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 : T.Y.B.Voc

Proposed Course : T.Y.B.Voc Software Development

Credit Based Semester and Grading System (CBCS) with effect from the academic year 2018-19

T.Y.B.Voc Software Development Syllabus

Academic year 2018-2019

Semester <VI>			
Course Code	**Course Title**	**Credits**	**Lectures /Week**
	General Component		
SBSD601	International Finance	3	3
SBSD602	Multimedia-II	3	3
SBSD603	Reasoning Aptitude and Placement Orientation	3	3
SBSD604	Economic Analyses & Data Analytics	3	3
	Skill Component	3	3
SBSD605	Artificial Intelligence	3	3
SBSD606	Physical Computing and IoT Programming	3	3
SBSD607	Emerging Technologies	3	3
SBSD608	Project	1.5	3
SBSD605PR	Artificial Intelligence Practical	1.5	3
SBSD606PR	Physical Computing and IoT Programming Practical	1.5	3
SBSD607PR	Emerging Technologies Practical	1.5	3

Semester VI – Theory

Course: SBSD601	**Course Title: International Finance(Credits :03 Lectures/Week:03)**	
	Objectives: ➢ Stabilization of World Economy-Analysis of Financial sector on global scale, development of new financial methods that affect the regional finacial system and facilitates it's integration. ➢ Emerging issues ➢ International monetary systems **Outcomes:** ➢ Apply knowledge of foreign exchange hedging to identify and manage the foreign exchange risks faced by globally active firms. ➢ Demonstrate the ability to work in a team setting to coordinate analysis of a case study to arrive at a sound financial decision regarding an issue in capital raising and international valuation.	
Unit I	Meaning, scope, importance of international finance. Emerging issues in International finance in a globalized world economy. Relationship/ role of BOP with International finance.	**15 L**
Unit II	Brief overview of international monetary system – Gold standard, Bretton Woods system, Fixed and flexible exchange rates, current exchange rate regimes.	**15 L**
Unit III	Foreign exchange Mares – meaning, functions and structure of forex markets. Types of transactions, exchange rates – meaning and factor determinants. Forex quotations- spot and forward and arbitrage.	**15 L**
Unit-IV	World Financial markets and institutions , euro currency markets- origin – Euro bonds.	**15 L**

Course: SBSD602	Course Title: Multimedia-II (Credits :03Lectures/Week:03)	
	Objectives: ➢ Learning Advance Corel Draw tools, photoshop. ➢ Animation using abode flash **Outcomes:** ➢ Students can create ads or collateral for print or for the web using corel draw and create animations using adobe flash	
Unit I	**Advance Corel Draw :- Importance & Usage various Interactive tool.** • How to apply Interactive extrude effect to an object with its options. • How to select color from one object & fill in other object. • How is interactive mesh tool different from interactive fill tool. • Explain various option of Outline & Fill tool. • Difference between Duplicate & Clone. • Use of Copy Properties from. • Use of Transformation tool. • Various options of Arranging order. • Difference between Combine & group. • Use of Perspective in CorelDraw. • How to apply Power clip effect to an imported image. • Various ways of adjusting colors on an image. • At the end they can able to make Layout for Poster, Menu, Broachers, Leaflets, Pamphlets etc.	**15 L**
Unit II	Advance Photoshop:- Navigating the Workspace • The Menu Bar • The Status Bar • The Toolbox • The Palettes Working with Documents • Navigator Palette & Hand Tool • New View & Duplicate • Image Size & Resolution • Image Size Dialog Box • Canvas Size • Crop Tool • Saving Images Image Modes & Color Selection • The Color Picker • Color & Swatch Palettes • Eyedropper • Info Palette Selections • Marquee Selection Tools • Lasso & Wand Selection Tools	**15 L**

