

**JAI HIND COLLEGE AUTONOMOUS**



**Syllabus for S.Y.BSc**

**Course : Information  
Technology**

**Semester : III**

*Credit Based Semester & Grading System*

*With effect from Academic Year 2019-20*

# List of Courses

**Course: Information Technology**

**Semester: III**

<b>SR. NO.</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>NO. OF LECTURES / WEEK</b>	<b>NO. OF CREDITS</b>
<b>SYBSc IT</b>				
1	SBIT301	Advanced Python Programming	5	2
2	SBIT302	Applied Data Structures and Algorithms	5	2
3	SBIT303	Computer Networks	5	2
4	SBIT304	Databases and Transactions	5	2
5	SBIT305	Core Java with JSP	5	2
6	SBIT301 PR	Advanced Python Programming Practical	3	2
7	SBIT302PR	Applied Data Structures and Algorithms Practical	3	2
8	SBIT303 PR	Computer Networks Practical	3	2
9	SBIT304 PR	Databases and Transactions Practical	3	2
10	SBIT305 PR	Core Java with JSP Practical	3	2

## Semester III - Theory

<b>Course: SBIT301</b>	<b>Advanced Python Programming (Credits: 02 Lectures/Week: 05)</b>	
	<p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ To be familiar about the basic constructs of programming such as functions, Strings, Tuples, Lists, Sets and Dictionaries etc.</li> <li>➤ To understand how to read/write to files, handle exceptions and multi-threading using python.</li> <li>➤ To build and package Python modules for reusability.</li> <li>➤ To understand the concept of pattern matching.</li> <li>➤ To understand the advanced concepts of GUI controls and designing GUI applications along with database connectivity to move the data to/from the application.</li> <li>➤ To be familiar with concepts of network programming, Sending email using smtp and web programming.</li> </ul> <p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>➤ Interpret Object oriented programming in Python</li> <li>➤ Understand and summarize different File handling operations</li> <li>➤ Explain how to design GUI Applications in Python and evaluate different database operations</li> <li>➤ Design and develop Client Server network applications using Python</li> </ul>	
<b>Unit I</b>	<p><b>Functions:</b> Function Calls, Type Conversion Functions, Math Functions, lambda functions, composition, Adding New Functions, Definitions and Uses, Parameters and Arguments, Fruitful Functions and Void Functions, Boolean Functions, Recursion, Checking Types.</p> <p><b>Strings:</b> String Slices, Strings Are Immutable, Searching, Looping and Counting. String Methods, the in Operator, String Comparison, String Operations.</p> <p><b>Lists:</b> Values and Accessing Elements, Lists are mutable, traversing a List, Deleting elements from List, Built-in List Operators, Built-in List functions and methods.</p> <p><b>Tuples:</b> Tuples, Accessing values in Tuples, Basic tuples operations, Built-in tuple functions.</p>	<b>15 L</b>

<p><b>Unit II</b></p>	<p><b>Sets and Dictionaries:</b>  Sets, sets are mutable, set methods, set operations and frozenset.  Creating a Dictionary, Accessing Values in a dictionary, Updating Dictionary, Deleting Elements from Dictionary, Properties of Dictionary keys, Operations in Dictionary, Built-in Dictionary Methods.  <b>Files:</b>  Text Files, The File Object Attributes, Directories.  <b>Exceptions:</b> Built-in Exceptions, Handling Exceptions, Exception with Arguments, User-defined Exceptions.  <b>Regular Expressions:</b> Concept of regular expression, various types of regular expressions, using match function, search, findall methods.  <b>Multithreaded Programming:</b>  Thread Module, creating a thread, synchronizing threads, multithreaded priority queue</p>	<p><b>15 L</b></p>
<p><b>Unit III</b></p>	<p><b>Modules:</b>  Importing module, Creating and exploring modules, Math module, Random module, Time module.  <b>Creating the GUI form: (using Tkinter/wxPython/PyQt)</b>  <b>Widgets:</b>  Button, Canvas, Checkbutton, Entry, Frame, Label, Listbox, Menubutton, Menu, Radiobutton, Scale, Scrollbar, Text, Spinbox, PanedWindow, LabelFrame, tkMessageBox. Handling Standard attributes and Properties of Widgets.  <b>Layout Management:</b>  Designing GUI applications with proper Layout Management features.  <b>Storing Data in Our MySQL Database via Our GUI:</b>  Connecting to a MySQL database from Python, Configuring the MySQL connection.  Designing the Python GUI database.  Using the INSERT command, using the UPDATE command, using the DELETE command.  Storing and retrieving data from MySQL database.</p>	<p><b>15 L</b></p>
<p><b>Unit IV</b></p>	<p><b>Network programming:</b>  Socket module, creating server-client programs, sending email using SMTP, reading from URL.  <b>Web Programming: CGI</b>  Introduction, Architecture, helping web servers process client data, building CGI applications, CGI Environment variables, GET and POST methods, using cookies in CGI, File uploading.  <b>Web Frameworks: Django</b>  Introduction, Web frameworks, Introduction to Django, Projects and Apps, “Hello World” Application.</p>	<p><b>15 L</b></p>

