JAI HIND COLLEGE AUTONOMOUS

Syllabus for S.Y.BSc

Course : Information technology

Semester : IV

Credit Based Semester & Grading System

With effect from Academic Year 2018-19

List of Courses

Course: Information Technology **Semester: IV**

SR. NO.	COURSE CODE	COURSE TITLE	NO. OF LECTURES / WEEK	NO. OF CREDITS
SYBSc				
1	SBIT401	Core Java	5	2
2	SBIT402	Introduction to Embedded Systems	5	2
3	SBIT403	Computer Oriented Statistical Techniques	5	2
4	SBIT404	Software Engineering	5	2
5	SBIT405	Computer Graphics and Animation	5	2
6	SBIT401 PR	Core Java Practical	3	2
7	SBIT402 PR	Introduction to Embedded Systems Practical	3	2
8	SBIT403 PR	Computer Oriented Statistical Techniques Practical	3	2
9	SBIT404 PR	Software Engineering Practical	3	2
10	SBIT405 PR	Computer Graphics and Animation Practical	3	2

Semester IV – Theory

Course: SBIT401	**Core Java (Credits : 02 Lectures/Week:05)**	
	Objectives: ➢ learning programming skills and logic ➢ learning object oriented approach **Outcomes:** ➢ development of skill in higher level languages	
Unit I	**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 **Data types:**primitive data types, Object Reference Types, Strings, Auto boxing, operators and properties of operators, Arithmetic operators, assignment operators, increment and decrement operator, relational operator, logical operator, bitwise operator, conditional operator. **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 **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	**12 L**
Unit II	**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. **Packages:** Creating Packages, Default Package, Importing Packages, Using A Package. **Enumerations,Arrays:** Two Dimensional Arrays, Multi-Dimensional Arrays, Vectors, Adding Elements To A Vector, Accessing Vector Elements, Searching For Elements In A Vector, Working With The Size of The Vector. **Multithreading:** the thread control methods, thread life cycle, the main thread, creating a thread, extending the thread class.	**12 L**
	Exceptions: Catching Java Exceptions, Catching Run-Time Exceptions,	**12 L**

Unit III	Handling Multiple Exceptions, The finally Clause, The throws Clause **Byte streams:** reading console input, writing console output, reading file, writing file, writing binary data, reading binary data, getting started with character streams, writing file, reading file	
Unit IV	**Event Handling:** Delegation Event Model, Events, Event classes, Event listener interfaces, Using delegation event model, adapter classes and inner classes. **Abstract Window Toolkit/Java Swing :** Window Fundamentals, Component, Container, Panel, Window, Frame, Canvas.Components– Labels, Buttons, Check Boxes, Radio Buttons, Choice Menus, Text Fields, Text, Scrolling List, Scrollbars, Panels, Frames **Layouts:** Flow Layout, Grid Layout, Border Layout, Card Layout.	**12 L**
Unit V	**Java Database Connectivity** JDBC Structure, JDBC, ODBC Bridge, SQL Package Open database, ODBC, Data Source name, ODBC Structure, Database Drivers **Networking and Sockets** Networking Basics, Connection oriented communication, Connectionless communication, Communication between client and socket and server socket, Server Socket class, Socket class, Proxy Server, UDP Sockets	**12 L** 27

Textbooks:

1. Vaishali Shah, Sharnam Shah.(2015).*Core Java 8 for Beginners*, SPD 1st edition
2. Joel Murach , Michael Urban. (2016). *Murach's beginning Java with Net Beans*, SPD 1st edition
3. Hortsman. (2013) *Core Java, Volume I: Fundamentals* Pearson 9th edition.
4. Gary Cornell and Hortsman.(2008). *Core Java, Volume II: Advanced Features* Pearson 8th edition

References:

1. Herbert Schildt . (2014). *Java: The Complete Reference* McGraw Hill 9th edition
2. R. NageswaraRao . (2008). Core Java: An Integrated Approach DreamTech 1st edition

