



**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 VI

**Credit Based Semester and Grading System (CBCS) with effect
from the academic year 2023-24**

T.Y.BVOC (Software Development)

Academic year 2023-2024

Semester VI			
Course Code	Course Title	Credits	Lectures /Week
General Component			
SBSD601	Multimedia-II	4	3
SBSD602	Reasoning Aptitude and Placement Orientation	4	3
SBSD603	Data Analytics	4	3
Skill Component			
SBSD604	Machine Learning	3	3
SBSD605	Big Data with NoSQL	3	3
SBSD606	Cloud Computing	3	3
SBSD607	Optimization Technique	3	3
SBSD604PR	Machine Learning Practical	1.5	3
SBSD605PR	Big Data with NoSQL Practical	1.5	3
SBSD606PR	Cloud Computing Practical	1.5	3
SBSD607PR	Project Viva & Voce Practical	1.5	3

Course Code: SBSD601	Course Title : Multimedia-II (Credits :04 Lectures/Week:03)	
Objectives:	To Understand And Create And Design & Animation For Print And Digital Media.	
Outcomes:	Layout Designs, Digital Illustration, Color Theory, Typography, Image Manipulation, Branding, Packaging And Advertising, Pre-Press, The Design Of Symbols And Logos & Corporate Stationery And Multimedia Project Management With Sound And Video Editing Techniques.	
Unit I	Canva , Adobe Image Ready & Photoshop Advance <ul style="list-style-type: none"> ● Creating GIF Animations Using Layers ● Use Of Actions, Batch, Automate Etc. ● Different Techniques Of Image Color Corrections, Smart Filters ● Creating Different Layouts As Per The Industry Requirements 	10 L
Unit II	Adobe Illustrator <ul style="list-style-type: none"> ● Importance of COLORS SCHEME IN LAYOUT ● Creating Vector using Pen tool ● Creating & Manipulating Paths ● Specifications RGB vs CMYK, ● Duplicating shapes & transformations ● Organizing Artwork With Layers ● Working With Type And Creating Corporate Stationery ● Saving for various software and export options 	15 L
Unit III	Adobe Spark & Adobe Premier <ul style="list-style-type: none"> ● Theory Of Video Editing And Different Video Standards ● Introduction to Interface and workflow ● Working with Video and Audio timeline ● Cutting & Editing Video, Applying Effects etc. ● Inserting different transitions in-between videos ● Exporting Video in different formats for presentation 	10 L

<p>Unit IV</p>	<p>XARA 3D</p> <p>Xara 3D is a software that allows you to create high quality 3D graphics like logos, titles, headings and buttons in the most easy way. With its clean design, intuitive tools, interactive editing and ready made styles, we can create own 3D graphics in a minute.</p> <p>Ulead GIF Animator</p> <p>We can create animated GIFs, or a fast loading animation for your Web site or Power Point Presentations in any format .This ultimate program have the time required for creating an animation, with its simple drag-and-drop object editing, round-trip auto-update from external image editors, and even more features.</p> <p>Flash Action Script</p> <ul style="list-style-type: none"> • Adobe Flash is an excellent technology that allows developers to add interactivity and smooth animations to web pages. 	<p>10 L</p>
<p>References:</p>	<ol style="list-style-type: none"> 1. CORELDRAW X4 FOR SIMPLE STEPS 2. CORELDRAW X4 THE OFFICIAL GUIDE BY GARY DAVID BOUTON 3. PRAKHAR COMPLETE COURSE FOR DTP 	

