HSNC UNIVERSITY, MUMBAI
Board of Studies in BVOC
In the subject of Web Technologies, KC College 1.

Name of Chairperson: -

a. **Dr. Rakhi Gupta,** Assistant Professor, Dept. of Information Technology, KC College, HSNC University, rakhi.gupta@kccollege.edu.in, 9619914191

2. **Name of Co-chairperson: -**
   a. **Ms. Geeta N. Brijwani,** Assistant Professor, Dept. of Comp. Sci., KC College, HSNC University, geeta.brijwani@kccollege.edu.in, 9890857969

3. **Two to five teachers each having minimum five years teaching experience amongst the full time teachers of the Departments, in the relevant subject.**
   a. **Mrs. Neha Patel,** Assistant Professor, Dept. of Information Technology, KC College, HSNC University, neha.patel@kccollege.edu.in, 9820609142
   b. **Ms. Nashrah Gowalker,** Assistant Professor, Dept. of Information Technology, KC College, HSNC University, nashrah.gowalker@kccollege.edu.in, 9664774108
   c. **Mr. Naveen Pahuja,** Assistant Professor, Dept. of Comp. Sci., KC College, HSNC University, naveenpahuja94@gmail.com, 8856881398
   d. **Ms. Aafreen Shaikh,** Assistant Professor, Dept. of B.Voc (Web Technologies), KC College, HSNC University, aafreen.shaikh@kccollege.edu.in, 9076894730 e.
4. **One Professor / Associate Professor from other Universities or professor / Associate Professor from colleges managed by Parent Body; nominated by Parent Body;-**
   a. **Dr. Sushil Kulkarni,** Associate Professor, Head, Dept. of Mathematics, Jai Hind College Autonomous, Mumbai, sushiltry@gmail.com, 9967770658

5. **Four external experts from Industry / Research / eminent scholar in the field relevant to the subject nominated by the Parent Body;**
   a. **Mr. Ravi Gupta,** Director, Frameboxx 2.0, ravi@frameboxx.in, 9820711434
   b. **Mr. Harish Chandar,** Director, India Tech International Pvt. Ltd., Mumbai, harishchandarb@gmail.com, 9821528022
   c. **Mr. Wilson Rao,** Co-ordinator, Dept. of Information Technology & BVOC, Jai Hind College, Autonomous, wilsonrao@gmail.com, 9821354297
   d. **Mr. Maunash A. Jani**, Software Developer, Genius Lynx, Mumbai, maunash08@gmail.com, 9022155698

6. **Top rankers of the Final Year Graduate and Final Year Post Graduate examination of previous year of the concerned subject as invitee members for discussions on framing or revision of syllabus of that subject or group of subjects for one year.**

a. **Mr. Ajit Vishwakarma,** Corporate Master Trainer, Managing Director, Vinayavish LLP, Mumbai, ajit@vinayavish.com, 9987230297

HSNC University Mumbai

(2022-2023)

Ordinances and Regulations

With Respect to

For the Programme Under

Bachelor of Vocational Studies in Web Technologies

Curriculum – Third Year BVoc Programme Semester-V and Semester -VI

2022-2023

HSNC University, Mumbai

Syllabus for T.Y.B.Voc

Program: B.Voc

Course: Web Technologies

With effect from the academic year 2022-2023

Third Year Semester – V Subject Information

Sr. No.	Subject Code	Subject Title	Credits
1.	**UV-TWT-501**	Software Testing	6
2.	**UV-TWT-502**	Technical Writing	6
3.	**UV-TWT-503**	Core Java	3
4.	**UV-TWT-504**	ASP.NET	3
5.	**UV-TWT-505**	Computer Networks	3
6.	**UV-TWT-5P3**	Core Java	3
7.	**UV-TWT-5P4**	ASP.NET	3
8.	**UV-TWT-5P5**	Computer Networks	3

Detailed Scheme Theory
T. Y. BVOC 2022-2023 SEM 5
T.Y B.VOC 501: Software Testing