Course: SBIT402	**Embedded Systems (Credits : 02Lectures/Week:05)**	
	Objectives: This course is structured to combine lectures, for the students to gain an in-depth understanding of fundamental concepts on embedded systems. To provide in-depth knowledge about embedded processor, its hardware. To explain programming concepts and embedded programming in C To explain real time operating systems. **Outcomes:** With these course the students should be able to: ➢ Understand the hardware and software components as well as their development cycles. ➢ Understand the deployment of embeddedprocessors and supporting devices. ➢ 8051 programming in Cdesigning of embedded system with 8051.	
Unit I	**Introduction**: Embedded Systems and general purpose computer systems, history, classifications, applications and purpose of embedded systems **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.	**12 L**
Unit II	**Embedded Systems** – Application and Domain Specific: Application specific – washing machine, domain specific - automotive. **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.	**12 L**
Unit III	**Designing Embedded System with 8051 Microcontroller**: Factors to be considered in selecting a controller, why 8051 Microcontroller, Designing with 8051. **The 8051 Microcontrollers**: Microcontrollers and Embedded processors, Overview of 8051 family. 8051 Microcontroller hardware, Input/output pins, Ports, and Circuits, External Memory.	**12 L**
Unit IV	**Programming embedded systems**: structure of embedded program, infinite loop, compiling, linking and debugging. **8051 Programming in C**: Data Types and time delay in 8051 C, I/O Programming, Logic operations, Data conversion Programs.	**12 L**
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,	**12 L**

	embedded product development life-cycle, trends in embedded industry.	

Textbook:

1. Michael Barr. (1999). *Programming Embedded Systems in C and C++*: O'Reilly.
2. Shibu K V. (2012). *Introduction to embedded systems*: Tata Mcgraw-Hill.
3. Muhammad Ali Mazidi. (2011). *The 8051 Microcontroller and Embedded Systems*: Pearson.
4. Rajkamal. *Embedded Systems*: Tata Mcgraw-Hill.

Course: SBIT403	**Computer Oriented Statistical Techniques(Credits : 02Lectures/Week:05)**	
	Objectives: Statisticians help to design data collection plans, analyze data appropriately and interpret and draw conclusions from those analyses. The central objective of the undergraduate major in Statistics is to equip students with consequently requisite quantitative skills that they can employ and build on in flexible ways. **Outcomes:** ➢ The fundamentals of probability theory, ➢ Statistical reasoning and inferential methods ➢ Statistical computing, ➢ Statistical modeling and its limitations, and have skill in ➢ Description, interpretation and exploratory analysis of data by graphical and other means;	
Unit I	**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. **The Standard Deviation and Other Measures of Dispersion:** Dispersion, or Variation,The Range, The Mean Deviation, The SemiInterquartileRange,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; Standard Scores, Software and Measures of Dispersion. **Introduction to R:** Basic syntax, data types, variables, operators, control statements, R-functions, R –Vectors, R – lists, R Arrays	**12 L**
Unit II	**Moments, Skewness, and Kurtosis** :Moments , Moments for Grouped Data ,Relations Between Moments , Computation of Moments for Grouped Data, Charlie's Check and Sheppard's Corrections, Moments in Dimensionless Form, Skewness, Kurtosis, Population Moments, Skewness, and Kurtosis, Software Computation of Skewness and Kurtosis. **Elementary Probability Theory**: Definitions of Probability, Conditional Probability; Independent and Dependent Events, Mutually Exclusive Events, Probability Distributions, Mathematical Expectation,Relation Between Population, Sample Mean, and Variance, Combinatorial Analysis, Combinations, Stirling's Approximation to n!,Relation of Probability to Point Set Theory, Euler or Venn Diagrams and Probability. **Elementary Sampling Theory** : Sampling Theory, Random Samples and Random Numbers, Sampling With and Without Replacement, Sampling Distributions, Sampling Distribution of Means, Sampling Distribution of Proportions, Sampling Distributions of Di ff and Sums, Standard Errors, Software Demonstration of Elementary Sampling Theory.	**12 L**