	• Selection Tool Practice • Transforming Selections • Quick Mask Mode • Transforming images	
Unit III	**Layers and Mask** • Intro to Layers • The Layers Palette • Move, Copy & duplicate Layers • Layer Mask • Clipmask **Adding and Working with Type** • Working With Type Introduction • The Type Tool • Type Palettes and Text Warping **Painting Tools** • Intro, Paint Bucket and Fill Command • Gradient, Pattern and Line Tools • Brushes • Eraser Tools **Saving & exporting** • Saving as PSD • Exporting as PDF, GIF, JPG & PNG • At the end they can able to make Layout for Advertisement in Magazine, Newspaper, Hoardings etc	**15 L**
Unit-IV	**Adobe Flash** • Drawing Tool bar introduction • Timeline Introduction • Introduction to Different Symbols, Library etc. • Introduction to Classic Animation • Introduction to Shape Animation • Introduction to Frame by Frame Animation • Introduction to Masking Techniques in Flash etc	**15 L**

Textbook:

1. Adobe PhotoshopCS6 Bible: The Comprehensive, Tutorial Resource PB by Dayley LD Wiley.
2. Exploring Adobe Flash CS6 PB by Tickoo J Wiley.
3. Adobe Flash Professional CC Classroom in a Book PB by Adobe Creative Team Pears on.

Course: SBSD603	Course Title: Reasoning Aptitude and Placement Orientation (Credits :03 Lectures/Week:03)	
	Objectives: ➢ Ability to use numbers and mathematical concepts to solve mathematical problems ➢ Ability to analyse the data using data interpretation **Outcomes:** ➢ Will be able to analyse data, understanding technical reports.	
Unit I	PICTURE REASONING- In this section, a series of pictures are given which may consist of picture series, picture analogy or picture classification, STATEMENT REASONING- In this section, sequence questions like seating arrangement or money distribution or height arrangement are given. A set of five questions are based directly on the statements given.	
Unit II	DATA INTERPRETATION -This section consists of a direct sequence of 5 questions based on the data which is provided in the form of table charts, bar charts, pie charts or line charts. DATA SUFFICIENCY- Here a set of two statements are given followed by 5 options which satisfy the answer for the statements. You have to decide which option best suits the answer.	
Unit III	ANALYTICAL PROBLEMS-This section will have case studies and you need to mark options from the given solutions and provide analysis for the appropriate solution, RELATION PROBLEM - This section consists of questions which are similar to the sets and relations like students with biology, maths, physics and chemistry, maths and biology, only physics, etc., and questions related as such	
Unit-IV	SYLLOGISM -This section consists of statement followed by two conclusions. We need to pick out from 5 options which suits the best answer, COMPREHENSION & TECHNICAL WRITING-In this section questions will test your comprehension and understanding of technical reports.	

Course: SBSD604	Course Title: Data Analytics (Credits :03 Lectures/Week:03)	
	Objectives: ➢ Discuss the overall process of how data analytics is applied ➢ Discuss how data analytics can be used to better address and identify risks ➢ Demonstrate the power of data analytics using case studies **Outcomes:** ➢ Obtain, clean/process and transform data. ➢ Analyze and interpret data using an ethically responsible approach. ➢ Use appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues.	
Unit 1.	Statistical Techniques Different types of data, Frequency Distributions, Measures of central tendency and dispersion, Basic Probability, Normal Distribution, Central Limit Theorem, Hypothesis Testing	
Unit 2	Regression Simple and Multiple Linear Regression, R2 and Adj R2 , ANOVA, Interpretation of coefficients, Dummy Variables, Residual Analysis, Outliers, Logistic Regression, Assumptions, Logistic Function, Chi-Square, -2 Log Likelihood, Classification Table, Interpreting Coefficients, Dependent Variable Prediction	
Unit 3	Forecasting (Time Series) Time Series vs. Causal Models, Moving Average, Exponential Smoothing, Trend, Seasonality, Cyclicity, Causal modeling using linear regression, Forecast Accuracy	
Unit 4	Data Mining Techniques Market Basket Analysis, Apriori, FPGrowth, Evaluation Methods: Lift, Kulc, IR, Chi –Square, Classification, Decision Tree Induction, Bayes Methods, Rule-Based Classification, Model Evaluation and Selection, Ensemble Approaches, Clustering, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering	