**Textbooks:**

1. Allen Downey. (2012). *Think Python*. Needham, Massachusetts: O'Reilly.
2. Jason Montojo, Jennifer Campbell, Paul Gries. (2014). *An Introduction to Computer Science using Python 3*. North Carolina Dallas, Texas: SPD.
3. Burkhard A. Meier. (2015). *Python GUI Programming Cookbook*. Birmingham, UK: Packt.
4. Budd. (2016). *Exploring Python*: TMH.
5. Wesley J.Chun(2012). *Core Python Applications Programming*, NJ: Pearson
6. <https://docs.python.org/3/tutorial>

## Evaluation Scheme

**[A] Evaluation scheme for Theory courses****I. Continuous Assessment ( C.A.) - 40 Marks**

- (i) C.A.-I : Test – 20 Marks of 40 mins. duration
- (ii) C.A.-II : Mini Project – 20 Marks

**II. Semester End Examination ( SEE)- 60 Marks**

- Q.1 Answer any two -10 Marks  
Q.2 Answer any two -10 Marks  
Q.3 Answer any two -10 Marks  
Q.4 Answer any two -10 Marks  
Q.5 Answer any four -20 Marks

**[B] Evaluation scheme for Practical courses**

- (i) Internal Practical – 20 marks
- (ii) External Practical – 30 marks

<b>Course:</b> <b>SBIT302</b>	<b>Applied Data Structures and Algorithms (Credits: 02 Lectures/Week: 05)</b>	
	<p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ To impart the basic concepts of data structures and algorithms</li> <li>➤ To understand concepts about searching and sorting techniques</li> <li>➤ To Understand basic concepts about stacks, queues, trees and graphs</li> <li>➤ To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures</li> <li>➤ To improve the logical ability</li> </ul> <p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>➤ Describe how arrays, records, linked lists, stacks, queues, trees, and graphs are represented in memory and used by algorithms</li> <li>➤ Describe common applications for arrays, records, linked list, stacks, queues, trees, and graphs</li> <li>➤ Demonstrate different methods for traversing trees.</li> </ul>	
<b>Unit I</b>	<p><b>Introduction</b> Data and Information, Data Structure, Classification of Data Structures, Primitive Data Types, Abstract Data Types, Operations on Data Structure, Algorithm, Importance of Algorithm Analysis, Complexity of an Algorithm, Asymptotic Analysis and Notations, Rate of Growth and Big O Notation, Role of data structure in compiler design –scanning,parsing, lexical analysis, symbol table.</p> <p><b>Array</b> Introduction, One Dimensional Array, Memory Representation of One Dimensional Array, Traversing, Insertion, Deletion, Searching, Sorting, Merging of Arrays, Multidimensional Arrays, Memory Representation of Two Dimensional Arrays, General Multi-Dimensional Arrays, Sparse Arrays, Sparse Matrix, Memory Representation of Special kind of Matrices, Advantages and Limitations of Arrays.</p>	<b>15 L</b>
<b>Unit II</b>	<p><b>Linked List</b> Linked List, One-way Linked List, Traversal of Linked List, Searching, Memory Allocation and De-allocation, Insertion in Linked List, Deletion from Linked List, Copying a List into Other List, Merging Two Linked Lists, Splitting a List into Two Lists, Reversing One way linked List, Circular Linked List, Applications of Circular Linked List, Two way Linked List, Traversing a Two way Linked List, Searching in a Two way linked List, Insertion of an element in Two way Linked List, Deleting a node from Two way Linked List, Header Linked List, Applications of the Linked list, Representation of Polynomials, Storage of Sparse Arrays, Application – Disk Management system.</p> <p><b>Stack</b> Introduction, Operations on the Stack Memory Representation of Stack, Array Representation of Stack, Applications of Stack, Evaluation of Arithmetic Expression, Matching Parenthesis, infix and postfix operations, Recursion , Application – backtracking and 8 Queens Problem</p>	<b>15 L</b>
	<p><b>Queue</b> Introduction, Queue, Operations on the Queue, Memory Representation of Queue, Array representation of queue, Linked List</p>	<b>15 L</b>