Unit III	**Statistical Estimation Theory:** Estimation of Parameters, Unbiased Estimates, Efficient Estimates, Point Estimates and Interval Estimates; Their Reliability, Confidence-Interval Estimates of Population Parameters, Probable Error. **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, pValues for Hypotheses Tests, Control Charts, Tests Involving Sample Di ffTests Involving Binomial Distributions erences, . **Statistics in R:** mean, median, mode, Normal Distribution , Binomial Distribution, Frequency Distribution in R.	**12 L**
Unit IV	**Small Sampling Theory:** Small Samples, Student's t Distribution, Confidence Intervals, Tests of Hypotheses and Significance, The ChiSquare 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, Contingency, Correlation of Attributes, Additive Property of chisquare.	**12 L**
Unit V	**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. **Correlation Theory**: Correlation and Regression, Linear Correlation,Measures of Correlation, The Least-Squares Regression Lines, Standard Error of Estimate, Explained and Unexplained Variation, Coe ffi, cient of Correlation Remarks Concerning the Correlation Coe ffi, cient Product-Moment Formula for the Linear Correlation Coe ffientci, Short Computational Formulas, Regression Lines and the Linear Correlation Coe ffi, Correlation of Time cient Series, Correlation of Attributes, Sampling Theory of Correlation,Sampling Theory of Regression.	**12 L**

Textbook:

1) Statistics Murray R. Spiegel, Larry J. Stephens. Mcgraw – Hill Iternational Fourth
2) A Practical Approach Using R R.B. Patil, H.J. Dand And R. BhavsarSpd 1st 2017
3) Fundamental Of Mathematical Statistics, S.C. Gupta And V.K. Kapoor Sultan Chand And Sons Eleventh Revised 2011
4) Mathematical Statistics, J.N. Kapur And H.C. Saxena S. Chand Twentieth Revised 2005

Course: SBIT404	Software Engineering (Credits :02 Lectures/Week:05)	
	Objectives: ➢ Understanding the development procedure and process ➢ Learning engineering techniques ➢ Introduction to models and estimation techniques. **Outcomes:** ➢ Engineering application to provide systematic approach to the development. ➢ Construction of business logic and management.	
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 **Socio-technical systems:** Essential characteristics of socio technical systems Emergent System Properties, Systems Engineering, Components of system such as organization, people and computers, Dealing Legacy Systems. **Critical systems:** Types of critical system, A simple safety critical system, Dependability of a system: Availability and Reliability, Safety and Security of Software systems.	**12 L**
Unit II	**Software Processes:** Process and Project, Component Software Processes, Software Development Process Models- Waterfall Model, Prototyping, Iterative Development, Rational Unified Process, The RAD Model **Software Development Process Models:** Waterfall Model, Prototyping, Iterative Development, Rational Unified Process, The RAD Model. **Agile software development:** Agile methods, Plan driven and agile development, Extreme programming, Agile project management, Scaling agile methods, Scrum and sprint. **Requirements Engineering Processes:** Feasibility study, Requirements elicitation and analysis, Requirements Validations, Requirements Management	**12 L**
Unit III	**Architectural Design:** Architectural Design Decisions, System Organisation, Modular Decomposition Styles, Control Styles, Reference Architectures. **User Interface Design:** Reference Architectures, Need of UI design, Design issues, The UI design Process, User analysis User Interface Prototyping Interface evaluation, Creating Wireframes. **Project Management:** Software Project Management, Management activities, Project Planning, Project Scheduling, Risk Management, WBS and PERT	**12 L**
Unit IV	**Verification and Validation:** 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:** Metrics, Function Point Metrics, Software Cost Estimation: Software Productivity, Estimation Techniques, Algorithmic Cost Modeling, Project Duration and Staffing	**12 L**

Unit V	**Process Improvement:** Process and product quality, Process Classification, Process Measurement, Process Analysis and Modeling, Process Change, The CMMI Process Improvement Framework. Software **Cost Estimation:** Software Productivity, Estimation Techniques Algorithmic Cost Modeling **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	**12 L**

Textbook:

1. Ian Somerville. *Software Engineering* : Pearson Education. Ninth

References:

1. Hans v an Vliet. *Software Engineering, Principles and Practice*, Wiley. Ninth
2. S. L. Pfleeger. *Software Engineering*, Macman, Eighth