A] Evaluation scheme for Theory courses

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

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

C.A.-II: 20 marks Assignment/Presentation

II. Semester End Examination (SEE)- 60 Marks

Course Code: SBSD602	Course Title: Reasoning Aptitude and Placement Orientation (Credits :04 Lectures/Week:03)	
	Objectives: <ul style="list-style-type: none"> <input type="checkbox"/> Ability to use numbers and mathematical concepts to solve mathematical problems <input type="checkbox"/> Ability to analyze the data using data interpretation Outcomes: <ul style="list-style-type: none"> <input type="checkbox"/> Will be able to analyze data, understanding technical reports. 	
Unit I	Reasoning Picture Reasoning Verbal Reasoning Syllogism Input Output Critical Reasoning Statement Reasoning	10 L
Unit II	Data Interpretation Tabular Graph Line Graph Pie Chart Bar Diagram Data Sufficiency Permutation and Combination	15 L
Unit III	Problem Solving and Comprehension Analytical Problems Relation Problem Arrangements Questions Decision Making Problems Syllogism Comprehension of Technical Writing	10 L
Unit-IV	Placement Orientation Resume check Mock Tests Pre-Placement Presentation Graduate Employability Test (Wheebox) Group Discussion Technical Knowledge Interview	10 L

Textbook:

1. Goleman, D. (1996) Emotional Intelligence: Why it Can Matter More Than IQ, Bloomsbury Publishing

Additional References:

1. Goleman, D. (2007) Social Intelligence: The New Science of Human Relationships, Arrow.
2. Meah, M. (2011) Competency Questions Made Easy, Sapere Media.
3. Povah, N. & Povah, L., (UK edn) (2009). Succeeding at Assessment Centres for Dummies, John Wiley & Sons.

A] Evaluation scheme for Theory courses

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

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

C.A.-II: 20 marks Assignment/Presentation /Field visits

II. Semester End Examination (SEE)- 60 Marks



Course Code: SBSD603	Course Title: Data Analytics (Credits: 04 Lectures/ weeks: 03)	
	<p>Course description: Data Analytics is the science of analyzing data to convert raw information to useful knowledge. This knowledge could help us understand our world better, and in many contexts enable us to make better decisions. This course seeks to present you with a wide range of data analytic techniques and is structured around diverse types of data analysis.</p> <p>Outcome:</p> <ul style="list-style-type: none"> □ Students will learn how to convert and analyse raw data into useful information to facilitate strategic decisions at work <p style="padding-left: 40px;">The students will acquire the knowledge on statistical techniques, regression analysis, Forecasting and Data Mining Techniques</p>	
Unit I	<p>Statistics and Presentation of Data</p> <p>Introduction: Meaning and definition of Statistics, functions, importance and limitations of statistics.</p> <p>Data: Relevance of data, classification of data into primary and secondary data, data collection methods (viz. Interview schedule, observation tools, questionnaires, google forms), merits and demerits of primary and secondary data</p> <p>Presentation of Data: Frequency distribution for Uni-Variate and Bi-Variate Data, Graphs (Histogram, Frequency Polygon and Curve, Ogive Curves), Diagrams (Bar Diagrams, Percentage and Pie Diagrams)</p>	15
Unit II	<p>Measures of Central Tendency and Dispersion</p> <p>Measures of Central Tendency: Mean(Arithmetic, weighted and combined), Median(Calculation and graphical using ogive), Partition Values, Mode(Calculation and graphical using Histogram), Relation between mean, median and mode.</p> <p>Measures of Dispersion: Absolute and Relative measures of Range, Quartile Deviation and Standard Deviation</p>	10
Unit III	<p>Bivariate Analysis and Forecasting Technique</p> <p>Regression Analysis: Least square method, regression equations</p> <p>Time Series Analysis: Components of Time Series, Method of Least square, Moving Averages Method</p>	10

Unit IV	Decision Theory Probabilistic and Non-Probabilistic Criteria of Decision-Making, Decision making under certainty, uncertainty and risk, Pay off tables, Decision Criterion, Decision Trees.	10
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Textbook:

1. Sheldon M. Ross, (4th edn).(2009). *Introduction to Probability and Statistics for Engineers and Scientists*: Academic Press.
2. Madhavan, Samir. (2015). *Mastering Python for Data Science: Packet*.