<b>Unit III</b>	Representation of Queue, Circular Queue, Some special kinds of queues, Deque, Priority Queue, Application of Priority Queue, Applications of Queues <b>Sorting and Searching Techniques</b> Bubble, Selection, Insertion, Merge Sort Searching: Sequential, Binary, Indexed Sequential Searches Binary Search. <b>Tree</b> Binary Tree, Properties of Binary Tree, Memory Representation of Binary Tree, Operations Performed on Binary Tree, Reconstruction of Binary Tree from its Traversals, Huffman Algorithm, Binary Search Tree, Operations on Binary Search Tree, Heap, Memory Representation of Heap, Operation on Heap, Heap Sort. Application- multi dimensional packet classification, minmax algorithm	
<b>Unit IV</b>	<b>Advanced Tree Structures</b> Red Black Tree, Operations Performed on Red Black Tree, AVL Tree, Operations performed on AVL Tree, 2-3 Tree, B-Tree, Application – Query Processing Hashing Techniques Hash function, Address calculation techniques, Common hashing functions Collision resolution, Linear probing, Quadratic, Double hashing, Bucket hashing, Deletion and rehashing. <b>Graph</b> Introduction, Graph, Graph Terminology, Memory Representation of Graph, Adjacency Matrix Representation of Graph, Adjacency List or Linked Representation of Graph, Operations Performed on Graph, Graph Traversal, Applications of the Graph, Reachability, Shortest Path Problems, Spanning Trees, Application – Web as dynamic graph	<b>15 L</b>
<b>Textbooks:</b> <ol style="list-style-type: none"> <li>1. Lalit Goyal, Vishal Goyal, Pawan Kumar(2014). <i>A Simplified Approach to Data Structures</i>. SPD</li> <li>2. Dinesh.P Mehta and Sartaj Sahni, <i>Handbook of Data structures</i></li> </ol>		

## Evaluation Scheme

### [A] Evaluation scheme for Theory courses

#### I. Continuous Assessment ( C.A.) - 40 Marks

(iii) C.A.-I : Test – 20 Marks of 40 mins. duration

(iv) C.A.-II : Case Study – 20 Marks

#### II. Semester End Examination ( SEE)- 60 Marks

Q.1	Answer any two	-10 Marks
Q.2	Answer any two	-10 Marks
Q.3	Answer any two	-10 Marks
Q.4	Answer any two	-10 Marks
Q.5	Answer any four	-20 Marks

### [B] Evaluation scheme for Practical courses

(i) Internal Practical – 20 marks

(ii) External Practical – 30 marks



<b>Course: SBIT303</b>	<b>Computer Networks (Credits :02 Lectures/Week: 05)</b>	
	<p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ This course is to provide students with an overview of the concepts and fundamentals of data communication and computer networks.</li> <li>➤ Build an understanding of the fundamental concepts of computer networking.</li> <li>➤ Understand and building the skills of subnetting and routing mechanisms.</li> <li>➤ Familiarize the student with the basic taxonomy and terminology of the computer networking area.</li> <li>➤ Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.</li> </ul> <p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>➤ This course will prepare students in Basic networking concepts.</li> <li>➤ Understand and explain Data Communications System and its components.</li> <li>➤ Understand different types of networks, various topologies and application of networks.</li> <li>➤ Understand types of addresses, data communication.</li> <li>➤ Have an understanding of the issues surrounding Mobile and Wireless Networks.</li> <li>➤ Understand the concept of networking models, protocols, functionality of each layer.</li> <li>➤ Learn basic networking hardware and tools.</li> <li>➤ Identify the different types of network topologies and protocols. .</li> <li>➤ Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer</li> </ul>	
<b>Unit I</b>	<p><b>INTRODUCTION to Networks and the Physical Layer</b></p> <p>USES OF COMPUTER NETWORKS: Business Applications, Home Applications, Mobile Users, Social Issues</p> <p>NETWORK HARDWARE: Personal Area Networks, Local Area Networks, Metropolitan Area Networks, Wide Area Networks, Internetworks</p> <p>NETWORK SOFTWARE: Protocol Hierarchies Design Issues for the Layers, Connection-Oriented Versus Connectionless, ServiceService Primitives, The Relationship of Services to Protocols</p> <p>REFERENCE MODELS:The OSI Reference Model, The TCP/IP Reference Model, A Comparison of the OSI and TCP/IP Reference Models</p> <p>EXAMPLE NETWORKS:The Internet, Third-Generation Mobile Phone Networks,Wireless LANs: 802.1, RFID and Sensor Networks</p> <p>NETWORK STANDARDIZATION</p>	<b>15 L</b>

	<p>THE PHYSICAL LAYER</p> <p>THE THEORETICAL BASIS FOR DATA COMMUNICATION Fourier Analysis, Bandwidth-Limited Signals, The Maximum Data Rate of a Channel</p> <p>GUIDED TRANSMISSION MEDIA: Magnetic Media, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics</p>	
Unit II	<p><b>THE PHYSICAL LAYER</b></p> <p>WIRELESS TRANSMISSION: The Electromagnetic Spectrum, Radio Transmission, Microwave Transmission, Infrared Transmission, Light Transmission</p> <p>COMMUNICATION SATELLITES: Geostationary Satellites, Medium-Earth Orbit Satellites, Low-Earth Orbit Satellites</p> <p>DIGITAL MODULATION AND MULTIPLEXING: Baseband Transmission, Passband Transmission, Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing</p> <p>THE PUBLIC SWITCHED TELEPHONE NETWORK: Structure of the Telephone System, The Local Loop: Modems, ADSL, and Fiber. Trunks and Multiplexing, Switching</p> <p>THE MOBILE TELEPHONE SYSTEM: First-Generation (1G) Mobile Phones: Analog Voice, Second-Generation (2G) Mobile Phones: Digital Voice, Third-Generation (3G) Mobile Phones: Digital Voice and Data</p>	15 L
Unit III	<p><b>Datalink Layer:</b> Introduction to DataLink Layer, Introduction Link Layer Addressing</p> <p>Error Detection and Correction: Introduction, Block Coding, Cyclic codes CheckSum, Data Link Control(DLC), DLC Services, DataLink Layer Protocols, HDLC, PPP</p> <p>MAC: Random Access, Controlled Access, Channelization</p> <p>Wired Lans: Ethernet, Ethernet Protocol, Standard Ethernet, Fast Ethernet Gigabit Ethernet, 10 Gigabit Ethernet</p> <p>Wireless LANs: Introduction, IEEE 802.11 PROJECT, Bluetooth, Wimax, Virtual Lans, RFID, Learning Bridges, Spanning Tree Bridges</p> <p><b>Network Layer</b></p>	15 L

