JAI HIND COLLEGE
BASANTSING INSTITUTE OF SCIENCE
&
J.T. LALVANI COLLEGE OF COMMERCE
(AUTONOMOUS)
"A" Road, Churchgate, Mumbai - 400 020, India.

Affiliated to
University of Mumbai

Program : B.Voc

Proposed Course : Software Development

Semester III

Credit Based Semester and Grading System (CBCS) with effect from the academic year 2022-23

S.Y.BVOC (Software Development)

Academic year 2022-2023

Semester III			
Course Code	**Course Title**	**Credits**	**Lectures /Week**
General Component			
SBSD301	Computational Mathematics	2	3
SBSD302	Green Computing	2	3
SBSD303	Digital Marketing	2	3
Skill Component			
SBSD304	Advanced Java	2	3
SBSD305	Python Programming and Data Structures	2	3
SBSD306	Data Communications and Network Security	2	3
SBSD307	Software Testing	2	3
SBSD304PR	Advanced Java Practical	2.5	3
SBSD305PR	Python Programming and Data Structures Practical	2.5	3
SBSD306PR	Data Communications and Network Security Practical	2.5	3
SBSD307PR	Software Testing Practical	2.5	3

Course Code: SBSD301	Course Title: Computational Mathematics (Credits :2 Lectures/Week: 3)
	Objectives: ◻ It will develop problem-solving and critical thinking skills and use these skills to solve complex computing problems **Outcomes:** ◻ Understand strategies for effective design and their application in designing computing systems ◻ Develop inductive and deductive skills in reasoning ◻ Formulate and solve abstract mathematical problems ◻ Gain experience in mathematical modeling of real-world phenomena using approximation and hypothesis testing and linear programming. ◻ Learn to acquire problem requirements and specifications from the client and express them

	THEORY	**(45 lectures)**
Unit I	**The Mean, Median, Mode, and Other Measures of Central Tendency**: Histogram, types of data ,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.	10 L
Unit II	**Random Variable and Distribution Function:** discrete and continuous distributions, Moments and Moment Generating Functions; Binomial Distribution; Poisson Distribution; Negative Binomial Distribution; Geometric Distribution; properties **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 Hypothesis Tests, Control Charts, Tests Involving Sample DiffTests Involving Binomial Distributions. **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.	13 L
Unit III	**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	12 L

	Line, Nonlinear Relationships, The Least-Squares Parabola, Regression, Applications to Time Series. **Linear Programming:** Linear optimization problem, Formulation and Graphical solution, Basic solution and Feasible solution**.**	
Unit IV	**Roots of non-linear equations**: Bisection method, Regula-Falsi method, Newton-Raphson Method, error **Interpolation**: Forward Difference, Backward Difference, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Lagrange's Interpolation.	**10 L**

Textbook:
1. "Fundamentals of Mathematical Statistics" by S. C. Gupta, V. K.Kapoor
2. "Introductory Methods of Numerical Methods" by S. S. Shastri , Vol.2
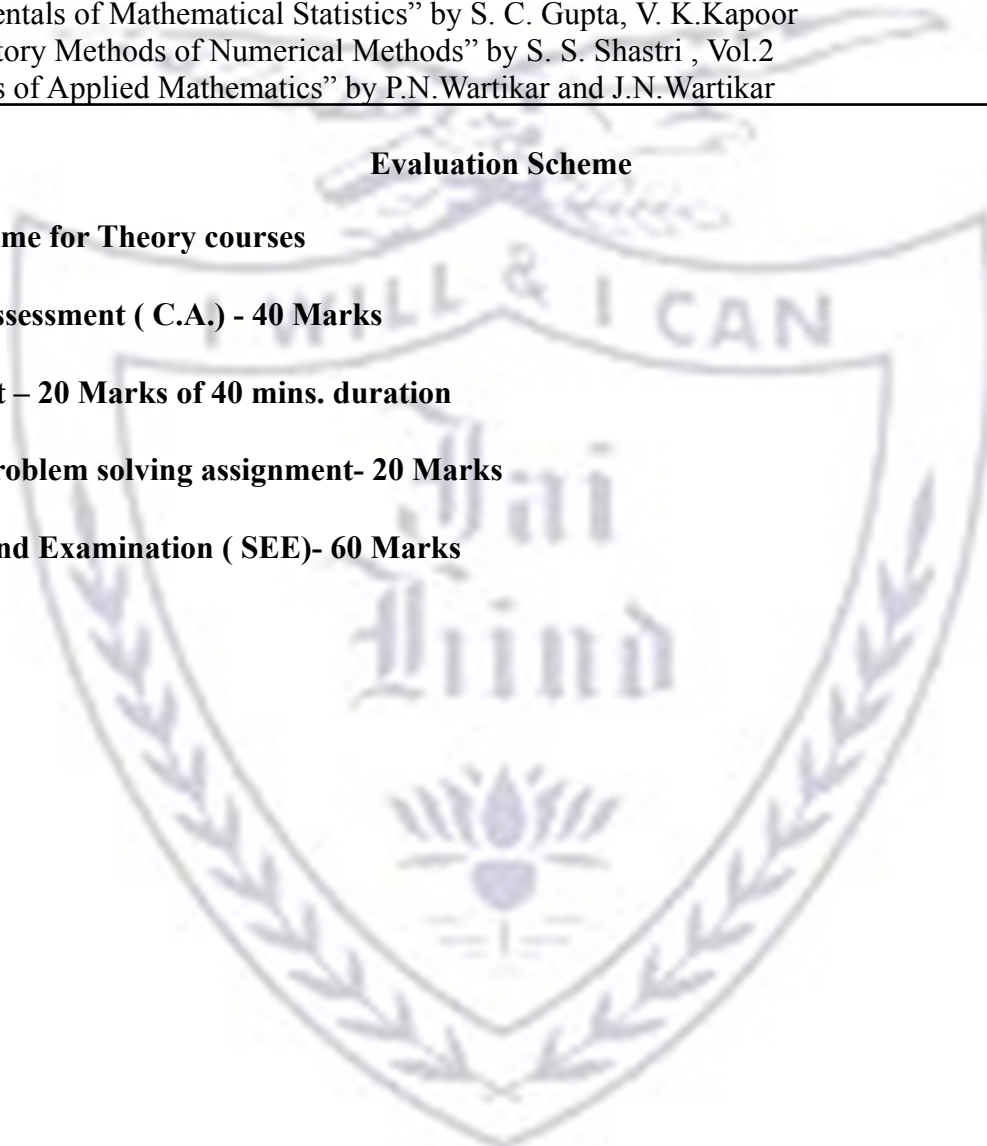3. "Elements of Applied Mathematics" by P.N.Wartikar and J.N.Wartikar