Unit	Content	No. of Lectures
1	**1.1 Testing Introduction :** Goals of Software Testing, Software Testing Methodology Definitions, Model for Software Testing, Effective Software Testing vs Exhaustive Software Testing, Software Failure Case Studies, Software Testing Terminology, **1.2 Software Testing Life Cycle (STLC),** Software Testing methodology, Verification and Validation, Verification requirements, Verification of high level design, Verification of low level design, validation.	**15**
2	**2.1 Dynamic Testing :** Black Box testing: boundary value Techniques analysis, equivalence class testing, state table based testing, cause-effect graphing based testing, error guessing. **2.2 White box Testing Techniques:** need, logic coverage criteria, basis path testing, graph matrices, loop testing, data flow testing, mutation testing. Static Testing. **2.3 Validation Activities**: Unit validation, Integration, Function, System, Acceptance Testing. **2.4 Regression Testing:** Progressive vs. Regressive, regression testing produces quality software, regression testability, objectives of regression testing, regression testing types, define problem, regression testing techniques.	**15**
3	**3.1 Test Management:** test organization, structure and of testing Managing the group, test planning, detailed test design and test,Test Process specification. **3.2 Software Metrics:** need, definition and classification of software matrices. Testing Metrics for Monitoring and Controlling the Testing Process: attributes and corresponding matrics, estimation model for testing effort, architectural design, information flow matrix used for testing, function point and test point analysis. **3.3 Efficient Test Suite Management:** minimizing the test suite and its benefits, test suite minimization problem, test suite prioritization its type , techniques and measuring effectiveness.	**15**
4	**4.1 Test Automation and Testing Tools:** need, categorization,Automation selection and cost in testing tool, guidelines for testing tools. Study of testing tools: WinRunner, QTP, LoadRunner, TestDirector and IBM Rational Functional Tester, Selenium etc. **4.2 Jenkins :**Introduction to delivery pipeline, Introduction to Jenkins, Jenkins management, Adding slave node to Jenkins, Building a delivery pipeline, Selenium integration with Jenkins	**15**

References:

1. Software Testing Principles and Practices Naresh Chauhan Oxford Higher Education

2. Effective Methods for Software Testing , third edition by Willam E. Perry, Wiley Publication
3. Software Testing and quality assurance theory and practice by Kshirasagar Naik, Priyadarshi Tripathy , Wiley Publication
4. Software Testing Concepts and Tools by Nageswara Rao Pusuluri , dreamtech press

T.Y B.VOC 502 : Technical Writing

Unit	Content	No. of Lectures
1	**1.1 Introduction to Technical Communication:** What Is Technical Communication? The Challenges of Producing Technical Communication, Characteristics of a Technical Document, Measures of Excellence in Technical Documents, Skills and Qualities Shared by Successful Workplace Communicators, How Communication Skills and Qualities Affect Your Career? **1.2 Understanding Ethical and Legal Considerations:** A Brief Introduction to Ethics, Your Ethical Obligations, Your Legal Obligations, The Role of Corporate Culture in Ethical and Legal Conduct, Understanding Ethical and Legal Issues Related to Social Media, Communicating Ethically Across Cultures, Principles for Ethical Communication **1.3 Writing Technical Documents:** Planning, Drafting, Revising, Editing, Proofreading **1.4 Writing Collaboratively:** Advantages and Disadvantages of Collaboration, Managing Projects, Conducting Meetings, Using Social Media and Other Electronic Tools in Collaboration, Importance of Word Press Website, Gender and Collaboration, Culture and Collaboration.	**15**
2	**2.1 Introduction to Content Writing**: Types of Content (Article, Blog, E-Books, Press Release, Newsletters Etc.), Exploring Content Publication Channels. Distribution of your content across various channels. **2.2 Blog Creation:** Understand the psychology behind your web traffic, Creating killing landing pages which attract users, Using Landing Page Creators, Setting up Accelerated Mobile Pages, Identifying UI UX Experience of your website or blog. **2.3 Organizing Your Information:** Understanding Three Principles for Organizing Technical Information, Understanding Conventional Organizational Patterns, **2.4 Emphasizing Important Information:** Writing Clear, Informative Titles, Writing Clear, Informative Headings, Writing Clear Informative Lists, Writing Clear Informative Paragraphs.	**15**

3	**3.1 Creating Graphics:** The Functions of Graphics, The Characteristics of an Effective Graphic, Understanding the Process of Creating Graphics, Using Color Effectively, Choosing the Appropriate Kind of Graphic, Creating Effective Graphics for Multicultural Readers.	**15**
	3.2 Researching Your Subject: Understanding the Differences Between Academic and Workplace Research, Understanding the Research Process, Conducting Secondary Research, Conducting Primary Research, **3.3 Research and Documentation**: Literature Reviews, Interviewing for Information, Documenting Sources, Copyright, Paraphrasing, Questionnaires.	
4	**4.1 Writing Proposals:** Understanding the Process of Writing Proposals, The Logistics of Proposals, The "Deliverables" of Proposals, Persuasion and Proposals, Writing a Proposal, The Structure of the Proposal. **4.2 Writing Informational Reports:** Understanding the Process of Writing Informational Reports, Writing Directives, Writing Field Reports, Writing Progress and Status Reports, Writing Incident Reports, Writing Meeting Minutes. Writing Recommendation Reports: Understanding the Role of Recommendation Reports, Using a Problem-Solving Model for Preparing Recommendation Reports, Writing Recommendation Reports. **4.3 Reviewing, Evaluating, and Testing Documents and Websites:** Understanding Reviewing, Evaluating, and Testing, Reviewing Documents and Websites, Conducting Usability Evaluations, Conducting Usability Tests, Using Internet tools to check writing Quality, Duplicate Content Detector, What is Plagiarism?, How to avoid writing plagiarism content? **4.4 Innovation management: an introduction:** The importance of innovation, Models of innovation, Innovation as a management process.	**15**