	<p>Introduction to Network Layer- Network Layer services,Packet Switching,IPV4 Addresses,Forwading of IP Packets  Network Layer Protocols-Internet Protocol(IP),ICMPv4,Mobile IP  Unicast Routing- Introduction,Routing Algorithms,Unicast Routing Protocols, Next Gen IP-IPV6 Addressing,The IPv6 Protocol,The ICMPv6 Protocol,Transition from IPv4 to IPv6, Tunneling</p>	
<p><b>Unit IV</b></p>	<p><b>THE TRANSPORT SERVICE:</b> Services Provided to the Upper Layers, Transport Service Primitives, Berkeley Sockets</p> <p><b>ELEMENTS OF TRANSPORT PROTOCOLS:</b> Addressing, . Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery</p> <p><b>CONGESTION CONTROL ALGORITHMS:</b> Desirable Bandwidth Allocation, Regulating the Sending Rate, Wireless Issues</p> <p><b>THE INTERNET TRANSPORT PROTOCOLS:</b> UDP-Introduction to UDP, Remote Procedure Call, The Real-Time Transport Protocol</p> <p><b>THE INTERNET TRANSPORT PROTOCOLS:</b> TCP- Introduction to TCP The TCP Service Model, The TCP Protocol, The TCP Segment Header TCP Connection Establishment, TCP Connection Release</p> <p><b>THE APPLICATION LAYER:</b> DNS-THE DOMAIN NAME SYSTEM ELECTRONIC MAIL, Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery, THE WORLD WIDE WEB, REALTIME AUDIO AND VIDEO, Quality Of service and VOIP, CONTENT DELIVERY AND PEER-TO-PEER</p>	<p><b>15 L</b></p>
<p><b>Textbook:</b></p> <ol style="list-style-type: none"> <li>1. Computer Networks Andrew Tanenbaum Pearson Fifth 2013</li> <li>2. Data Communication and Networking Behrouz A. Forouzan Tata McGraw Hill Fifth Edition 2013</li> <li>3. Data and Computer Communications William Stallings Pearson Eight edition</li> </ol>		

## Evaluation Scheme

### [C] Evaluation scheme for Theory courses

#### III. Continuous Assessment ( C.A.) - 40 Marks

- (i) C.A.-I : Test – 20 Marks of 40 mins. duration
- (ii) C.A.-II : Mini Project – 20 Marks

#### IV. Semester End Examination ( SEE)- 60 Marks

- Q.6 Answer any two -10 Marks
- Q.7 Answer any two -10 Marks
- Q.8 Answer any two -10 Marks
- Q.9 Answer any two -10 Marks
- Q.10 Answer any four -20 Marks