Evaluation Scheme

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 : Problem solving assignment- 20 Marks

   II. Semester End Examination (SEE)- 60 Marks

Course Code: SBSD302	Green Computing(Credits :02 Lectures/Week:03)	
	Objectives: ☐ The objective is to make them understand the major causes of fires and learn how to prevent fires, look for possible fire hazards and be aware of fire safety devices in their office and building. ☐ It also intends to provide graduate students with an understanding of the role of Green Computing and their impact on the global carbon footprint. This includes how to estimate the carbon footprint of the Green Computing operations of an organization and access ways to reduce the carbon footprint by changes to policies for procurement of raw materials, changes to Computing operations and revising business processes. **Outcomes:** ☐ Have a greater awareness of fire and be able to select the correct firefighting equipment relative to its contents, capacity and limitations and operate it safely in the event of fire. ☐ Evaluate workplace to determine the existence of occupational safety and health hazards. ☐ Perform cradle to grave lifecycle analyses of the materials used in electronic devices. ☐ Students will be aware and promote green initiatives in their environments leading to a green movement. ☐ Understand the environmental impacts of using paper and knowledge about the cost and efficiency benefits of reducing paper. ☐ Relate the challenge of managing e- waste to the broader goal of developing sustainable electronics.	
	THEORY	**(45 lectures)**
Unit I	**Occupational Safety & Health Management-** **Making A Commitment: Management's Commitment And Involvement**, Roles and Responsibilities, Responsibility, Discipline, Management Accountability, Supervisory Accountability. **Being A Part: Workforce Involvement,** Joint Labour/Management Safety and Health Committees, Policy Establishing Joint Committees. **Put It in Writing: A Written Safety and Health Program,** Reasons for a Comprehensive Safety Program, Building A Safety and Health Program, Other Required Written Programs, Requirements and Elements of OSHA Guidelines For a Safety and Health Program, Emergency and Medical Planning, Emergency Procedures and Response **Fire Safety-** **Fire Chemistry:** Definition of Fire, Fire Triangle, Fire Tetrahedron, Classes of Fire, Three Stages of Fire. **Essential Elements:** Action Plan for Developing a Program, Program Goals, Program Elements. **Identification and Control of Materials Considered Hazardous:** Identification of Hazardous Materials, Ignition Sources, Flash Point and Ignition Points, The Use of Chemicals, Combustible Solids, Combustible Metals. **Fire Detection Systems:** Automatic Fire Detection Systems, Radiation Detectors, Smoke Detectors.	**12 L**