References:

1 Technical Communication, Mike Markel, Bedford/St.Martin's 11 edition

2 Innovation Management and New Product Development, Paul Trott

3 Handbook of Technical Writing, Gerald J. Alred, Bedford/St. Martin's 09 edition

4 Technical Writing 101: A Real-World Guide to Planning and Writing Technical Content, Alan S. Pringle and Sarah S. O'Keefe

5 Innovation and Entrepreneurship, Peter Drucker, Harper Business 03 edition

T.Y B.VOC 503: Core Java

Unit	Content	No. of Lectures
1	**1.1 Introduction:** History, architecture and its components, Java Class File, Java Runtime Environment, The Java Virtual Machine, JVM Components, The Java API, java platform, java development kit, Lambda Expressions, Methods References, Type Annotations, Method Parameter Reflection, setting the path environment variable, Java Compiler And Interpreter, java programs, java applications, main(), public, static, void, string[] args, statements, white space, case sensitivity, identifiers, keywords, comments, braces and code blocks, variables, variable name. **1.2 Java Operator:** Data types: primitive data types, Object Reference Types, Strings, Auto boxing, operators and properties of operators, Arithmetic operators, assignment operators, increment and decrement operator, relational operator, logical operator, bitwise operator, conditional operator. **1.3 Loops and Control:** Control statements for decision making: select statements (if statement, if … else … statement, if …. Else … if … statement, switch statement), goto statement, looping (while loop, do … while loop and for loop), nested loops, breaking out of loops (break and continue statements), labeled loops. **1.4 Arrays and Strings:** One- and two-dimensional array, creating an array, strings, stringbuffer. **1.5 Introduction of Classes:** Defining a class, creating instance and class members: creating object of a class, accessing instance variables of a class, creating methods, naming methods of a class, accessing methods of a class, constructor, parameterized constructor, 'this' keyword, garbage collection, finalize method, methods overloading, constructor overloading, nested and inner classes, static member. Visibility control: public access, friendly access, protected access, private access, private protected access.	**15**

2	**2.1 Inheritance**: Derived Class Objects, Inheritance and Access Control, Default Base Class Constructors, this and super keywords. **2.2 Interface and Abstract**: 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. **2.3 Packages and Collection**: Creating Packages, Default Package, Importing Packages, Using A Package.	**15**
	Collection Framework: Array List, LinkedList, HashSet, TreeMap, Enumeration, Queue.	
3	**3.1 Exceptions:** Catching Java Exceptions, Catching Run-Time Exceptions, Handling Multiple Exceptions, The finally Clause, The throws Clause. **3.2 Byte streams**: Reading console input, writing console output, reading file,	**15**
4	**4.1 Event Handling**: Delegation Event Model, Events, Event classes, Event listener interfaces, Using delegation event model, adapter classes and inner classes. **4.2 Abstract Window Toolkit**: Individual Components Label, Button, CheckBox, Radio Button, Choice, List, Menu, Text Field, Text Area. **4.3 Layout :** Flow Layout, Grid Layout, Border Layout, Card Layout.	**15**

Reference Books:

1. Java: The Complete Reference by Herbert Schildt, MCGrawHill 11th Edition, 2018
2. Java2 Programming - Black Book by Steven Holzner, Dreamtech Press, 5th Edition, 2006
3. Programming in Java by John Hubbard, Schaum Series, 2nd Edition 2019
4. Murach's beginning Java with Net Beans by Joel Murach , Michael Urban, Murach, 5th Edition 2018

S.Y B.VOC 504: ASP.NET

Unit	Content	No. of Lectures

1	**1.1 Introducing .NET:** The .NET Framework and .NET Core, C#, VB, and the .NET Languages, The Common Language Runtime, The .NET Class Library, Difference between .NET and .NET Core framework. **1.2 The C# Language:** C# Language Basics, Variables and Data Types, Variable Operations, Object-Based Manipulation, Conditional Logic, Loops, Methods. **1.3 Types, Objects, and Namespaces:** The Basics About Classes, Building a Basic Class, Value Types and Reference Types, Understanding Namespaces and Assemblies, Advanced Class Programming.	**15**
2	**2.1 Web Form Fundamentals**: Writing Code, Using the Code-Behind Class, Adding Event Handlers, Understanding the Anatomy of an ASP.NET Application, Introducing Server Controls, Using the Page Class, Using Application Events, Configuring an ASP.NET Application. **2.2 Form Controls / Server Side Control** : Stepping Up to Web Controls, Web Control Classes, List Controls, Table Controls, Web Control Events and AutoPostBack, Validation, Understanding Validation, Using the Validation Controls, Rich Controls, The Calendar, The AdRotator, Pages with Multiple Views, User Controls and Graphics, User Controls, Dynamic Graphics, The Chart Control, Website Navigation: Site Maps, URL Mapping and Routing, The SiteMapPath Control, The TreeView Control, The Menu Control. **2.3 Error Handling, Logging, and Tracing:** Avoiding Common Errors, Understanding Exception Handling, Handling Exceptions, Throwing Your Own Exceptions, Using Page Tracing. **2.4 Validations:** Introduction, Adding Validation, Styling Validation Errors , Data Annotations , Custom Validation , Validation Summary, Client-side Validation	**15**
3	**3.1 Data Binding:** Delegation Event Model, Events, Event classes, Event listener interfaces, Using delegation event model, adapter classes and inner classes. **3.2 The Data Controls:** Individual Components Label, Button, CheckBox, Radio Button, Choice, List, Menu, Text Field, Text Area **3.3 XML**: XML Explained, The XML Classes, XML Validation, XML Display and Transforms. **3.4 ASP.NET AJAX:** Understanding Ajax, Using Partial Refreshes, Using Progress Notification, Implementing Timed Refreshes, Working with the ASP.NET AJAX Control Toolkit.	**15**
4	**4.1 MVC Architecture:** MVC Controllers, MVC Design Pattern, Working with Query Strings, MVC and API Controllers **4.2 Introduction & Routing:** Difference between ASP. Net web form and ASP.Net MVC, MVC Project structure, Create controller and view, Communication between controller and view, Routing mechanism flow	**15**