Additional References:

1. Cotton, Richard.(2013). *Learning* :O'Reilly.
2. Dalgaard, Peter. (2008). *Introductory statistics with R*: Springer Science & Business Media.
3. Everitt, Brains.(Second Edition).(2014). *Handbook of Statistical Analysis Using R*: 4 LLC.

A] Evaluation scheme for Theory courses

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

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

C.A.-II: 20 marks Assignment/Presentation /Field visits

II. Semester End Examination (SEE)- 60 Marks



Course Code: SBSD604	Course Title: Machine Learning (Credits :03 Lectures/Week:03)	
	Objectives: <ul style="list-style-type: none"> □ The syllabus will familiarize students with a broad cross-section of models and algorithms for machine learning Outcomes: Upon the successful completion of the course students should be able to: <ul style="list-style-type: none"> □ Students will have a good understanding of the fundamental issues and challenges of machine learning: data,model selection,model complexity ,etc. □ Students will be able to design and implement various machine learning and deep learning algorithms in a range of real world applications 	
Unit I	Introduction to Machine Learning: Machine Learning definitions, difference between AI, ML and DL, application of ML types of machine learning, data, Machine Learning life cycle, data scrubbing: feature selection, row compression, one-hot encoding, binning, missing data; Bias, variance, accuracy, overfitting, underfitting; dataset, cross validation;Gradient descent:-batch,stochastic	15 L
Unit II	Supervised Learning and Linear Regression: Simple linear regression, SSE, SST, SSR, coefficient of determination, Mean absolute percentage error, Root mean square error, prediction, multiple linear regression, feature selection in MLR. Classification and Logistic Regression: K-nearest neighbours classifier, confusion matrix, assessing performance of classification: AUC, Precision, Recall, Specificity, logistic regression	15 L
Unit III	Decision Tree and Random Forest: Decision tree algorithm, measures of impurity, entropy, information gain, pruning, bootstrap algorithm, bagging, random forest Naïve Bayes and Support Vector Machine: Conditional probability, Bayes' Theorem, Naïve Bayes' Classifier, support vector machine classifier: hyperplane, kernel function	15 L

Unit IV	<p>Unsupervised Learning: Clustering, types of clustering, Hierarchical clustering: dendrogram, divisive approach, agglomerative approach, Centroids-based Clustering : k-means clustering, wss, elbow method</p> <p>Dimensionality reduction:</p> <p>Curse of dimensionality, Methods of Dimensionality Reduction, Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), Generalized Discriminant Analysis (GDA)</p>	15 L
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Textbook:

1. Understanding Machine Learning: From Theory To Algorithms, 2017 By Shai Shalev-Shwartz And Shai Ben-David
2. Introduction To Machine Learning, An Early Draft Of A Proposed Textbook, Nils J. Nilsson Robotics Laboratory Department Of Computer Science Stanford University, Stanford, Ca 94305
3. The Elements of Statistical Learning. Trevor Hastie, Robert Tibshirani and Jerome Friedman.
4. Pattern Recognition & Machine Learning, Christopher Bishop, Springer