	Fire Control Systems: Automatic Sprinkler Systems, Carbon Dioxide Systems, Foam Extinguishing Systems, Water Spray Systems, Dry Chemical Extinguishing Systems, Portable Fire Extinguishers. **Emergency Response Planning for Safety:** Alerting and Warning Employees, Accountability after Evacuation, Training Employees on Types of Emergencies.	
Unit II	**Minimizing Power Usage:** Power Problems, Monitoring Power Usage Servers, Low-Cost Options, Reducing Power Use, Data De-Duplication, Virtualization, Management, Bigger Drives, Involving the Utility Company, Low Power Computers, PCs, Linux, Components, Servers, Computer Settings, Storage, Monitors, Power Supplies, Wireless Devices, Software. **Cooling:** Cooling Costs, Power Cost, Causes of Cost, Calculating Cooling Needs, Reducing Cooling Costs, Economizers, On-Demand Cooling, HP's Solution, Optimizing Airflow, Hot Aisle/Cold Aisle, Raised Floors, Cable Management, Vapour Seal, Prevent Recirculation of Equipment Exhaust, Supply Air Directly to Heat Sources, Fans, Humidity, Adding Cooling, Fluid Considerations, System Design, Datacentre Design, Centralized Control, Design for Your Needs, Put Everything Together.	**10 L**
Unit III	**Going Paperless:** Paper Problems, The Environment, Costs: Paper and Office, Practicality, Storage, Destruction, Organizational Realities, Changing Over, Paperless Billing, Handheld Computers vs. the Clipboard, Unified Communications, Intranets, What to Include, Building an Intranet, Microsoft Office SharePoint Server 2007, Electronic Data Interchange (EDI), Nuts and Bolts, Value Added Networks, Advantages, Obstacles. **Datacenter Design and Redesign:** Energy Consumption Design Upgrading Servers, Server consolidation, Virtualization. **Virtualization:** Server Virtualization- Introduction, Advantages, Best Practices, Use Caution. Server Virtualization Solutions- VMware Infrastructure 3, Microsoft Virtual Server 2005.	**13 L**
Unit IV	**Recycling:** Problems, China, Africa, Materials, Means of Disposal Recycling, Refurbishing, Make the Decision Life Cycle, from beginning to end, Life, Cost, Green Design, Recycling Companies, Finding the Best One, Checklist, Certifications. Hard Drive Recycling: Consequences, cleaning a Hard Drive, Pros and cons of each method, CDs and DVDs, good and bad about CD and DVDs disposal, Change the mind-set **Staying Green:** Organizational Check-ups, Chief Green Officer, Evolution, Sell the CEO, SMART Goals, Equipment Check-ups, Gather Data, Tracking the data, Baseline Data, Benchmarking, Analyse Data, Conduct Audits.	**10 L**

Textbooks:
1. Occupational Health and Safety Management - A Practical Approach by Charles D. Reese
2. Fire Safety Management Handbook by Daniel E. Della-Giustina
3. Green IT: Reduce Your Information System's Environmental Impact while adding to the bottom line by Toby Velte, Anthony Velte, Robert Elsenpeter

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 :Project /Case Study - 20 Marks

II. Semester End Examination (SEE)- 60 Marks

Course Code: SBSD303	Course Title: Digital Marketing (Credits:02 Lectures/Week:03)	
	Objectives: **The course will help students to** ☐ Understand the Digital Marketing tools and techniques to optimize searches, market content on social media and various strategies ☐ It will teach students how to market their products (tour package or a software program) ☐ Learning SEO and online business promotion tools are often in demand skills and students will be equipped for the industry **Outcomes:** ☐ This course will teach students about the importance and concept of digital marketing, Search Engine Optimization, Marketing on Social Media, Affiliate Marketing and Mobile Commerce. Digital Marketing Skills are much needed in all the fields today.	
	THEORY	**(45 lectures)**
Unit – I:	**Digital Marketing** **Concept and Scope** Competitor and Website Analysis Online Buying behavior Target Audience analysis List of Free and Premium Digital Marketing Tools **Search Engine Optimization (SEO)** Rank Webpage on top of search, ORM, Google Webmaster Tool, Google Analytics, Paid Ads Optimization Strategies **Pay-per-click advertising (PPC)-**Google Ads Campaign Management, Optimization, and Reporting **Content marketing**: Designing Content, Choosing Digital Marketing Channels, Blogs, Infographics or Video as per the Target Audience	**15L**
Unit – II	**Social Media Platforms to serve Ads** Social Networking (Facebook, LinkedIn, etc.) Facebook Marketing Tools Microblogging (Twitter, Tumblr) Photo sharing (Instagram, Snapchat, Pinterest) Video sharing (YouTube, Facebook Live, Instagram, etc.)	**10L**

Unit – III	**Affiliate marketing:** Concept, Referrals can mention your website and backlink it to your own businesses **Email marketing**: - Cost saving tool, advantages and disadvantages **Display advertising** blogs, networks, video ads, contextual data, ads on the search engines, classified or dynamic advertisement **Manage your Online Reputation**	**10L**
Unit – IV	**Mobile commerce and E commerce Business Marketing** **Mobile Marketing** (SMS Marketing) Mobile optimized template with right UX and loading speed Multi -channel marketing **E commerce Business Marketing** E commerce websites Neuromarketing Techniques **Data Visualization**- Google Data Studio, Google Sheets Digital Marketing Strategies-Case studies	**10L**

Textbooks:
1. Koontz, O'Donnell &Weihrich, (1980) *Management,* Tokyo: McGrawHill Inc
2. Robbins (16th ed) (1979). *Organizational Behavior*, New Delhi: Prentice-Hall of India.
3. Singh, D. (2001). *Emotional Intelligence at work*, Response Books, New Delhi: Sage Publication
4. Sissors, Jack Z., Surmanek, Jim. (1976). *Advertising Media Planning*: Crain books.
5. James R Adams. (1977). *Media Planning*: Business books.
6. D, Nidhi. (ed 2011). *E-Commerce Concepts and Applications*, Mumbai: International Book House Pvt Ltd.
7. Whiteley, David. (2013). *E-Commerce Technologies and Applications,* London: McGraw Hill.