	4.3 Data Management Technique and Model Layer: Overview of Models and View Models, ViewData, ViewBag, TempData and Session; Scope of ViewData, ViewBag, TempData and Session **4.4 Working with EF:** Introduction, Entity Framework, Database-first vs Codefirst, Changing the Model, Seeding the Database, Querying Objects.	

References:

1. Beginning ASP.NET 4.5 in C# by Matthew MacDonald
2. Murach's ASP.NET 4.6 Web Programming in C# by Mary Dealmater, 2015
3. C# The Basics by Vijay Mukhi, BPB Publications
4. Asp.Net Visual C#.Net by Vijay Nicoel, TMH
5. Programming ASP.NET MVC 5, 2013

T.Y B.VOC 505: Computer Networks

Unit	Content	No. of Lectures
1	**1.1 Introduction:** Data communications, networks, network types, Internet history, Protocol and standards and administration. **1.2 Network Models:** Protocol layering, TCP/IP protocol suite, The OSI model. **1.3 Introduction to Physical layer:** Data and signals, analog signals, digital signals, transmission impairment, data rate limits, performance. **1.4 Digital and Analog transmission:** Digital-to-digital conversion, analogtodigital conversion, transmission modes, digital-to-analog conversion. **1.5 Bandwidth Utilization:** Multiplexing and Spectrum Spreading: Multiplexing TDM, FDM, Spread Spectrum. **1.6 Transmission and Transmission media:** Guided Media**,** Unguided Media, Synchronous and asynchronous Transmission. **1.7 Switching:** Introduction, circuit switched networks, packet switching, structure of a switch.	**15**
2	**2.1 Introduction to the Data Link Layer:** Link layer addressing, Data Link Layer Design Issues, Error detection and correction, checksum, Cyclic Redundancy check code, forward error correction versus retransmission, Framing, Flow control, Flow And Error Control Protocols used. **2.2 Introduction to Data Link Control:** DLC services, data link layer protocols, HDLC, Point-to-point protocol. **2.3 Media Access Control**: Random access, controlled access, channelization, Wired LANs – Ethernet Protocol, standard ethernet, fast ethernet, gigabit ethernet, IEEE Standard 802.3 Ethernet, 802.4 Token Bus, 802.5 Token Ring. **2.4 Wireless LANs:** Introduction, IEEE 802.11 project, Bluetooth, WiMAX, Cellular telephony, Mobile IP. **2.5 Connecting devices and Virtual LANs.** **2.6 Virtual-Circuit Networks**: Frame Relay, ATM, ATM LANs versions of 802.11, 802.11a,802.11b,802.11g,802.11n, 802.11ac, OFDM, OFDMA.	**15**

3	**3.1 Introduction to the Network Layer**: Internet Protocol (IP): Datagram Format, Fragmentation and reassembly, Network layer services, network layer performance, IPv4 addressing, forwarding of IP packets, Internet Protocol, ICMPv4, Address mapping, ARP, RARP, DHCP. **3.2 Unicast Routing:** Introduction, routing algorithms, unicast routing protocols- Distant Vector routing, Link State Routing, Path vector routing. Spanning tree, spanning tree algorithm, Multicast, Broadcast. **3.3 Next generation IP:** IPv6 addressing, IPv6 protocol, ICMPv6 protocol, transition from IPv4 to IPv6.	**15**
4	**4.1 Introduction to the Transport Layer**: Introduction, Transport layer protocols (Simple protocol, Stop-and-wait protocol, Sliding Window protocol, Go-Back-n protocol, Selective repeat protocol, , Selective reject protocol Bidirectional protocols), Transport layer services, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Congestion control. **4.2 Introduction to Application Layer:** World wide-web and HTTP, FTP, Electronic mail, MIME (Multipurpose Internet Mail Extension), Telnet, Secured Shell, Domain name system. SNMP. **4.3 Multimedia:** Digitizing Audio and Video, Audio and Video compression, RTP, RTCP, Voice over IP.	**15**