Course: SBSD605	**Artificial Intelligence Credits :(03 Lectures/Week:03)**	
	Objectives: ➢ Know the three areas of research of AI, and give examples of problems from each area. ➢ Understand how depth first, breadth first, and bi-directional searches are performed. **Outcomes:** ➢ Explain how Artificial Intelligence enables capabilities that are beyond conventional technology ➢ Ability to apply Artificial Intelligence techniques for problem solving	
UNIT I	**Introduction:** What is Artificial Intelligence? Foundations of AI, history, the state of art AI today. **Intelligent Agents:** agents and environment, good behavior, nature of environment, the structure of agents	
UNIT II	**Solving Problems by Searching:** Problem solving agents, examples problems, searching for solutions, uninformed search, informed search strategies, heuristic functions. **Beyond Classical Search:** local search algorithms, searching with non-deterministic action, searching with partial observations, online search agents and unknown environments.	
UNIT III	**Adversarial Search:** Games, optimal decisions in games, alpha-beta pruning, stochastic games, partially observable games, state-of-the-are game programs. **Logical Agents:** Knowledge base agents, The Wumpus world, logic,propositional logic, propositional theorem proving, effective propositional model checking, agents based on propositional logic.	
UNIT IV	**First Order Logic:** Syntax and semantics, using First Order Logic, Knowledge engineering in First Order Logic. **Inference in First Order Logic:** propositional vs. First Order, unification and lifting, forward and backward chaining, resolution. **Planning:** Definition of Classical Planning, Algorithms for planning as state space search, planning graphs, other classical planning approaches, analysis of planning approaches, Time, Schedules and resources, hierarchical planning, Planning and Acting in Nondeterministic Domains, multiagent planning **Knowledge Representation:** Categories and Objects, events, mental events and objects, reasoning systems for categories, reasoning with default information, Internet shopping world	

Textbook:

1. Artificial Intelligence: A Modern ApproachStuart Russel and Peter Norvig Pearson

Publisher, 3rd Edition.
2. A First Course in Artificial Intelligence, Deepak Khemani, TMH
3. Artificial Intelligence: A Rational Approach, Rahul Deva, Shroff publishers
4. Artificial Intelligence, Elaine Rich, Kevin Knight and Shivashankar Nai, TMH
5. Artificial Intelligence & Soft Computing for Beginners, Anandita DasBhattacharjee

Course: SBSD606	**Course Title:(Credits :03 Lectures/Week:03)** **Physical Computing and IoT Programming**	
	Objectives: ➢ **To learn about SoC architectures; Learn how Raspberry Pi. Learn to program Raspberry Pi.** ➢ **Implementation of internet of Things and Protocols.** **Outcomes:** ➢ **Enable learners to understand System On Chip Architectures.** ➢ **Introduction and preparing Raspberry Pi with hardware and installation.** ➢ **Learn physical interfaces and electronics of Raspberry Pi and program them using practical's** ➢ **Learn how to make consumer grade IoT safe and secure with proper use of protocols.**	
Unit I	SoC and Raspberry Pi System on Chip: What is System on chip? Structure of System on Chip. SoC products: FPGA, GPU, APU, Compute Units. ARM 8 Architecture: SoC on ARM 8. ARM 8 Architecture Introduction Introduction to Raspberry Pi: Introduction to Raspberry Pi, Raspberry Pi Hardware, Preparing your raspberry Pi. Raspberry Pi Boot: Learn how this small SoC boots without BIOS. Configuring boot sequences and hardware.	**15L**
Unit II	Programming Raspberry Pi Raspberry Pi and Linux: About Raspbian, Linux Commands, Configuring Raspberry Pi with Linux Commands Programing interfaces: Introduction to Node.js, Python. Raspberry Pi Interfaces: UART, GPIO, I2C, SPI Useful Implementations: Cross Compilation, Pulse Width Modulation, SPI for Camera.	**15L**
Unit III	Introduction to IoT: What is IoT? IoT examples, Simple IoT LED Program. IoT Service as a Platform: Clayster, Thinger.io, SenseIoT, carriots and Node RED. IoT Security and Interoperability: Risks, Modes of Attacks, Tools for Security and Interoperability.	**15L**
Unit IV	IoT Data Link Layer and Network Layer Protocols: PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART,Z-Wave, Bluetooth Low Energy, Zigbee Smart Energy DASH7 Network Layer:IPv4, IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP Transport layer protocols : Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) Session layer: Session Layer-HTTP, CoAP, XMPP, AMQP, MQTT Service layer protocols: Service Layer - oneM2M, ETSI M2M, OMA, BBFs	**15L**