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 : Presentation- 20 Marks

II. Semester End Examination (SEE)- 60 Marks

Course Code: SBSD304	Course Title: Advanced Java (Credits :02 Lectures/Week: 03)	
	Objectives: ☐ Knowledge of the structure and model of the java programming language, (knowledge) ☐ Use the java programming language for various programming technologies (understanding) ☐ Develop software in the java programming language, (application) ☐ Evaluate user requirements for software functionality required to decide whether the java programming language can meet user requirements (analysis) **Outcomes:** ☐ Programming in the Java programming language ☐ Knowledge of object-oriented paradigm in the Java programming language, ☐ The use of Java in a variety of technologies and on different platforms.	
	THEORY	**(60 Lectures)**
Unit I	**Introduction to servlets:** Need for dynamic content, java servlet technology,why servlets? Servlet API and Lifecycle: servlet API, servletConfig interface, ServletRequest and ServletResponse Interfaces, GenericServlet Class. ServletInputStream And ServletOutputStream Classes, RequestDispatcherInterface,HttpServletClass,HttpServletRequest and HttpServletResponse Interfaces, HttpSessionInterface,Servlet Lifecycle. **Working with servlets:** organization of a web application, creating a web application(using netbeans) , creating a servlet, compiling and building the web application	15 L
UNIT II	**JSP:** Introduction, disadvantages, JSP v/s Servlets, Life Cycle of JSP, Comments,JSPdocuments,JSP elements, Action elements, implicit objects, scope,character quoting conventions, unified expression language. Java server Faces : Need of MVC , what is JSF?, components of JSF, JSF as an application, JSF lifecycle,JSF configuration, JSF web applications (login form, JSF pages) **EJB:** Enterprise bean architecture,Benefits of enterprise bean, types of beans,Accessing beans ,packaging beans, creating web applications, creating enterprise bean, creating web client, creating JSP file, building and running web application	15 L

UNIT III	**Persistence, Object/Relational Mapping And JPA:** What is Persistence? Persistence in Java, Current Persistence Standards in Java, Why another Persistence Standards? Object/Relational Mapping, Introduction to Java Persistence API: The Java Persistence API, JPA, ORM, Database and the Application, Architecture of JPA, How JPA Works? JPA Specifications: Application Requirement Specifications, Software Requirements, The Application Development Approach, Creating Database and Tables in Mysql, creating a Web Application, Adding the Required Library Files, creating a Javabean Class, Creating Persistence Unit [Persistence.Xml], Creating JSPS, The JPA Application Structure, Running the JPA Application.	15 L
UNIT IV	**Introduction to Hibernate:** What is Hibernate? Why Hibernate? Hibernate, Database and The Application, Components of Hibernate, Architecture of Hibernate, How Hibernate Works? Writing Hibernate Application: Application Requirement Specifications, Software Requirements, The Application Development Approach, Creating Database and Tables in Mysql, creating a Web Application, Adding the Required Library Files, creating a Javabean Class, Creating Hibernate Configuration File, Adding a Mapping Class, Creating JSPS, Running The Hibernate Application.	15 L

Textbooks:
1. Java Server Faces A practical Approach for beginners, B M Harwani, Eastern Economy
2. Edition (PHI).
3. Advanced Java Technology, Savaliya, Dreamtech.
4. Java EE 7 For Beginners, Sharanam Shah, Vaishali Shah, SPD, First edition , 2017
5. Java EE 8 Cookbook: Build reliable applications with the most robust and mature technology for enterprise development, Elder Moraes, Packt, 2018
6. Advanced Java Programming, Uttam Kumar Roy, Oxford press, 2015

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- 20Marks

II. Semester End Examination (SEE)- 60 Marks

Course Code: SBSD305	Course Title: Python Programming and Data Structures (Credits : 02 Lectures/Week: 03)	
	Objectives: ☐ To be familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc. ☐ To understand how to read/write to files, handle exception using python. ☐ To build and package Python modules for reusability. ☐ To design and understand object‑oriented concepts with Python classes. ☐ To understand the concept of pattern matching. ☐ To understand the concepts of GUI controls and designing GUI applications along with database connectivity to move the data to/from the application. **Outcomes:** ☐ In addition to providing an overview of how Python is used in the business world today, this course is intended to teach basic to intermediate to advance level programs involving data using Python. ☐ This course focuses on both procedural programming and object-oriented design. Thus this course can serve as a good foundation to learn other applications of Python (such as mobile development) as well as other programming languages.	
	THEORY	**(60 Lectures)**
Unit I	**Introduction**: The Python Programming Language, History, features, Installing Python, Running Python program. Interactive and script modes of IDLE, Data Types : Values and Types Type conversion, expressions and operators Of types int, float, boolean. Built-in function type. Operator precedence. Variables, Variable Names and Keywords. **Control Statements**: The conditional statements if, if-else, if-elsif-else The iterative statements while, while-else, for-else. Nested compound statements. The continue statement to skip over one iteration of a loop, the break statement to exit the loop, pass statement. **Functions**: The import statement for already-defined functions and constants. The compound statement def to define functions; the role of indentation for delimiting the body of a compound statement; calling a previously defined function. Advantages of functions, function parameters, Recursive functions Built-in functions. **Modules**: Importing module, Creating and exploring modules, Math module, Random module, Time module.	**15 L**
Unit II	**Strings**: Strings and tuples are immutable, lists are mutable. String Methods, operators and comparison. **Tuples**: Built-in methods, Operations **Lists**: Accessing elements, Built-in List functions, List Operations **Sets and Dictionaries**: Difference between sets and dictionaries, Sets and frozen sets. Creating a Dictionary, Accessing Values in a Dictionary, Built-in methods, Operations on dictionary. **Introduction to object-oriented programming**: Classes, Constructors, Inheritance. **Python File Input-Output:** Opening and closing files, Various types of file modes, Reading and writing to files	**15 L**