References:

1. Data Communication and Networking by Behrouz A. Forouzan, Tata McGraw Hill, Fifth Edition, 2013
2. TCP/IP Protocol Suite by Behrouz A. Forouzan , Tata McGraw Hill, Fourth Edition 2010
3. Computer Networks by Andrew Tanenbaum, Pearson, Fifth Edition 2013
4. Data Communication by William Stalling, Tata McGraw Hill, Fifth Edition

PRACTICALS: Core Java
T.Y B.VOC-5P1

Practical No.	Practical
1.	Write a Java program to create a Java class: (a) without instance variables and methods, (b) with instance variables and without methods, (c) without instance variables and with methods. (d) with instance variables and methods.
2.	Write a Java program that illustrates the concepts of selection statement, looping, nested loops, breaking out of loop.
3.	Write a Java program to find GCD and LCM of two number
4.	Write a Java program to display the following pattern. a. ***** **** *** ** * b. A BC DEF GHIJ c. (a) (a + b) (a + b + c) (a + b + c + d) (a + b + c + d + e) (a + b + c + d + e + f) (a + b + c + d + e + f + g) (a + b + c + d + e + f + g + h) (a + b + c + d + e + f + g + h + i) d. 1 1 1 1 2 1 1 3 3 1 1 4 6 4 1
5.	Write a Java program to find the frequency of Character in a String

6.	Create a package We have to calculate the percentage of marks obtained in three subjects (each out of 100) by student A and in four subjects (each out of 100) by student B. Create an abstract class 'Marks' with an abstract method 'getPercentage'. It is inherited by two other classes 'A' and 'B' each having a method with the same name which returns the
	percentage of the students. The constructor of student A takes the marks in three subjects as its parameters and the marks in four subjects as its parameters for student B. Create an object for each of the two classes and print the percentage of
7.	marks for both the students.
8.	Create a class named 'Member' having the following members: Data members 1 - Name 2 - Age 3 - Phone number 4 - Address 5 - Salary It also has a method named 'printSalary' which prints the salary of the members. Two classes 'Employee' and 'Manager' inherits the 'Member' class. The 'Employee' and 'Manager' classes have data members 'specialization' and 'department' respectively. Now, assign name, age, phone number, address and salary to an employee and a manager by making an object of both of these classes and print the same.
9.	Demonstrate method overloading and method overriding in Java

PRACTICALS: ASP.NET
T.Y B.VOC-5P2

Practical No.	Practical
1.	Create an application that obtains four int values from the user and displays the product.
2.	a. C# Program to implement Phone Book b. C# Program to find a number using Pythagoras Theorem
3.	a. Create an application to demonstrate following operations i. Generate Fibonacci series. ii. Test for prime numbers. iii. Test for vowels. iv. Use of for each loop with arrays v. Reverse a number and find sum of digits of a number. b. Create simple application to perform following operations i. Finding factorial Value ii. Money Conversion iii. Quadratic Equation iv. Temperature Conversion
4.	Create a simple web page with various sever controls to demonstrate setting and use of their properties. (Example: AutoPostBack)
5.	Working with Basic and Form Controls with Master Page and storing into database
6.	Create a simple login form in MVC ASP.NET

7.	Handle Routing in Angular Single Page Applications (SPAs) with JavaScript and Node.js
8.	Working with data controls
9.	Working with AJAX and XML

PRACTICALS: Computer Networks
T.Y B.VOC-5P3

Practical No.	Practical
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
2.	• 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
3.	Use of ping and tracert / traceroute, ipconfig / ifconfig, route and arp utilities.
4.	a. Configure IP static routing. b. Implement Spanning tree algorithm
5.	a. Configure IP routing using RIP. b. Implement broadcasting in the designed network
6.	Configuring Simple OSPF. Simulate given routing algorithm.
7.	a. Configuring DHCP server and client. b. Configuring DNS Server and client.
8.	Create virtual PC based network using virtualization software and virtual NIC.
9.	Configuring OSPF with multiple areas.