### [D] Evaluation scheme for Practical courses

- (i) Internal Practical – 20 marks
- (ii) External Practical – 30 marks

<b>Course: SBIT304</b>	<b>Databases and Transactions (Credits: 02 Lectures/Week: 05)</b>	
	<p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ Manipulation of data.</li> <li>➤ Learning the development and structuring of data.</li> <li>➤ Managing the transactions of the automated information and management systems.</li> </ul> <p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>➤ Handling large sets of data.</li> <li>➤ Foundation for learning various types of databases.</li> <li>➤ Detailed understanding of transaction management.</li> </ul>	
<b>Unit I</b>	<p><b>Introduction to Databases:</b> Data, database system and file system, Purpose of database system, Relational databases, Database architecture.</p> <p><b>Data Models:</b> Type of data models, Business rules, Degrees of data abstraction, data independence.</p> <p><b>Database design and ER Model:</b> Overview, ER Model, Constraints, ER Diagrams, ERD Issues, Codd's rules, Relational Schemas.</p> <p><b>Relational database model and design:</b> Features, Logical view of data, Keys, integrity rule, Functional Dependency, Decomposition, Normalization (1NF, 2NF, 3NF, BCNF)</p>	<b>15 L</b>
<b>Unit II</b>	<p><b>Introduction to SQL and Constraints:</b> DDL, DQL, DML, TCL, Constraints, types of constraints, Integrity constraints</p> <p><b>Query Processing in SQL:</b> Character and numeric functions, Aggregate function, Null Values, Order by, Sequences, set operators, Group by clause with roll up and cube, sub queries and nested sub queries, Joins and types, views.</p> <p><b>User Privileges:</b> User accounts and session creation and access.</p>	<b>15 L</b>
<b>Unit III</b>	<p><b>Introduction to PL / SQL:</b> Identifiers and Keywords, Operators, Expressions.</p> <p><b>Control Blocks:</b> Control Structures, Cursors, Parametric cursors, Collections and composite data types, Procedures and Functions, Exceptions Handling, Packages, Triggers, compound Triggers and controlling triggers.</p>	<b>15 L</b>
<b>Unit IV</b>	<p><b>Transaction management and Concurrency:</b> Control Transaction management: ACID properties, serializability and concurrency control, transaction control statements, Lock based concurrency control: 2PL, Strict s2PL, Deadlocks, Time stamping methods, phantom problems, Optimistic methods, Database recovery management.</p>	<b>15 L</b>
<p><b>Textbooks:</b></p> <ol style="list-style-type: none"> <li>1. Joel Murach, A. (2014). <i>Murach's Oracle SQL and PL/SQL</i>. California, Mike Murach &amp; Associates</li> <li>2. A Silberschatz, H Korth, S Sudarshan, <i>Database System and Concepts</i>. New York, NY. McGraw-Hill, Fifth Edition</li> <li>3. C. J. Date (2003). <i>Introduction to Database System</i>. London, United Kingdom. Pearson, First Edition.</li> </ol>		

## Evaluation Scheme

### [A] Evaluation scheme for Theory courses

#### I. Continuous Assessment ( C.A.) - 40 Marks

- (i) C.A.-I :Test – 20 Marks of 40 mins. duration
- (ii) C.A.-II : Mini Project – 20 Marks

#### II. Semester End Examination ( SEE)- 60 Marks

- Answer any two -10 Marks
- Answer any two -10 Marks
- Answer any two -10 Marks
- Answer any two -10 Marks
- Answer any four -20 Marks

### [B] Evaluation scheme for Practical courses

- (i) Internal Practical – 20 marks
- (ii) External Practical – 30 marks

<b>Course:</b> <b>SBIT305</b>	<b>Course Title: Core Java with JSP (Credits :02 Lectures/Week:05)</b>	
	<p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ To become familiar with the features of Java Language</li> <li>➤ To discover how to write Java code according to Object-Oriented Programming principles.</li> <li>➤ To become comfortable with concepts such as Classes, Objects, Inheritance, Polymorphism and Interfaces</li> <li>➤ To learn Java APIs for Collections, I/O Streams</li> <li>➤ To design GUI applications and Applets using AWT and Swing.</li> <li>➤ To develop Multithreaded and Networking application</li> </ul> <p>Introduce Java EE Concepts with JSP</p> <p><b>Outcomes:</b></p> <p>The course is designed to provide programming fundamentals using JAVA along with JSP Enterprise Programming Concepts</p>	
<b>Unit I</b>	<p><b>Introduction:</b> 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><b>Data types:</b> 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.</p> <p><b>Control Flow Statements:</b> The If...Else If...Else Statement, The Switch...Case Statement</p> <p><b>Iterations:</b> The While Loop, The Do ... While Loop, The For Loop, The Foreach Loop, Labeled Statements, The Break And ContinueStatements, The Return Statement</p> <p><b>Classes:</b> 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><b>Inheritance:</b> 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><b>Packages:</b> Creating Packages, Default Package, Importing Packages,</p>	<b>15 L</b>

	Using A Package.	
<b>Unit II</b>	<p><b>Enumerations, Arrays:</b> 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.</p> <p><b>Multithreading:</b> the thread control methods, thread life cycle, the main thread, creating a thread, extending the thread class.</p> <p><b>Exceptions:</b> Catching Java Exceptions, Catching Run-Time Exceptions, Handling Multiple Exceptions, The finally Clause, The throws Clause</p> <p><b>Byte streams:</b> 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</p>	<b>15 L</b>
<b>Unit III</b>	<p><b>Event Handling:</b> Delegation Event Model, Events, Event classes, Event listener interfaces, Using delegation event model, adapter classes and inner classes.</p> <p><b>Abstract Window Toolkit and Swing:</b> 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</p> <p><b>Layouts:</b> Flow Layout, Grid Layout, Border Layout, Card Layout</p> <p><b>Applet:</b> Introduction 5.2 Types applet 5.3 Applet Life cycle - Creating applet - Applet tag 5.4 Applet Classes - Color - Graphics - Font</p> <p><b>JDBC:</b> Overview of RDBMS, Introduction to Call Level Interface (CLI), Introduction to JDBC, JDBC Architecture, Types of JDBC Drivers, Establishing a JDBC Connection, Using Statement, Using Prepared Statement, Using Callable Statement, Scrollable and Updatable Result Set, Inserting &amp; Fetching from BLOB Columns, Managing Transactions in JDBC, New Features introduced in JDBC 3.0, Auto Increment Columns</p> <p><b>Introduction to Network:</b> Introduction to Socket</p>	<b>15 L</b>
<b>Unit-IV</b>	<p><b>Introduction to JSP :</b> Java EE basic Concepts, JSP Architecture, JSP Standard / Implicit Objects, Request, Response, Out, config, Application, Session, Page, Page Context, exception, JSP Page Implementation Class, JSP Basics &amp; Syntax, JSP Directive Tags, Page Directive, Include Directive</p>	<b>15 L</b>
<p><b>Textbook:</b></p> <ol style="list-style-type: none"> <li>1) Core Java 8 for Beginners Vaishali Shah, Sharman Shah, SPD Publisher 1<sup>st</sup> Edition</li> <li>2) Java: The Complete Reference, Herbert Schildt, McGraw Hill Publication, 9<sup>th</sup> Edition</li> <li>3) Java EE7 for Beginners, Sharanam Shah, Vaishali Shah, SPD Publisher 1<sup>st</sup> Edition</li> </ol>		