Textbook:

1. Learning Internet of Things, Peter Waher, Packt Publishing(2015)
2. Mastering the Raspberry Pi, Warren Gay, Apress(2014)
3. From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle,1st Edition, Academic Press, 2014.

Course: SBSD607	Course Title: Emerging Technologies(Credits :03Lectures/Week:03)	
	Objectives: Understand MongoDB as a data store. Understand NoSQL and its difference with SQL. Be comfortable with Mongo's query and update languages. Common use-cases and architectures of MongoDB. MongoDB with java and python. Understanding MongoDB Data Model. Query Mongo using Mongo's JSON-based query language. **Outcomes:** ➢ Ability to understand the concepts behind MongoDB, NoSQL and JSON. ➢ Executing MongoDB queries, connecting and interacting with MongoDB usingjava and python. ➢ Creating and parsing and persisting JSON. ➢ Importing and exporting JSON file with MongoDB.	
Unit I	**Introduction to Data Warehousing:** Introduction, Necessity,Framework of the datawarehouse, options, developing datawarehouses, end points. **Data Warehousing Design Consideration and Dimensional Modeling:** Defining Dimensional Model, Granularity of Facts, Additivity of Facts, Functional dependency of the Data, Helper Tables, Implementation many to-many relationships between fact and dimensional modelling. **Extract, Transform, and Load Basics:** ETL, Manual ETL processes, Staging, To stage or not to stage, Configuration of a staging area, Mappings and operators in OWB, The canvas layout, OWB operators, Source and target operators, Data flow operators, Pre/post-processing operators	15 L
Unit II	**NoSQL:** SQL, NoSQL, Definition, A Brief History of NoSQL, ACID vs. BASE, CAP Theorem, The BASE, NoSQL Data Types, Advantages of NoSQL, Disadvantages of NoSQL, SQL vs. NoSQL Databases, Categories of NoSQL Databases. **Introducing MongoDB:** History, MongoDB Design Philosophy, Speed, Scalability, and Agility, Non-Relational Approach, JSON-Based Document Store, Performance, Features and Applications, Comparison with SQL. **The MongoDB Data Model:** The Data Model, JSON and BSON, The Identifier, Capped Collection, Polymorphic Schemas, Object-Oriented Programming.	15 L
Unit III	**Querying MongoDB**:Basic Querying, Data types, Create and Insert, Explicitly Creating Collections, Inserting Documents Using Loop, Update, Delete, Read, Using Indexes, Stepping Beyond the Basics, Using Conditional Operators, Regular Expressions, MapReduce,Aggregation. **Data Management in MongoDB and Architecture:**Core Processes,	15 L