Third Year Semester -VI Subject Information

Sr No.	Subject Code	Subject Title	Credits
1.	**UV-TWT-601**	Human Computer Interaction	6
2.	**UV-TWT-602**	DevOps	6
3.	**UV-TWT-603**	Advance Java	3
4.	**UV-TWT-604**	Data Warehousing and Mining	3
5.	**UV-TWT-6P3**	Advance Java	3
6.	**UV-TWT-6P4**	Data Warehousing and Mining	3
7.	**UV-TWT-6P5**	Project	6

T.Y B.VOC 601: Human Computer Interaction

Unit	Content	No. of Lectures
1	**1.1 Introduction:** Machine learning, Examples of Machine Learning Problems, Structure of Learning, learning versus Designing, Training versus Testing, Characteristics of Machine learning tasks, Predictive and descriptive tasks, **1.2 Machine learning Models:** Geometric Models, Logical Models, Probabilistic Models. **1.3 Features:** Feature types, Feature Construction and Transformation, Feature Selection	**15**
2	**2.1 Classification:** Binary Classification- Assessing Classification performance, Class probability Estimation Assessing class probability Estimates, Multiclass Classification. **2.2 Regression:** Assessing performance of Regression- Error measures, Overfitting- Catalysts for Overfitting, Case study of Polynomial Regression. **2.3Theory of Generalization:** Effective number of hypothesis, Bounding the Growth function, VC Dimensions, Regularization theory.	**15**
3	**3.1 Linear Models:** Least Squares method, Multivariate Linear Regression, Regularized Regression, Using Least Square regression for Classification. Perceptron, Support Vector Machines, Soft Margin SVM, Obtaining probabilities from Linear classifiers, Kernel methods for non-Linearity. **3.2 Logic Based and Algebraic Model:** Distance Based Models: Neighbours and Examples, Nearest Neighbours Classification, Distance based clustering-K means Algorithm, Hierarchical clustering, **3.3 Rule Based Models:** Rule learning for subgroup discovery, Association rule mining.	**15**
4	**4.1 Tree Based Models:** Decision Trees, Ranking and Probability estimation Trees, Regression trees, Clustering Trees. **4.2 Probabilistic Model:** Normal Distribution and Its Geometric Interpretations, Naïve Bayes Classifier, Discriminative learning with Maximum likelihood, Probabilistic Models with Hidden variables: Estimation-Maximization Methods, Gaussian Mixtures, and Compression based Models. **4.3 Trends In Machine Learning :** Model and SymbolsBagging and Boosting, Multitask learning, Online learning and Sequence Prediction, Data Streams and Active Learning, Deep Learning, Reinforcement Learning.	**15**

Text Books:

1. Machine Learning: The Art and Science of Algorithms that Make Sense of Data Peter Flach Cambridge University Press 2012 2.
2. Introduction to Statistical Machine Learning with Applications in R Hastie, Tibshirani, Friedman Springer 2nd 2012 3.
3. Introduction to Machine Learning Ethem Alpaydin PHI 2nd 2013

T.Y B.VOC 602: DevOps

Unit.	Content	No. of Lectures
1	**1.1 Introduction to Microservices,** Microservices Architecture, Fragmentation of business requirement, Deployment pattern, API gateway Service Discovery, Database Management for Microservices, Create Microservices	**15**
2	2.1 **Introduction to DevOps**, DevOps ecosystem, DevOps phases, Introduction to containerisation, Introduction to docker, Creating docker images using Docker file, Container life cycle	**15**
3	3.1 Install and configure docker, Create docker image using Docker file, Docker file, Start docker container, Connect to docker container, Copy the website code to the container, Use docker management commands to, List the images, List the containers, Start and stop container, Remove container and image	**15**
4	**4.1 Introduction to** YAML , Introduction to Docker Swarm and Docker Stack , Introduction to Kubernetes, Creating Kubernetes cluster, Creating service in Kubernetes, Deploying an application using dashboard 4.2 Configure Kubernetes, Configure Kubernetes Dashboard, Setup a Kubernetes cluster, Access application using Kubernetes service, Deploy the website using Dashboard	**15**

Reference Books:

1.
2.

T.Y B.VOC 603: Advance Java

Unit	Content	No. of Lectures

1	**1.1 Introduction to JFC and Swing**, Features of the Java Foundation Classes, Swing API Components, JComponent Class, Windows, Dialog Boxes, and Panels, Labels, Buttons, Check Boxes, Menus, Toolbars, Implementing Action interface, Pane, JScrollPane, Desktop pane, Scrollbars, Lists and Combo Boxes, Text-Entry Components, Colors and File Choosers, Tables and Trees, Printing with 2D API and Java Print Service API.	**15**
	1.2 JDBC Introduction, JDBC Architecture, Types of JDBC Drivers, The Connectivity Model, The java.sql package, Navigating the ResultSet object's contents, Manipulating records of a ResultSet object through User Interface , The JDBC Exception classes, Database Connectivity, Data Manipulation (using Prepared Statements, Joins, Transactions, Stored Procedures), Data navigation.	
2	**2.1 Threads and Multithreading**, The Lifecycle of a thread, Creating and running threads, Creating the Service Threads, Schedules Tasks using JVM, Thread-safe variables, Synchronizing threads, Communication between threads. **2.2 Overview of Networking**, Working with URL, Connecting to a Server, Implementing Servers, Serving multiple Clients, Sending EMail, Socket Programming, Internet Addresses, URL Connections, Accessing Network interface parameters, Posting Form Data, Cookies, Overview of Understanding the Sockets Direct Protocol. **2.3 What Is a Servlet?** The Example Servlets, Servlet Life Cycle, Sharing Information, Initializing a Servlet, Writing Service Methods, Filtering Requests and Responses, Invoking Other Web Resources, Accessing the Web Context, Maintaining Client State, Finalizing a Servlet.	**15**
3	**3.1 What Is a JSP Page?,** The Example JSP Pages, The Life Cycle of a JSP Page, Creating Static Content, Creating Dynamic Content, Unified Expression Language, JavaBeans Components, JavaBeans Concepts, Using NetBeans GUI Builder Writing a Simple Bean, Properties: Simple Properties, Using Custom tags **3.2 Introduction to EJB**, Benefits of EJB, Types of EJB, Session Bean: State Management Modes; Message-Driven Bean, Differences between Session Beans and Message- Driven Beans, Defining Client Access with Interfaces: Remote Access, Local Access, Local Interfaces and Container-Managed Relationships, Deciding on Remote or Local Access,	**15**
4	**4.1 Web Service:** What are web services, The REST Architectural style , Introducing HTTP, The core architectural elements of a RESTful system, Description and discovery of RESTful web services, Java tools and frameworks for building RESTful web services, JSON message format and tools and frameworks around JSON, Build RESTful web services with JAX-RS APIs, The Description and Discovery of RESTful Web Services, Design guidelines for building RESTful web services, Secure RESTful web services	15