	Exception handling: What is an exception, Various keywords to handle exceptions such try, catch, except, else, finally, raise.	
Unit III	**GUI with Tkinter**: Widgets- Button, Canvas, Checkbutton, Entry, Frame, Label, Listbox, Menubutton, Menu, Radiobutton, Scale, Scrollbar, Text. ,Spinbox, PanedWindow, LabelFrame, tkMessagebox. Handling Standard attributes and Properties of Widgets. **Database connectivity in Python**: Mysql connector, accessing connector module. Using connect, cursor, execute & close functions. Reading single & multiple results of query execution, executing different types of statements, executing transactions. **Flask**: Introduction, Initialization, Routes and View Functions, Server Startup, The Request-Response Cycle, Templates, Request object, cookies, session, Redirect.	**15 L**
Unit IV	**Stacks**: Operations enqueue() and dequeue(), i.e., enter() and exit(),is_empty(), first(), last()); implementation using Python lists, Application **Queues**: Operations push(), pop(), is_empty(); stacktop(), len() implementation using lists. Applications **Linked List**: Singly, doubly and circularly linked lists, with head and optional tail. Implementation of list nodes as Python objects. Operations: insertion and deletion at the front and the rear of the list. Search for a value in a list, Delete a value in a list. Applications **Trees**: Trees and binary trees, definitions and properties Insertion and deletion of a tree node. Binary tree traversal.	**15 L**

Textbooks:

1. Allen Downey. (2012). Think Python. Needham, Massachusetts: O'Reilly.
2. Allen Downey. (2012). Think Python.Retrieved from http://www.greenteapress.com/thinkpython/thinkpython.pdf
3. Miguel Grinberg. Flask Web Development: O'Reilly.
4. Jason Montojo, Jennifer Campbell, Paul Gries. (2014).   An Introduction to Computer Science using Python 3. North Carolina Dallas, Texas: SPD.
5. Goodrich, Tamassia, Goldwasser.(2016).Data Structures and Algorithms in Python: J. Wiley.
6. Rance D. Necaise, College of William and
7. Mary.(2016).Data Structures and Algorithms Using Python: J. Wiley.
8. Burkhard A. Meier. (2015). Python GUI Programming Cookbook. Birmingham, UK: Packt.
9. E. Balagurusamy. (2016). Introduction to Problem Solving with Python: TMH.
10. Joel Murach, Michael Urban. (2017).Murach's Python programming: SPD.
11. Michael H.Goldwasser, David Letscher. (2008). Object-oriented Programming in Python. Upper Saddle River, N.J: Pearson Prentice Hall.
12. Budd. (2016). Exploring Python: TMH.
13. 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

Course Code: SBSD306	Course Title: Data Communications and Network Security (Credits :02 Lectures/Week:03)	
	Objectives: ☐ The course objectives include learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks, and gaining practical experience in configuring, monitoring, and troubleshooting of LAN systems. **Outcomes:** ☐ Interpret the basics of Computer Networks and Various Protocols. ☐ Generalize functionalities and services of each layer of OSI and TCP/IP model. ☐ Explains the concept of data framing and error control mechanisms ☐ Compares Different routing protocols ☐ Understand types of addresses, data communication. ☐ Understanding client- server network application in form of TELNET, FTP, HTTP, Email concepts. ☐ Understanding the basics of Security and Cryptographic Algorithms	
	THEORY	**(60 Lectures)**
Unit I	**Introduction to Physical layer: Data and signals:** Analog and Digital, periodic analog signals, digital signals, transmission impairment, data rate limits, performance. **Digital and Analog transmission:** Digital-to-digital conversion, analog-to-digital conversion, transmission modes, digital-to-analog conversion, analog-to-analog conversion. **Bandwidth Utilization: Multiplexing and Spectrum Spreading:** Multiplexing, Spread Spectrum **Switching:** Circuit switched networks, Datagram Networks, structure of a switch	15L
Unit II	**Introduction to the Data Link Layer: Error detection and correction**: Introduction, block coding, Linear block codes, cyclic codes, checksum, forward error correction, error correcting codes, error detecting codes. **Data Link Control:** Framing, Flow and Error Control, Protocols, Noiseless channels, Noisy Channels, HDLC, Point-to-point Protocol **Multiple Access**: Random access, controlled access, channelization **Wired LANs** – Ethernet Protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet **Wireless LANs & WANs:** Introduction, IEEE 802.11 project, Bluetooth, Cellular telephony, Satellite networks. Virtual LANs.	15L