	mongod, mongo, mongos, MongoDB Tools, Standalone Deployment, Replication, Master/Slave Replication, Replica Set, Implementing Advanced Clustering with Replica Sets, Sharding, Sharding Components, Data Distribution Process, Data Balancing Process, Operations, Implementing Sharding, Controlling Collection Distribution. **MongoDB Use Cases:**Performance Monitoring, Schema Design, Operations, Sharding, Content Management.	
Unit IV	**MongoDB Best Practices**:- Managing indexes:-Store data as a single document, Avoid creating large documents Avoid long field names. MongoDB Setup and Configuration, Continuous Availability with MongoDB, Managing MongoDB, Security for MongoDB. **JSON:** Introduction, JSON Grammar,Values and Tokens, Syntax, JSON comparision with XML, Data Types, Objects, Arrays, Creating JSON, JSON Object, Parsing JSON, JSON Stringify, Persisting JSON. Importing and exporting JSON files with MongoDB.	15 L

Textbook:

1. Data Warehousing by Soumendra Mohanty, Tata McGrawHill
2. Practical MongoDB by Shakuntala Gupta, Edward, Navin Sabharwal, Apress
3. Next GenerationDatabases by Guy Harrison, Apress
4. Beginning JSON, Ben Smith, Apress

Course: SBSD608	**Course Title: Project (Credits :03 Lectures/Week:03)**

	Objectives: ➢ Learning through practice is a very good way of crystallizing in your mind what you may have learnt. ➢ A management level post graduate course is of no use if you are unable to apply theoretical knowledge in practical scenarios. ➢ Project work is one such tool- It enables you to apply your conceptual knowledge in a practical situation and to learn the art of conducting a study in a systematic way and presenting its findings in a coherent report. ➢ A proper application towards this exercise should help you in your professional life. **Outcomes:** ➢ Students can deal with small or a big issue in an organization, the problem can be from any discipline of management. ➢ Analysis and interpretation of data leading to valid conclusions.	
Unit I	**Investigation** Project fixing, Synopsis **Analysis** Project history**,** Requirement Gathering**,** Objective And Scope of Project**,** Problems With Existing System**,** Advantage Of Proposed System**,** Feasibility Study**,** Cost Benefit Analysis**,** Requirement Specification, Tools & Technology	
Unit II	**Design Phase** Detailed Life Cycle Of Project(Logical Design), Class Diagram, E-R Diagram, Event Table, Use Case Diagram **Coding Phase** Data base Design (with proper records), Forms, Modules Design, Validating Forms/ applications	
Unit III	**Testing Phase** Module Testing/ unit testing, Integration Testing, System Testing, Acceptance Testing **Maintenace and Evaluation** System MaintainaceAnd Future Enhancement, User Manual/ help report	
Unit IV	**Review and Black Book**	

Textbook:

1. Modern Systems Analysis and Design; Jeffrey A. Hoffer, Joey F. George, Joseph,S.Valacich;
Pearson Education; Third Edition; 2002.
2. ISO/IEC 12207: Software Life Cycle Process
(http://www.software.org/quagmire/descriptions/iso-iec12207.asp).
3. IEEE 1063: Software User Documentation (http://ieeexplore.ieee.org).

Semester VI – Practical

Course:	**Artificial Intelligence (Credits : 1.5 Practicals/Week: 01)**

SBSD605PR	1. (a) Write a program to implement depth first search algorithm. (b) Write a program to implement breadth first search algorithm. 2. (a) Write a program to simulate 4-Queen / N-Queen problem. (b)Write a program to solve tower of Hanoi problem. 3. (a) Write a program to implement alpha beta search. (b) Write a program for Hill climbing problem. 4. (a) Write a program to implement A* algorithm. (b) Write a program to implement AO* algorithm. 5. (a) Write a program to solve water jug problem. (b) Design the simulation of tic –tac –toe game using min-max algorithm. 6. (a) Write a program to solve Missionaries and Cannibals problem. (b) Design an application to simulate number puzzle problem. 7. (a) Write a program to shuffle Deck of cards. (b) Solve traveling salesman problem using artificial intelligence technique. 8. (a) Solve the block of World problem. (b) Solve constraint satisfaction problem 9. (a) Derive the expressions based on Associative law (b) Derive the expressions based on Distributive law 10. (a) Write a program to derive the predicate. (b) Write a program which contains three predicates: male, female, parent. Make rules for following family relations: father, mother, grandfather,grandmother, brother, sister, uncle, aunt, nephew and niece, cousin. Question: i. Draw Family Tree. ii.Define: Clauses, Facts, Predicates and Rules with conjunction and disjunction