Course: SBIT405	Computer Graphics and Animation(Credits : 02 Lectures/Week:05)	
	Objectives: ➢ Identify and explain the core concepts of computer graphics ➢ Apply graphics programming techniques to design, and create computer graphics scenes. ➢ Create programs to solve graphics programming issues, including 3D transformation, colour modeling, textures, and ray tracing **Outcomes:** ➢ Students will demonstrate their ability to use computer graphics techniques, models, and algorithms to solve graphics problems.	
Unit I	**Introduction to Computer Graphics:** Overview of Computer Graphics, Computer Graphics Application and Software, Description of 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 (Raster-Scan) Graphics Displays, Cathode Ray Tube Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, Random-Scan Display Processor, LCD displays. **Scan conversion** – Digital Differential Analyzer (DDA) algorithm, Bresenhams' Line drawing algorithm.Bresenhams' 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	
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. **Three-Dimensional Transformations:** Three-Dimensional Scaling, Three-Dimensional Shearing, ThreeDimensional Rotation, Three-Dimensional Reflection, ThreeDimensional Translation, Multiple Transformation, Rotation about an Arbitrary Axis in Space, Reflection through an Arbitrary Plane, Matrix Representation of 3D Transformations, Composition of 3D 12 35 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	
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.	

	Light: Radiometry,Transport,Equation,Photometry **Color:**Colorimetry,ColorSpaces,ChromaticAdaptation, Color Appearance	
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. **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.	
Unit V	**Computer Animation:** Principles of Animation, Key framing, Deformations, Character Animation, Physics-Based Animation, Procedural Techniques, Groups of Objects. **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.	35

Textbook:

1. Computer Graphics, Hearn, Baker, Pearson Publisher
2. Computer Graphics - Principles and Practice, J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Pearson Publisher

Semester IV – Practical

Course: SBIT401 PR	**Core Java Practical (Credits : 02Practicals/Week:01)**
	1.Java Basics a.Write a Java program that takes a number as input and prints its multiplication table upto 10. b.Write a Java program to display the following pattern. ***** **** *** ** * c.Write a Java program to print the area and perimeter of a circle. **2.**Use of Operators a.Write a Java program to add two binary numbers. b.Write a Java program to convert a decimal number to binary number and vice versa. c.Write a Java program to reverse a string. **3.**Java Data Types a.Write a Java program to count the letters, spaces, numbers and other characters of an input string. b.Implement a Java function that calculates the sum of digits for a given char array consisting of the digits '0' to '9'. The function should return the digit sum as a long value. c.Find the smallest and largest element from the array **4.**Methods and Constructors a.Designed a class SortData that contains the method asec() and desc(). b.Designed a class that demonstrates the use of constructor and destructor. c.Write a java program to demonstrate the implementation of abstract class. **5.**Inheritance a.Write a java program to implement single levelinheritance. b.Write a java program to implement method overriding c.Write a java program to implement multiple inheritance. **6.**Packages and Arrays a.Create a package, Add the necessary classes and import the package in java class. b.Write a java program to add two matricesand print the resultant matrix. c.Write a java program for multiplying two matricesand print the product for the same. **7.**Vectors and Multithreading a.Write a java program to implement the vectors. b.Write a java program to implement thread life cycle. c.Write a java program to implement multithreading. **8.**File Handling a.Write a java program to open a file and display the contents in the console window. b.Write a java program to copy the contents from one file to other file. c.Write a java program to read the student data from user and store it in the file. **9.**GUI and Exception Handling

	a.Design a AWT/Swing program to print the factorial for an input value. b.Design an AWT/Swingprogramto perform various string operations like reverse string, string concatenation etc. c.Write a java program to implement exception handling. **10.**GUI Programming. a.Design an AWT/Swing application that contains the interface to add student information and display the same. b.Design a calculator based on AWT/Swing application. c.Design an AWT/Swing application to generate result marks sheet. **11.**Programs using JDBC

Course: SBIT402PR	Embedded Systems Practical (Credits :02Practicals/Week:01)
	1. Design and develop a reprogrammable embedded computer using 8051 microcontrollers and to show the following aspects. a. Programming b. Execution c. Debugging 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. 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 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. 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. 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. 7. Generate traffic signal 8. Implement Temperature controller. 9. Implement Elevator control 10. Using FlashMagic (a) To demonstrate the procedure for flash programming for reprogrammable embedded system board using FlashMagic (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.