Unit III	**Introduction to the Network Layer**: **Logical Addressing:** IPv4 addresses, IPv6 Addresses **Internet Protocol:** Internetworking, IPv4 and IPv6 packet format, Transition from IPv4 and IPv6 **Address mapping, Error Reporting and Multicasting:** Address mapping, ICMPv4, IGMP, ICMPv6 **Routing Protocols:** Unicast routing protocols and Multicast routing protocols **Introduction to the Transport Layer**: Process to Process delivery, UDP, TCP	15L
Unit IV	**Introduction to Application Layer:** Domain name system, Remote logging, Electronic mail and File Transfer, World wide-web and HTTP **Introduction to the concepts of Security:** The need for security, Principles of Security, Types of Attacks **Cryptography Techniques:** Introduction, Plain Text and Cipher Text, Substitution Techniques, Transposition Techniques, Encryption and Decryption, Symmetric and Asymmetric Key Cryptography, Key Range and Key Size.	15 L

Textbooks:
1. Data Communication and Networking Behrouz A. Forouzan Tata McGraw Hill Fifth Edition
2. Computer Networks Andrew Tanenbaum Pearson Fifth Edition
3. Cryptography and Network Security, Atul Kahate, McGraw Hill Third Edition

Evaluation Scheme

[A] Evaluation scheme for Theory courses

III.   Continuous Assessment (C.A.) - 40 Marks
iii)   C.A.-I : Test – 20 Marks of 40 mins. duration
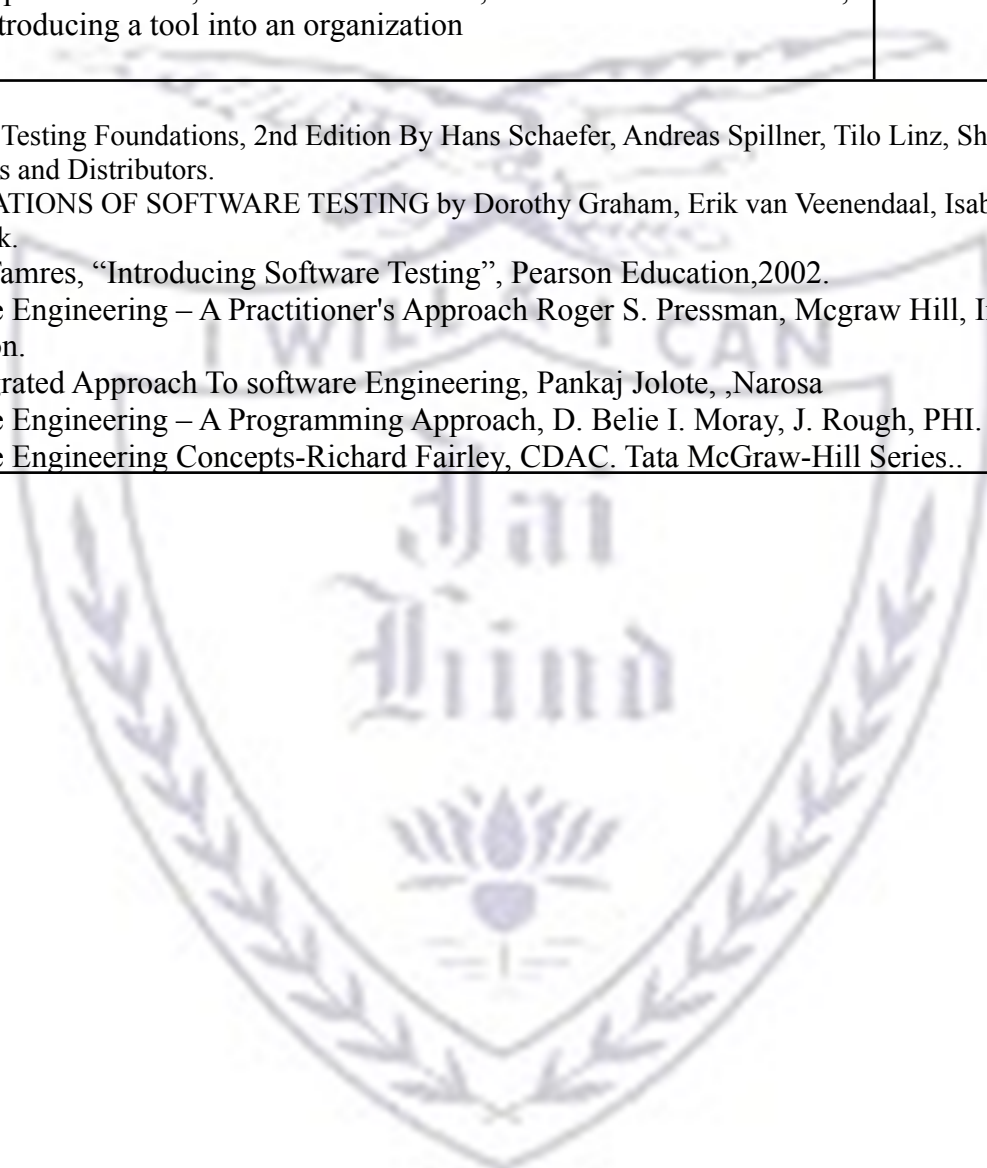   **iv) C.A.-II : Mini-Project-20 Marks**