Course: SBSD606PR	**Practical Title: Physical Computing and IoT Programming(Credits : 1.5 Practicals/Week: 01)**

	1. Preparing Raspberry Pi: Hardware preparation and Installation 2. Linux Commands: Exploring the Raspbian 3. GPIO: Light the LED with Python 4. Displaying different LED patterns with Raspberry Pi. 5. Displaying time over 4 digit 7 segment display using Raspberry Pi 6. SPI: Camera Connection and capturing Images using SPI 7. Interfacing Raspberry Pi with RFID. 8. Node RED: Connect LED to Internet of Things 9. Visitor monitoring with Raspberry Pi and Pi Camera. 10. Create a simple Web server using Raspberry Pi

Course: SBSD607PR	**Practical Title: Emerging Technologies (Credits : 1.5 Practicals/Week: 01)**

	Practical: 1) Installation of the database and OWB 2) Importing the source data structures in Oracle. Design the target data structure using Oracle. Create the target structure in OWB 3) Perform the ETL process. 4) Generate the different types of reports in using Oracle. 5) Create the Pivot table and Pivot chart using some existing data or create the new data in Excel. 6) MongoDB Basics a) MongoDB query to create and drop database. b) MongoDB query to create, display and drop collection c) MongoDB query to insert, query, update and delete a document. 7) Executing simple MongoDB queries- 1) Indexing 2) Limiting records 3) Sorting records 8. Queries for implementing aggregation in MongoDB. 9. Queries for implementing replication, backup in MongoDB. 10. Connecting Java and python with MongoDB and inserting, retrieving, updating and deleting. 11. Creating, parsing and persisting JSON. 12. Exporting and Importing JSON files with MongoDB.

Evaluation Scheme

[A] Evaluation scheme for Theory courses

I. Internal Test- 25 Marks

II. Semester End Examination (SEE)- 75 Marks

[B] Evaluation scheme for Practical courses

I. Practical Exam (50 Marks)

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

Class: **Paper-**

Subject: **Time**:

Day & Date: **Total Marks :75**

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 three of the following questions (Based on Unit 1)**	**(15 marks)**
1)		(5)
2)		(5)
3)		(5)
4)		(5)
5)		(5)
6)		(5)
Q2)	**Answer three of the following questions (Based on Unit 2)**	**(15 marks)**
1)		(5)
2)		(5)
3)		(5)
4)		(5)
5)		(5)
6)		(5)
Q3)	**Answer three of the following questions (Based on Unit 3)**	**(15 marks)**
1)		(5)
2)		(5)
3)		(5)
4)		(5)
5)		(5)
6)		(5)
Q4)	**Answer three of the following questions (Based on Unit 4)**	**(15 marks)**
1)		(5)
2)		(5)
3)		(5)
4)		(5)
5)		(5)

6)		(5)
Q5)	**Answer <u>three</u> of the following questions (Based on Unit 1,2,3, 4)**	**(15 marks)**
1)		(5)
2)		(5)
3)		(5)
4)		(5)
5)		(5)
6)		(5)

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

MUMBAI 400020.

CLASS: **TIME:**

SUBJECT: **DATE:**

SEMESTER VI PRACTICAL EXAMINATION

1) Practical Examination – 50 Marks

1)	a) Questions on Practical programs	(20 marks)
	b) Questions on Practical programs	(20 marks)
	c) Journal	(5 marks)
	d) Viva	(5 marks)