References:

1. Himalaya Publishing House Sandeep Vishwakarma

T.Y B.VOC 604: Data Warehousing and Mining

Unit	Content	No. of Lectures
1	**Data Warehouse** **1.1 Overview and Concepts:** Need for data warehousing, The building blocks of a Data warehouse. **1.2 Architecture and Infrastructure :** Data Warehouse Architecture, Infrastructure and Metadata Management **1.3 Principles Of Dimension Modeling :** Introduction to Dimensional Modeling, Advanced Concepts	**15**
2	**2.1 Extract Transform Load Cycle:** ETL overview, Extraction, Loading, Transformation techniques. **2.2 Information Access and Delivery**: Matching information to classes of users, OLAP – the need, Design of the OLAP database, OLAP operations: slice, dice, rollup, drill-down etc. OLAP implementations. **2.3 Implementation And Maintenance:** Physical design process, Aggregates and Indexing. Data Warehouse Deployment	**15**
3	**Data Mining** **3.1 Introduction:** Basics of data mining, related concepts, Data mining techniques. The KDD process **3.2 Concept Description:** Class Characterization and comparison, Attribute relevance analysis, Attribute oriented Induction, Mining descriptive statistical measures in large databases. **3.3 Classification Algorithms:** What is Classification? Supervised Learning, Classifier Accuracy, Decision Tree and Naïve Bayes Classifier.	**15**
4	**4.1 Clustering:** What is clustering? Types of data, Partitioning Methods (K- Means, K-Medoids) Hierarchical Methods(Agglomerative , Divisive) **4.2 Association rules:** Motivation For Association Rule mining, Market Basket Analysis, Apriori Algorithm, FP tree Algorithm, Iceberg Queries. Advanced Association Rules concepts **4.3 Web Mining:** Web Content Mining, Web Structure Mining, Web Usage Mining.	**15**

Text Books:

1) Ralph Kimball, "The Data Warehouse Lifecycle toolkit', 2nd edition, Wiley India. 2) Han, Kamber, "Data Mining Concepts and Techniques", 2nd edition ,Elsevier 3) Reema Theraja “Data warehousing”, Oxford University Press.

4) “Introduction to Data Mining”, 1/e Pang-Ning Tan, Vipin Kumar, Michael Steinbach Pearson Education 5) M.H. Dunham, "Data Mining Introductory and Advanced Topics", Pearson Education.

Reference Books :

1) Paulraj Ponniah, "Data Warehousing Fundamentals", Wiley Student edition.

2) “Data mining For Business intelligence” Galit Shmueli, Nitin Patel, Peter Bruce; Wiley Student Edition. 3) “Data Warehousing, Data Mining & OLAP” Alex ber son & Stephen J Smith, Tat McGraw Hill.

4) “Data Mining with SQL Server 2008” Jamie McLennan & others, Wiley Indian Edition.

5) "Mastering Data Mining”, M Berry and G. Linoff, Wiley Student Edition. 6) R. KimballI, "The Data Warehouse Toolkit', John Wiley.

T.Y B.VOC 605: Project

Project Documentation and Viva-voce (Semester V) and
Project Implementation and Viva-Voce (Semester VI)

Goals of the course Project Documentation & Implementation and Viva-Voce

The student should:

- Be able to apply relevant knowledge and abilities, within the main field of study, to a given problem
- Within given constraints, even with limited information, independently analyse and discuss complex inquiries/problems and handle larger problems on the advanced level within the main field of study
- Reflect on, evaluate and critically review one's own and others' scientific results
- Be able to document and present one's own work with strict requirements on structure, format, and language usage
- Be able to identify one's need for further knowledge and continuously develop one's own knowledge • To prepare the synopsis and documentation for SRS (Software Requirement Specification).