IV. Semester End Examination (SEE)- 60 Marks

Course Code: SBSD307	Course Title: Software Testing (Credits :02 Lectures/Week:03)
	Objectives: ☐ To study various test processes and continuous quality improvement. ☐ To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing. ☐ To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects. ☐ To understand the difference between Types of errors and faults. ☐ To study methods of test generation from requirements. ☐ To understand the use of various test tools Application of software testing techniques in commercial environments. **Outcomes:** ☐ Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods ☐ Design and conduct a software test process for a software testing project. ☐ Understand the use of software testing methods and modern software testing tools for their testing projects ☐ Design SQA activities, SQA strategy, formal technical review report for software quality control and assurance ☐ Apply software testing knowledge and engineering methods

	THEORY	(60 Lectures)
Unit I	**Fundamentals of testing:** Necessity of testing, what is it, Testing principles, Fundamental test process, The psychology of testing **Testing throughout the software life cycle:** Software development models, Test levels, Test types: the targets of testing, Maintenance testing	**15 L**
Unit II	**Static techniques**: Reviews and the test process, Review process, Static analysis by tools **Test design techniques:** Identifying test conditions and designing test cases, Categories of test design techniques, Specification-based or black box techniques Structure-based or white-box techniques, Experience based techniques	**15 L**
Unit III	**Test management**: Test organization, Test plans, Estimates and strategies, Test progress monitoring and control Configuration management, Risk and testing Incident	**15 L**

	Standards and Test Process Improvement Introduction, Standards Considerations, Test Improvement Process, Capability Maturity Model Integration,(CMMI). ISO standards	
Unit IV	**Software Quality Assurance(SQA):** Quality and factors, Quality Assurance,Quality Control Software Quality Metrics, Process and Product Quality, Capability Maturity Model (CMM). Software Quality Assurance(SQA), Need for SQA, SQA Activities, Building blocks of SQA **Tool support for testing**: Types of test tool, Effective use of tools, Potential benefits and risks, Introducing a tool into an organization	**15 L**

Textbook:
1. Software Testing Foundations, 2nd Edition By Hans Schaefer, Andreas Spillner, Tilo Linz, Shroff Publishers and Distributors.
2. FOUNDATIONS OF SOFTWARE TESTING by Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black.
3. Louise Tamres, "Introducing Software Testing", Pearson Education,2002.
4. Software Engineering – A Practitioner's Approach Roger S. Pressman, Mcgraw Hill, International Education.
5. An Integrated Approach To software Engineering, Pankaj Jolote, ,Narosa
6. Software Engineering – A Programming Approach, D. Belie I. Moray, J. Rough, PHI.
7. Software Engineering Concepts-Richard Fairley, CDAC. Tata McGraw-Hill Series..

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/Case Study: 20 Marks

II. Semester End Examination (SEE)- 60 Marks

Course Code: SBSD304 PR	**Advance Java practical**
	(Credits :2.5 Practicals/Week:01)
	1. Develop Simple Servlet Question Answer Application to demonstrate use of HttpServletRequestand HttpServletResponse interfaces.
	2. Develop Servlet Application of Basic Calculator (+,-,*, /, %) using ServletInputStream and ServletOutputStream
	3. Develop a JSP Application to accept Registration Details form user and Store it into the database table.
	4. Develop a JSP Application to Authenticate User Login as per the registration details.
	5. If login success the forward user to Index Page otherwise show login failure Message
	6. Develop a web application to add items in the inventory using JSF.
	7. Develop a simple Inventory Application Using JPA.
	8. Create a simple JPA application to store and retrieve Book details.
	9. Develop a JPA Application to demonstrate use of ORM associations.
	10. Develop an application to demonstrate Hibernate One- To -One Mapping Using Annotation.

Evaluation Scheme

[B] Evaluation scheme for Practical courses-50 Marks

Course Code: SBSD305 PR	Course Title: Python Programming and Data Structures Practical (Credits:2.5 Practicals/Week:01)

	Practical: 1
	   a. Programs based on lists, conditional constructs, the for statement and the range function; interactively using the built-in functions len, sum, max, min.
	   b. Programs using break and continue statements.
	   c. Write a program to implement user defined module.
	
	Practical 2:
	   a. Programs related to string manipulation.
	   b. Programs using list comprehensions and anonymous functions.
	
	Practical 3:
	   a. Programs related to dictionaries.
	   b. Programs using the built-in methods of the string, list and dictionary classes
	
	Practical 4:
	   a. Design a class that store the information of Employee and display the same.
	   b. Implement the concept of inheritance using python.
	
	Practical 5:
	   a. Programs to read and write files.
	   b. Program to demonstrate exception handling
	   c. Program to demonstrate the use of regular expressions
	
	Practical 6:
	   a. Program based on GUI application using Tkinter.
	