## Evaluation Scheme

### [A] Evaluation scheme for Theory courses

#### I. Continuous Assessment ( C.A.) - 40 Marks

- (vii) C.A.-I : Test – 20 Marks of 40 mins. duration
- (viii) C.A.-II : Mini Project – 20 Marks

#### II. Semester End Examination ( SEE)- 60 Marks

- Q.1 Answer any two -10 Marks
- Q.2 Answer any two -10 Marks
- Q.3 Answer any two -10 Marks
- Q.4 Answer any two -10 Marks
- Q.5 Answer any four -20 Marks

### [B] Evaluation scheme for Practical courses

- (i) Internal Practical – 20 marks
- (ii) External Practical – 30 marks

<b>Course SBIT301 PR</b>	<b>Advanced Python Programming Practical (Credits :02 Practicals/Week:01)</b>
	<p><b>1. Functions and Lists</b></p> <p>a) Write a function to check the input value is Armstrong and also write the function for Palindrome.</p> <p>b) Write a recursive function to print the factorial for a given number.</p> <p>c) Take a list, say for example this one:  <math>a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]</math>  and write a program that prints out all the elements of the list that are less than 5.</p> <p>d) Write a program that takes two lists and returns True if they have at least one common member.</p> <p>e) Write a Python program to print a specified list after removing the 0<sup>th</sup>, 2<sup>nd</sup>, 4<sup>th</sup> and 5<sup>th</sup> elements.</p> <p>f) Define a procedure histogram () that takes a list of integers and prints a histogram to the screen. For example, histogram ([4, 9, 7]) should print the following:</p> <pre style="text-align: center;"> **** ***** ***** </pre> <p><b>2. Strings, Tuples and Dictionaries</b></p> <p>a) Demonstrate all the methods of string and tuples.</p> <p>b) Write a Python script to sort (ascending and descending) a dictionary by value.</p> <p>c) Write a Python script to concatenate following dictionaries to create a new one.  Sample Dictionary :  dic1={1:10, 2:20}  dic2={3:30, 4:40}  dic3={5:50,6:60}  Expected Result : {1: 10, 2: 20, 3: 30, 4: 40, 5: 50, 6: 60}</p> <p>d) Write a Python program to sum all the items in a dictionary.</p> <p><b>3. Files and Regular Expressions</b></p> <p>a) Write a Python program to read an entire text file.</p> <p>b) Write a Python program to append text to a file and display the text.</p> <p>c) Write a Python program to read last n lines of a file.</p> <p>d) Program to demonstrate the use of regular expressions.</p> <p><b>4. Exceptions and Multithreading</b></p> <p>a) Write a program to handle any five python exceptions.</p> <p>b) Write a Python program to illustrate user defined exception.</p> <p>c) Write a program for producer consumer problem to illustrate multithreading in python.</p> <p><b>5. Modules</b></p> <p>a) Open a new file in IDLE (“New Window” in the “File” menu) and save it as geometry.py in the directory where you keep the files you create for this course. Then copy the functions you wrote for calculating volumes and areas in the “Control Flow and Functions” exercise into this file and save it. Now</p>

open a new file and save it in the same directory. You should now be able to import your own module like this: `import geometry` Try and add `print dir(geometry)` to the file and run it. Now write a function `pointyShapeVolume(x, y, squareBase)` that calculates the volume of a square pyramid if `squareBase` is True and of a right circular cone if `squareBase` is False. `x` is the length of an edge on a square if `squareBase` is True and the radius of a circle when `squareBase` is False. `y` is the height of the object. First use `squareBase` to distinguish the cases. Use the `circleArea` and `squareArea` from the `geometry` module to calculate the base areas.

- b) Write a python program to demonstrate random module.
- c) Write a python program to demonstrate different methods of time module.

**6. GUI Programming: (using Tkinter/wxPython/PyQt)**

- a) Try to configure the widget with various options like: `bg='red'`, `family='times'`, `size=18`
- b) Try to change the widget type and configuration options to experiment with other widget types like Message, Button, Entry, Checkbutton, Radiobutton, Scale etc.