To start the project:

- Start thinking early in the programme about suitable projects.
- Read the instructions for the project.
- Attend and listen to other student´s final oral presentations.
- Refer to previously submitted project reports.
- Communicate and be mentored by senior master students.
- Attend related information events (workshops / seminars / conferences etc.) about the related topics.

Application and approval:

- Read all the detailed information about project.
- Finalise supervisor / guide / guide in area of interest.
- Check with the coordinator about subject/project, place and supervisor / guide / guide.
- Write the project proposal and plan along with the supervisor / guide / guide.
- Fill out the application together with the supervisor / guide / guide.
- Hand over the complete application, proposal and plan to the coordinator.
- Get an acknowledgement and approval from the coordinator to start the project.

During the project:

- Search, gather and read information and literature about the theory.
- Document the practical work and your results systematically.
- Take part in seminars and the follow-ups/supervision.
- Think early on about disposition and writing of the final report.
- Discuss your thoughts with the supervisor / guide and others.
- Read the SOP and the remaining document which will be required again.
- Plan for and do the mid-term reporting to the coordinator/examiner.
- Do a mid-term report also at the work-place (can be a requirement in some work-places).
- Write the first draft of the final report and rewrite it based on feedback from the supervisor / guide / and possibly others.
- Plan for the final presentation of the report.

Finishing the project:

- Finish the report and obtain an OK from the supervisor / guide.
- Ask the supervisor / guide to send the certificate and feedback form to the coordinator.
- Attend the pre-final oral presentation arranged by the Coordinator.
- Rewrite the final report again based on feedback from the opponents and possibly others.
- Prepare a title page and a popular science summary for your report.
- Send the completed final report to the coordinator (via plagiarism software)
- Rewrite the report based on possible feedback from the coordinator.
- Appear for the final exam.

Project Proposal/research plan

- The student should spend the first 1-2 weeks writing a 1-2 pages project plan containing: - Short background of the project
  - Aims of the project
  - Short description of methods that will be used - Estimated time schedule for the project
- The research plan should be handed in to the supervisor / guide and the coordinator.
- Writing the project plan will help you plan your project work and get you started in finding information and understanding of methods needed to perform the project.

Project Documentation

The documentation should contain:

- Introduction - that should contain a technical and social (when possible) motivation of the project topic.
- Description of the problems/topics.
- Status of the research/knowledge in the field and literature review.
- Description of the methodology/approach. (The actual structure of the chapters here depends on the topic of the documentation.)
- Results - must always contain analysis of results and associated uncertainties.
- Conclusions and proposals for the future work.
- Appendices (when needed).

- Bibliography - references and links.

For the bachelors documentation, the chapters cannot be dictated, they may vary according to the type of project. However, in Semester III Project Documentation and Viva Voce must contain at least 3 chapters (Introduction, Review of Literature, Methodology / Approach, etc. depending on the type of project.) The Semester V report should be spiral bound.
In Semester VI, the remaining Chapters should be included (which should include Proposed Design / UI design , Experiments performed, Results and discussion, Testing methodology , Conclusions and proposals for future work, Appendices ,) and Bibliography - references and links. Semester VI report should include all the chapters and should be hardbound. It should also contain the National/International paper published in reputed journal by the student.

PRACTICALS: Advance Java
T.Y B.VOC-6P1

Practical No.	Practical
1.	Write a java program to present a set of choices for a user to select Stationary products and display the price of Product after Selection from the list.
2.	Write a java program to demonstrate typical Editable Table, describing employee details for a software company.
3.	Write a java program using Split pane to demonstrate a screen divided in two parts, one part contains the names of Planets and another Displays the image of planet. When user selects the planet name form Left screen, appropriate image of planet displayed in right screen.
4.	Develop Simple Servlet Question Answer Application to demonstrate use of HttpServletRequest and HttpServletResponse interfaces.
5.	Develop Servlet Application of Basic Calculator (+,-,*, /, %) using ServletInputStream and ServletOutputStream.
6.	Develop a JSP Application to accept Registration Details form user and Store it into the database table.
7.	Develop a JSP Application to Authenticate User Login as per the registration details. If login success the forward user to Index Page otherwise show login failure Message.
8.	Develop a web application to add items in the inventory using JSF.
9.	Develop a Room Reservation System Application Using Enterprise Java Beans.

PRACTICALS: Data Warehousing and Mining T.Y B.VOC-6P2

Practical No.	Practical
1.	Importing the source data structures in Oracle
2.	Design the target data structure using Oracle
3.	Create the target structure in OWB
4.	Designed and build the ETL mapping
5.	Perform the ETL process and transform it to data marts.
6.	Create the cube and process it in OWB. 7
7.	Generate the different types of reports in using Oracle.
8.	Perform the deployment of Warehouse
9.	Create the Pivot table and Pivot chart using some existing data or create the new data