Course: SBIT403PR	Computer Oriented Statistical Techniques Practical (Credits : 02Practicals/Week:01)
	1) Using R execute the basic commands, array, list and frames. 2) Create a Matrix using R and Perform the operations addition, inverse, transpose and multiplication operations. 3) Using R Execute the statistical functions:mean, median, mode, quartiles, range, inter quartile range histogram 4) Using R import the data from Excel / .CSV file and Perform the above functions 5) Using R import the data from Excel / .CSV file and Calculate the standard deviation, variance, co-variance. 6) Using R import the data from Excel / .CSV file and draw the skewness. 7) Import the data from Excel / .CSV and perform the hypothetical testing. 8) Import the data from Excel / .CSV and perform the Chi-squared Test. 9) Using R perform the binomial and normal distribution on the data. 10) Perform the Linear Regression using R. 11) Compute the Least squares means using R. 12) Compute the Linear Least Square Regression

Course: SBIT404PR	Software Engineering Practical (Credits :02Practicals/Week:01)
	1. Study and implementation of class diagrams. **2.** Study and implementation of Use Case Diagrams. **3.** Study and implementation of Entity Relationship Diagrams **4.** Study and implementation of Sequence Diagrams **5.** Study and implementation of State Transition Diagrams **6.** Study and implementation of Data Flow Diagrams. **7.** Study and implementation of Collaboration Diagrams. **8.** Study and implementation of Activity Diagrams. **9.** Study and implementation of Component Diagrams. **10.** Study and implementation of Deployment Diagrams

Course: SBIT405PR	Computer Graphics and Animation Practical (Credits :02Practicals/Week:01)
	1. Solve the following: a. Study and enlist the basic functions used for graphics in C / C++ / Python language. Give anexample for each of them. b. Draw a co-ordinate axis at the centre of the screen. **2. Solve the following:** a. Divide your screen into four region, draw circle, rectangle, ellipse and half ellipse in each region with appropriate message. b. Draw a simple hut on the screen. **3. Draw the following basic shapes in the centre of the screen :** i. Circle ii. Rectangle iii. Square iv. Concentric Circles v. Ellipse vi. Line **4. Solve the following:** a. Develop the program for DDA Line drawing algorithm. b. Develop the program forBresenham's Line drawing algorithm. **5. Solve the following**: a. Develop the program for the mid-point circle drawing algorithm. b. Develop the program for the mid-point ellipse drawing algorithm. **6. Solve the following:** a. Write a program to implement 2D scaling. b. Write a program to perform 2D translation **7. Solve the following:** a. Perform 2D Rotation on a given object. b. Program to create a house like figure and perform the following operations. i.Scaling about the origin followed by translation. ii. Scaling with reference to an arbitrary point. iii. Reflect about the line y = mx + c. **8. Solve the following:** a. Write a program to implement Cohen-Sutherland clipping. b. Write a program to implement Liang - Barsky Line Clipping Algorithm **9. Solve the following:** a. Write a program to fill a circle using Flood Fill Algorithm. b. Write a program to fill a circle using Boundary Fill Algorithm. **10. Solve the following:** a. Develop a simple text screen saver using graphics functions. b. Perform smiling face animation using graphic functions. c. Draw the moving car on the screen

Evaluation Scheme

[A] Evaluation scheme for Theory courses

III. Continuous Assessment (C.A.) - 25 Marks

(vii) Internal Test – 20 Marks of 40 mins.Duration

(viii) Class Participation -05 Marks

IV. Semester End Examination (SEE)- 75 Marks

Q.1	**Answer any 3**	**15 Marks**
Q.2	**Answer any 3**	**15 Marks**
Q.3	**Answer any 3**	**15 Marks**
Q.4	**Answer any 3**	**15 Marks**
Q.5	**Answer any 3**	**15 Marks**

[B] Evaluation scheme for Practical courses

Practical Exam – 50 marks of 2 hours 30 mins duration


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