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: SBSD605	Course Title: Big Data with NoSQL (Credits : 03 Lectures/Week: 03)	
	<p>Course Objectives:</p> <ul style="list-style-type: none"> ● Technologies used to handle big data. ● Explore the origins of NoSQL databases and the characteristics that distinguish them from traditional relational database management systems. ● Understand the architectures and common features of the main types of NoSQL databases (key-value stores, document databases, column-family stores, graph databases) <p>Outcome: Students will thoroughly learn basic and advanced analytic techniques for manipulating and analyzing data.</p>	
Unit I	<p>Introduction to Big Data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data?, Other Characteristics of Data, Which are not Definitional Traits of Big Data, Why Big Data?, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment, What is New Today?, What is Changing in the Realms of Big Data?</p> <p>Introduction to Hadoop: Introducing Hadoop, Why Hadoop?, Why not RDBMS?, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, Hadoop Distributors, HDFS, Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN, Interacting with Hadoop Ecosystem.</p>	15L
Unit II	<p>Introduction to MAPREDUCE Programming: Introduction, Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression</p> <p>Introduction to Hive: What is Hive?, Hive Architecture, Hive Data Types, Hive File Format, Hive Query Language (HQL), RCFile Implementation, SerDe, User-Defined Function (UDF).</p> <p>Introduction to Pig: What is Pig?, The Anatomy of Pig, Pig on Hadoop, Pig Latin Overview, Data Types in Pig, Running Pig, Execution Modes of Pig, HDFS Commands, Relational Operators, Eval Function, Complex Data Types, User-Defined Functions (UDF).</p>	15L
Unit III	<p>NoSQL: Why NoSQL, Aggregate Data Models</p> <p>MongoDB: MongoDB Basics - Documents, Collections, Databases, Data Types. Creating, Updating, and Deleting Documents - Inserting and Saving Documents, Removing documents, Updating documents. Querying - Introduction to find, Query criteria, Type specific queries, Cursors. Indexing - Introduction, Unique index, Using explain and hint, Index administration. Aggregation - count, distinct, group.</p> <p>Key Value Data stores: From array to key value databases, Essential features of key value Databases, Properties of keys, Characteristics of Values, Key-Value</p>	15L

	Database Data Modeling Terms, Key-Value Architecture and implementation Terms, Designing Structured Values, Limitations of Key- Value Databases, Design Patterns for Key-Value Databases.	
Unit IV	<p>Column Database: Column-store Architectures: C-Store and Vector-Wise, Column-store internals and, Inserts/updates/deletes, Indexing, Adaptive Indexing and Database Cracking, Compressed Data Late Materialization Joins , Group-by, Aggregation and Arithmetic Operations.</p> <p>Graph Databases: What is Graph?, The Power of Graph Databases, Options for Storing Data, Data modeling with graph-Querying Graph, A comparison and graph modeling, Cross-Domain models, Common Modeling Pitfalls, Identifying nodes and relationships, Avoiding Anti-Patterns.</p> <p>Introduction to Cassandra: An Introduction, Features of Cassandra, CQL Data Types, CQLSH, Keyspaces, CRUD (Create, Read, Update, and Delete) Operations, Collections.</p>	15L
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. Big Data and Analytics, 2ed by Seema Acharya, Subhashini Chellappan. 2. Big Data Analytics, 2ed by Radha Shankarmani, M. Vijayalakshmi, Wiley. 3. Practical MongoDB - Architecting, Developing, and Administering MongoDB by Shakuntala Gupta Edward and Navin Sabharwal 4. MongoDB: The Definitive Guide by Kristina Chodorow and Michael Dirolf , O'REILLY. 5. Daniel Abadi, Peter Boncz and Stavros Harizopoulos, The Design and Implementation of Modern Column-Oriented Database Systems, Now Publishers. 6. Graph Databases by Ian Robinson, Jim Webber & Emil Elifrem , O'Reilly. 7. Next Generation Databases NoSQL, NewSQL and BigData by Guy Harrison. 8. NoSQL Distilled by Pramod J. Sadalage and Martin Fowler. 		

