes.</p> <p>Abstract Window Toolkit: Window Fundamentals, Component, Container, Panel, Window, Frame, Canvas.Components – Labels, Buttons, Check Boxes, Radio Buttons, Choice Menus, Text Fields, Text, Scrolling List, Scrollbars, Panels,</p> <p>Frames Layouts: Flow Layout, Grid Layout, Border Layout, Card Layout.</p>
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