**7. Database Programming**

- a) Design a simple database application that stores the records and retrieve the same.
- b) Design a database application to search the specified record from the database.
- c) Design a database application to that allows the user to add, delete and modify the records.

**8. Network programming**

- a) Program to create server-client and exchange basic information.
- b) Program to send email & read contents of URL.

**9. Web programming: CGI**

- a) Create a simple CGI application. Also illustrate get and post methods.
- b) Write a CGI program to set and retrieve cookies.
- c) Write a CGI program to upload and download a file.

**10. Web programming: Django**

- a) Demonstrate simple web application using Python Django framework.

<b>Course: SBIT302 PR</b>	<b>Applied Data Structures and Algorithms Practical (Credits :02 Practicals/Week:01)</b>
	<ol style="list-style-type: none"> <li>1. <b>Implement the following:</b> <ol style="list-style-type: none"> <li>a) Write a program to store the elements in 1-D array and perform the operations like searching, sorting and reversing the elements. [Menu Driven]</li> <li>b) Read the two arrays from the user and merge them and display the elements in sorted order.[Menu Driven]</li> <li>c) Write a program to perform the Matrix addition, Multiplication and Transpose Operation. [Menu Driven]</li> </ol> </li> <li>2. <b>Implement the following for Linked List:</b> <ol style="list-style-type: none"> <li>a) Write a program to create a single linked list and display the node elements in reverse order.</li> <li>b) Write a program to search the elements in the linked list and display the same</li> <li>c) Write a program to create double linked list and sort the elements in the linked list.</li> </ol> </li> <li>3. <b>Implement the following for Stack:</b> <ol style="list-style-type: none"> <li>a) Write a program to implement the concept of Stack with Push, Pop, Display and Exit operations.</li> <li>b) Write a program to convert an infix expression to postfix and prefix conversion.</li> <li>c) Write a program to implement Tower of Hanoi problem.</li> </ol> </li> <li>4. <b>Implement the following for Queue:</b> <ol style="list-style-type: none"> <li>a) Write a program to implement the concept of Queue with Insert, Delete, Display and Exit operations.</li> <li>b) Write a program to implement the concept of Circular Queue</li> <li>c) Write a program to implement the concept of Deque</li> </ol> </li> <li>5. <b>Implement the following sorting techniques:</b> <ol style="list-style-type: none"> <li>a) Write a program to implement bubble sort.</li> <li>b) Write a program to implement selection sort.</li> <li>c) Write a program to implement insertion sort.</li> </ol> </li> <li>6. <b>Implement the following data structure techniques:</b> <ol style="list-style-type: none"> <li>a) Write a program to implement merge sort.</li> <li>b) Write a program to search the element using sequential search.</li> <li>c) Write a program to search the element using binary search.</li> </ol> </li> <li>7. <b>Implement the following data structure techniques:</b> <ol style="list-style-type: none"> <li>a) Write a program to create the tree and display the elements.</li> <li>b) Write a program to construct the binary tree.</li> <li>c) Write a program for inorder, postorder and preorder traversal of tree</li> </ol> </li> <li>8. <b>Implement the following data structure techniques:</b> <ol style="list-style-type: none"> <li>a) Write a program to insert the element into maximum heap.</li> <li>b) Write a program to insert the element into minimum heap.</li> </ol> </li> <li>9. <b>Implement the following data structure techniques:</b> <ol style="list-style-type: none"> <li>a) Write a program to implement the collision technique.</li> <li>b) Write a program to implement the concept of linear probing.</li> </ol> </li> <li>10. <b>Implement the following data structure techniques:</b> <ol style="list-style-type: none"> <li>a) Write a program to generate the adjacency matrix.</li> <li>b) Write a program for shortest path diagram</li> </ol> </li> </ol>

<b>Course:</b> <b>SBIT303 PR</b>	<b>Computer Networks Practical (Credits :02 Practicals/Week:01)</b> <ol style="list-style-type: none"> <li>1. IPv4 Addressing and Subnetting <ol style="list-style-type: none"> <li>a) Given an IP address and network mask, determine other information about the IP address such as: <ul style="list-style-type: none"> <li>• Network address</li> <li>• Network broadcast address</li> <li>• Total number of host bits</li> <li>• Number of hosts</li> </ul> </li> <li>b) Given an IP address and network mask, determine other information about the IP address such as: <ul style="list-style-type: none"> <li>• The subnet address of this subnet</li> <li>• The broadcast address of this subnet</li> <li>• The range of host addresses for this subnet</li> <li>• The maximum number of subnets for this subnet mask</li> <li>• The number of hosts for each subnet</li> <li>• The number of subnet bits</li> <li>• The number of this subnet</li> </ul> </li> </ol> </li> <li>2. Use of ping and tracert / traceroute, ipconfig / ifconfig, route and arp utilities</li> <li>3. Configure IP static routing.</li> <li>4. Configure IP routing using RIP.</li> <li>5. Configuring Simple OSPF</li> <li>6. Configuring DHCP and DNS server and client</li> <li>7. Create virtual PC based network using virtualization software and virtual NIC.</li> <li>8. a. Configuring OSPF with multiple areas  b. Configuring BGP</li> <li>9. Use of Wireshark to scan and check the packet information of following protocols <ul style="list-style-type: none"> <li>• HTTP</li> <li>• ICMP</li> <li>• TCP</li> <li>• SMTP</li> <li>• POP3</li> </ul> </li> <li>10. Configuring FTP, SSH and TELNET.</li> </ol>
-------------------------------------	--