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: SBSD60 6	Course Title: Cloud Computing (Credits :03 Lectures/Week:03)	
	Objectives: <ul style="list-style-type: none"> ● To study the importance of cloud in E-commerce. ● Exploring reference model for cloud Outcomes: <ul style="list-style-type: none"> ● Students will be able to store, manage, process, share, collaborate data and information with high speed and accuracy. ● Students will learn Platform as a Service, Infrastructure as a service and Software as Service ● Students will understand the new ways you can use to program, develop, deploy and provide application access to the users 	
Unit I	<p>Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Biocomputing, Mobile Computing, Quantum Computing, Optical Computing, Nanocomputing, Network Computing.</p> <p>Cloud Computing Fundamentals: Motivation for Cloud Computing, Defining Cloud Computing, Principles of Cloud computing, Cloud Ecosystem, Requirements for Cloud Services, Cloud Application, Benefits and Drawbacks. Overview of AWS, Azure and GCP cloud.</p> <p>Cloud Computing Architecture and Management: Cloud Architecture, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications on the Cloud, Managing the Cloud, Migrating Application to Cloud.</p>	15 L
Unit II	<p>Cloud Deployment Models: Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.</p> <p>Cloud Service Models: Infrastructure as a Service: Python basics for cloud automation, Platform as a Service: Overview of Sales force CRM and Force.com , Software as a Service : Overview of Office 365 and Google apps.</p> <p>Choosing the Right Cloud Service Model: Considerations When Choosing a Cloud Service Model, when to use SaaS, PaaS, IaaS, Common Cloud Use Cases (Cloud Bursting, Archiving/Storage, Data Mining and Analytics, Test Environments).</p> <p>Cloud Service Providers: EMC, Google, Amazon Web Services, Microsoft, IBM, SAP Labs, Salesforce, Rackspace, VMware, Manjrasoft</p>	15 L
Unit III	<p>Open Source Softwares available for the Cloud Deployment: Eucalyptus, OpenNebula, OpenQRM</p> <p>Open source CMS: Drupal , Joomla , Typo3 , DjangoCMS.</p> <p>Technological Drivers for Cloud Computing: SOA and Cloud, Virtualization: Virtualization Opportunities, Approaches in Virtualization, Hypervisor and Its Role, Types of Virtualization, From Virtualization to Cloud Computing.</p>	15 L

	Cloud Security : Introduction, Security Aspects: Data Security, Virtualization Security, Network Security. Platform-Related Security, Audit and Compliance, Regulations in the Cloud, Audit Design Strategies, Overview of tools : cloud conformity	
Unit IV	<p>Enterprise Cloud-Based High Performance Computing (HPC) Applications: Overview of High Performance Computing (HPC) on Cloud, Enterprises HPC applications (high-performance grid computing, high-performance big data computing/analytics, high performance reasoning) , HPC Cloud vendor solutions: compute grids (Windows HPC, Hadoop, Platform Symphony, Gridgain), data grids (Oracle coherence, IBM Object grid, Cassandra, Hbase, Memcached, HPC hardware (GPGPU, SSD, Infiniband, Non blocking switches) , HPC on Cloud mainstream offerings: reengineering of HPC applications to leverage HPC on Cloud, Hadoop performance tuning, etc.</p> <p>Advanced Concepts in Cloud Computing: Intercloud, Cloud Management, Mobile Cloud, Media Cloud , Interoperability and Standards, Cloud Governance , Computational Intelligence in Cloud, Green Cloud, Cloud Analytics.</p>	15 L
<p>Textbook:</p> <ol style="list-style-type: none"> 1. “Essentials of CLOUD COMPUTING” by K. Chandrasekaran 2. “Architecting the Cloud” by Michael J. Kavis 3. “Cloud Computing: Concepts, Technology, and Architecture” by Thomas Erl 4. “Cloud Computing Theory and Practice” by Dan C. Marinescu 5. “Cloud Computing from Beginning to End” by Ray J. Rafaels 		