	Practical 7:
	   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.
	
	Practical 8:
	   a. Creating web-based application using Flask with app routing.
	   b. Implementing Templates in Flask
	   c. Implementing cookies and session in flask.
	
	Practical 9:
	   a. Write a program to implement stack and its applications.
	   b. Write a program to implement queue and its applications.
	   c. Write a program to implement linked list and its applications. (singly, doubly)
	
	Practical 10:
	   a. Write a program to perform insertion and deletion of a node from a tree.
	   b. Write a program to print pre-order, post-order and in-order traversal of a tree

Evaluation Scheme

[B] Evaluation scheme for Practical courses- 50 Marks

Course Code: SBSD306	Course Title: Data Communications and Network Security Practical (Credits :2.5 Practicals / Week:01)

PR	1. IPv4 Addressing and Subnetting
	    a) Given an IP address and network mask, determine other information about the IP address such as:
	      ● Network address
	      ● Network broadcast address
	      ● Total number of host bits
	      ● Number of hosts
	
	    b) Given an IP address and network mask, determine other information about the IP address such as:
	      ● The subnet address of this subnet
	      ● The broadcast address of this subnet
	      ● The range of host addresses for this subnet
	      ● The maximum number of subnets for this subnet mask
	      ● The number of hosts for each subnet
	      ● The number of subnet bits
	      ● The number of this subnet
	
	2. Use of ping and tracert / traceroute, ipconfig / ifconfig, route and arp utilities.
	3. Configure IP static routing.
	4. Configure IP routing using RIP.
	5. a. Configuring Simple OSPF.
	   b. Configuring OSPF with multiple areas.
	6. Configuring DHCP server and client.
	7. Configuring DNS Server and client.
	8. Configuring HTTP and FTP Server
	9. Configuring Email Server
	10. Configuring wired and wireless network
	11. Use of Wireshark to scan and check the packet information and perform passive attack
	12. WAP to implement following algorithms using any programming language
	    a. Caesar Cipher
	    b. Monoalphabetic Cipher
	    c. RailFenceTechnique

Evaluation Scheme

B] Evaluation scheme for Practical courses-50 Marks

Course Code: SBSD307PR	Practical Title: Software Testing(Credits : 2.5 Practicals/Week: 01)
	1. Testing Life Cycle: a) Setting up a company that sells testing services to software houses. b) Prepare SRS and design for the software project. c) Write a test plan for a software project. 2. Black Box Testing – Equivalence Partitioning and Boundary value Analysis 3. Black Box Testing: Decision table and Cause Effect Graphing 4. Branch – Decision – Condition Coverage 5. State Transition Testing 6. Data Flow Testing 7. Structured Testing –Loop Coverage, Call coverage and Path Coverage. 8. Test Automation using Selenium IDE 9. Test Automation using Selenium Webdriver

Evaluation Scheme

[B] Evaluation scheme for Practical courses-50 Marks

Class: Paper-

Subject: **Time**:

Day & Date: **Total Marks :60**

PLEASE READ CAREFULLY THE WARNING PRINTED ON THE ANSWER BOOK IN
CONNECTION WITH THE USE TO UNFAIR MEANS.

General Instructions:-   1. All questions are Compulsory

2. Numbers to the <u>right</u> indicate <u>maximum marks</u>

3. Answers to the sub-questions of the same question must be written <u>together.</u>

4. Each question carries 5 marks.

Q1)	**Answer <u>two</u> of the following questions (Based on Unit 1)**	**(10 marks)**
1)		(5)
2)		(5)
3)		(5)
4)		(5)
Q2)	**Answer <u>two</u> of the following questions (Based on Unit 2)**	**(10 marks)**
1)		(5)
2)		(5)
3)		(5)
4)		(5)
Q3)	**Answer <u>two</u> of the following questions (Based on Unit 3)**	**(10 marks)**
1)		(5)
2)		(5)
3)		(5)
4)		(5)
Q4)	**Answer <u>two</u> of the following questions (Based on Unit 4)**	**(10 marks)**
1)		(5)
2)		(5)
3)		(5)
4)		(5)
	……P.T.O	

Q5)	Answer four of the following questions (Based on all units)	(20 marks)
1)		(5)
2)		(5)
3)		(5)
4)		(5)
5)		(5)
6)		(5)
7)		(5)
8)		(5)

JAI HIND COLLEGE

BASANTSING INSTITUTE OF SCIENCE & J. T. LALVANI COLLEGE OF COMMERCE.

MUMBAI 400020.

CLASS: TIME:

SUBJECT: DATE:

SEMESTER III PRACTICAL EXAMINATION

Examination Total 50 Marks:

1) Practical Examination – 30 Marks

1)	a) Questions on Practical programs	(10 marks)
	b) Questions on Practical programs	(10 marks)
	c) Journal	(5 marks)
	d) Viva	(5 marks)

2) Internal Examination- 20 Marks

2)	a) Practical Programs/case study	(10 marks)
	b) Practical Programs/case study	(10 marks)
	OR	
	a) Mini Project	(20 Marks)

I WILL & I CAN

Jai Hind