<b>Course:</b> <b>SBIT304 PR</b>	<b>Databases and Transactions Practical (Credits :02 Practicals/Week:01)</b>
	<ol style="list-style-type: none"> <li><b>1. Relational Algebra and Calculus (Tutorial):</b> <ol style="list-style-type: none"> <li>a) Selection and projection, set operations, Joins</li> <li>b) Tuple relational calculus and Domain relational Calculus</li> </ol> </li> <li><b>2. SQL basic operations:</b> <ol style="list-style-type: none"> <li>a) Implementing DQL on Dual table</li> <li>b) DDL and DML to implement Education system.</li> </ol> </li> <li><b>3. SQL basic operations with keys and constraints:</b> <ol style="list-style-type: none"> <li>a) DDL and DML to implement Hospital system.</li> <li>b) SET operations, Aggregate functions, Order by, Group by.</li> </ol> </li> <li><b>4. Joins, subqueries and nested subqueries.</b> <ol style="list-style-type: none"> <li>a) Hospital System and Personal data tables.</li> </ol> </li> <li><b>5. Controlling user access.</b> <ol style="list-style-type: none"> <li>a) Create users, sessions.</li> <li>b) Privileges</li> </ol> </li> <li><b>6. Introduction to PL/SQL:</b> <ol style="list-style-type: none"> <li>a) Declaring Variables</li> <li>b) Writing Executable Statements</li> <li>c) Writing Control Structures</li> <li>d) Working with Composite Data Types</li> </ol> </li> <li><b>7. Cursors and Exceptions PL/SQL:</b> <ol style="list-style-type: none"> <li>a) Create cursors for the education and hospital system.</li> <li>b) Handle exceptions based on education and hospital system.</li> </ol> </li> <li><b>8. Subprograms:</b> <ol style="list-style-type: none"> <li>a) Create functions on education system.</li> <li>b) Create stored procedures on hospital system and hospital system.</li> </ol> </li> <li><b>9. Packages to contain functions and procedures.</b></li> <li><b>10. Triggers:</b> <ol style="list-style-type: none"> <li>a) Basic Triggers.</li> <li>b) Operation on Triggers</li> <li>c) Compound Triggers.</li> </ol> </li> <li><b>11. Locks.</b> <ol style="list-style-type: none"> <li>a) Implementing shared locks</li> <li>b) Implementing exclusive locks</li> </ol> </li> </ol>

<b>Course: SBIT305PR</b>	<b>Core Java with JSP Practical (Credits : 2 Practicals /Week: 01)</b>
<b>1.</b>	<b>Java Basics</b>
a.	Write a Java program that takes a number as input and prints its multiplication table
b.	Write a Java program to display the following pattern. *** ** **** ** *
c.	Write a Java program to print the area and perimeter of a circle.
<b>2.</b>	<b>Use of Operators</b>
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
c.	Write a Java program to reverse a string.
<b>3.</b>	<b>Java Data Types</b>
a.	Write a Java program to count the letters, spaces, numbers and other characters of
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
c.	Find the smallest and largest element from the array
<b>4.</b>	<b>Methods and Constructors</b>
a.	Designed a class SortData that contains the method asc() 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.
<b>5.</b>	<b>Inheritance</b>
a.	Write a java program to implement single level inheritance.
b.	Write a java program to implement method overriding
c.	Write a java program to implement multiple inheritance.
<b>6.</b>	<b>Packages and Arrays</b>
a.	Create a package, Add the necessary classes and import the package in java
b.	Write a java program to add two matrices and print the resultant matrix.
c.	Write a java program for multiplying two matrices and print the product for the same.
<b>7.</b>	<b>Vectors and Multithreading</b>
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.
<b>8.</b>	<b>File Handling</b>

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.
<b>9.</b>	<b>GUI and Exception Handling</b>
a.	Design a AWT program to print the factorial for an input value.
b.	Design an AWT program to perform various string operations like reverse string.
c.	Write a java program to implement exception handling.
<b>10.</b>	<b>GUI Programming.</b>
a.	Design an AWT application that contains the interface to add student information
b.	Design a calculator based on AWT application.
c.	Design an AWT application to generate result marks sheet.
<b>11.</b>	<b>Implement the following JSP applications.</b>
a.	Develop a simple JSP application to display values obtained from the use of
b.	Develop a simple JSP application to pass values from one page to another with
c.	Create a registration and login JSP application to register and authenticate the