[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 : SBSD60 7	Course Title: Optimization Technique (Credits :03 Lectures/Week:03)	
	<p>Objectives:</p> <ul style="list-style-type: none"> ● To provide students with the skills necessary to solve and interpret optimization problems. ● To acquaint the students with in-depth knowledge of Optimization Techniques and their applications to Business decision problems. <p>Outcomes:</p> <ul style="list-style-type: none"> ● Student will be able to use optimization techniques and numerical methods of optimization ● Understand the Concept of optimization and classification of optimization problems. ● Formulate the LPP for a real life Problems and give the solution for the problem using using Simplex and Big-M method. ● Find the feasible solution of Transportation Problem using North-west Corner Rule, Least cost Method and VAM. ● Solve the Assignment and Travelling Salesman Problem using Hungarian Algorithm ● Solve sequencing and queuing problems when working with the real world issues 	
	THEORY	(60 Lectures)
Unit I	<p>Introduction:-Development – Definition– Characteristics and Phases – Types of models -Operations Research models – applications.</p> <p>SOLVING LP:-LP Solutions: Four Cases, The Graphical Solution, The Simplex Algorithm, The Big M Method</p> <p>DUALITY:-Primal – Dual, Finding the Dual of an LP, The Dual Theorem.</p> <p>SENSITIVITY ANALYSIS:-Reduced Cost, Shadow Price, Conceptualization, Duality and Sensitivity Analysis, The 100% Rule.</p>	15 L
Unit II	<p>The Transportation and Assignment Problems: The Transportation Problem, Approach To Solution To A Transportation Problem By Using Transportation Algorithm- North West Corner Method, Solution By Least Cost Cell, Solution By Vogel’s Approximation Method, Optimality Test. Maximization Case Of Transportation Problem, Transshipment Problem. The Assignment Problem - Hungarian Method, Scheduling Problem, Travel Salesman Problem.</p> <p>Network Models: Scope and Definition of Network Models, Minimal Spanning Tree Algorithm, Shortest-Route Problem, Shortest Route Algorithms, Linear Programming Formulation of the Shortest-Route Problem. Maximal flow model - Enumeration of Cuts, Maximal-Flow Algorithm Programming Formulation of Maximal Flow Mode. CPM and PERT - Network Representation, Critical Path (CPM) Computations, Construction of the Time Schedule, Linear Programming Formulation of CPM, PERT Calculations.</p>	15 L
Unit III	<p>SEQUENCING PROBLEM: ‘N’ Jobs and Two Machines, SEQUENCING OF ‘N’ JOBS ON THREE MACHINES, Processing of ‘N’ Jobs on ‘M’ Machines, PROCESSING OF 2 JOBS ON ‘M’ MACHINES.</p> <p>Replacement model:</p>	15 L

	<p>Introduction, Failure mechanism of items- bathtub curve, costs associated with maintenance. General Approach To Solution To Replacement Problem, Replacement Of Items Whose Efficiency Reduces Or Maintenance Cost Increases With Time Or Due To Age And Money Value Is Not Considered, Comparing Of Replacement Alternatives By Using Criteria Of Present Value, Replacement Of Items That Fail Completely And Suddenly And Are Expensive To Be Replaced, Staffing Problem.</p> <p>Queuing: Queuing System, Queuing Problems, Steady, Transient And Explosive States In A Queue System, Queue Models</p>	
Unit IV	<p>Theory of games introduction, Two-person, zero-sum games, The Maximum –Minimax principle, Games without saddle points –Mixed Strategies, 2 x n and m x 2 Games – Graphical solutions, Dominance property, Use of L.P. to games, Algebraic solutions to rectangular games.</p> <p>Simulation: Introduction, Definition, types of simulation models, steps involved in the simulation process - Advantages and Disadvantages – Application of Simulation to queuing and inventory.</p>	15 L
<p>References books:-</p> <ol style="list-style-type: none"> 1. Operations Research by P.Rama Murthy , second edition. 2. Operations research An introduction by Handy A Taha, eight edition. 3. Introduction to operation research by FREDERICK S. HILLIER and GERALD J. LIEBERMAN, ninth edition. 		

[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 : Assignment- 20 Marks

II. Semester End Examination (SEE)- 60 Marks

Course Code: SBSD604PR	Practical Title: Machine Learning Practicals (Credits :1.5 Practicals/Week: 01)
	<ol style="list-style-type: none"> 1. Perform the linear regression and prediction. 2. Perform the data classification using KNN algorithm 3. Perform the data clustering using clustering algorithm. 4. Implement hierarchical clustering. 5. Perform the logistic regression on the given data warehouse data. 6. Implement decision tree learning algorithm. 7. Implement Support Vector Machine. 8. Implement Naive Bayes' learning algorithm.

Evaluation Scheme

[B] Evaluation scheme for Practical courses- 50 Marks

Course Code: SBSD605PR	Practical Title: Big Data with NoSQL Practical (Credits : 1.5 Practicals /Week: 01)
	<ol style="list-style-type: none"> 1. Installation of hadoop. 2. Implement the following file management tasks in Hadoop: Adding files and directories , Retrieving files , Deleting files 3. Demonstrate mapreduce programs: <ol style="list-style-type: none"> a. Write a mapreduce program for word count. b. Write a mapreduce program to find maximum temperature. 4. Demonstrate Hive queries on the following: <ol style="list-style-type: none"> a. Built-in operators b. Built-in functions c. Aggregation functions d. User defined function 5. Demonstrate Pig queries on the following <ol style="list-style-type: none"> a. Group operator, order operator, filter operator, joins, User-Defined Functions (UDF).

	<ul style="list-style-type: none"> b. Write a pig script to find the number of products sold in each country. 6. Demonstrate MongoDB queries on the following: Databases, Collections, Documents and Aggregation. 7. Demonstrate queries using Redis for Key Value Data Store <ul style="list-style-type: none"> a. String b. Lists c. Sets 8. Demonstrate queries for Column Databases <ul style="list-style-type: none"> a. Insert,update,delete b. Group-by, Aggregation c. Arithmetic Operations. d. Joins 9. Demonstrate queries using Neo4j for GraphDB <ul style="list-style-type: none"> a. Creating relationships between nodes b. Matching Relationships c. Adding/Removing properties to relationships. d. Deleting Relationships e. Aggregate functions 10. Demonstrate CQL CRUD Operations.
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Evaluation Scheme

[B] Evaluation scheme for Practical courses- 50 Marks

Course: SBSD606PR	<p>Practical Title: Cloud Computing Practical (Credits :1.5 Practicals/Week:01)</p> <ul style="list-style-type: none"> 1. A simple example showing how to create a datacenter with one host and run one cloudlet on it. 2. A simple example showing how to create two datacenters with one host and a network topology each and run two cloudlets on them. 3. A simple example showing how to create two datacenters with one host each and run cloudlets of two users with network topology on them. 4. A simple example showing how to create two datacenters with one host each and run two cloudlets on them. 5. A simple example showing how to create two datacenters with one host each and run cloudlets of two users on them. 6. An example showing how to create scalable simulations. 7. An example showing how to pause and resume the simulation, and create simulation entities (a DatacenterBroker in this example) dynamically. 8. An example showing how to create simulation entities (a
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	<p>DatacenterBroker in this example) in run-time using a global manager entity (GlobalBroker).</p> <p>9. Practical public cloud - AWS – Actual Implementation</p> <ol style="list-style-type: none"> 1. Create public and private network using a /16 CIDR Block 2. Launch a Three tier application, Cloud Front – Load Balancer - Database 3. Deploy any open source content management system 4. Launch Kubernetes cluster 5. Deploy single tier docker application
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Evaluation Scheme

[B] Evaluation scheme for Practical courses- 50 Marks



<p>Course: SBSD607PR</p>	<p>Practical Title: Project Viva & voce Practical (Credits : 1.5 Practicals/Week: 01) Implementation of Project</p>
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[B] Evaluation scheme for Project

I. Project Implementation (50 Marks)



**BASANTSING INSTITUTE OF SCIENCE & J. T. LALVANI COLLEGE OF COMMERCE.
MUMBAI-400020.**

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 right indicate maximum marks
3. Answers to the sub-questions of the same question must be written together.
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 <u>four</u> 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)



