DAYANANDA SAGAR UNIVERSITY

Shavige Malleshwara Hills, Kumaraswamy Layout,

Bengaluru - 560114, Karnataka.

SCHOOL OF ENGINEERING

SCHEME & SYLLABUS
FOR
BACHELOR OF VOCATION

SPECIALIZATION: IT (DATA ANALYTICS)

(1st & 2nd Sem)

Scheme and Syllabus for
B.Voc - Information Technology (Data Analytics) - AY: 2019-2020
1st Semester

General Education Components:12 Credits,180h				
Sl.No.	**Course Code**	**Course Name**	**Credits**	**Hours**
1.	19VI101	English	2	30
2.	19VI102	Mathematics-1	3	45
3.	19VI103	Applied Science	2	30
4.	19VI104	Problem Solving Techniques	3	45
5	19VI105	Basics of Electrical & Electronics	2	30
Skill Components :18 Credits,270h				
1.	19VI106	Basics of Electrical & Electronics Lab	6	90
2.	19VI107	Basics of Computer Lab	6	90
3	19VI108	Web Programming Lab	6	90

Semester – 2

General Education Components :12 Credits,180h				
Sl. No.	**Course Code**	**Course Name**	**Credits**	**Hours**
1.	19VI201	Python	2	30
2.	19VI202	JAVA	2	30
3.	19VI203	Mathematics - II	2	30
4	19VI204	Data Structures	2	30
5	19VI205	Data Base – I	2	30
6	19VI206	Mathematical Foundation of Data Science & Analytics	2	30
Skill Components :18 Credits,270h				
1.	19VI207	SQL Server Lab	6	90
2.	19VI208	Java Lab	6	90
3.	19VI209	Python lab	6	90
4.	19VI210	Customer Service Lab	Audit	30

1st Semester Syllabus

SEM/YEAR : **I SEM/1st Year**
COURSE CODE : **19VI101**
TITLE OF THE COURSE : **English**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

- To Speak fluently
- To Make simple technical presentations
- To Develop Communication skills for academic and social interaction.
- To comprehend technical literature by listening.
- To write technical documents in correct English.
- To have a better interactive skill.

Course outcomes

- Students achieve proficiency in English
- Develop their professional communication skills
- Acquire skills for placement

UNIT 1: Parts of Speech **(8 hours)**

Noun- Different kind of nouns, Numbers, Articles, Pronoun- Different kind of pronouns, Adjectives- Degrees of comparison, Verbs- Verb forms (V1,V2,V3), Active and Passive voice, Adverbs, Preposition, Conjunctions, Interjection.

UNIT 2: VERBTENSES **(5 hours)**

Maindivisions, Subdivisions

UNIT 3: LANGUAGE SKILLS DEVELOPMENTEXERCISES **(6 hours)**

Reading and Listening Exercises- Comprehension Passages, Stories, Newspaper Reading, Spoken English exercises- Self-Introduction, Story Telling, Announcements, Talk on given situations/topics

UNIT 4: WRITING SKILL and SENTENCES **(5 hours)**

Letter writing (Leave Letter/Apology Letter), Types of Sentences, QuestionTags, DirectandIndirectSpeech

UNIT 5: LANGUAGESKILLSDEVELOPMENT **(6 hours)**

Arranging a set of information in proper order, Story development from bare outlines, Role plays Practice on giving directions, Question & Answer sessions

Text Books:

1. HighSchoolEnglish Grammar by Wren &Martin - S.Chand&Co. Ltd
2. English Communication for Polytechnics by S.Chandrashekhar & Others – Orient Black Swan
3. English Grammar atGlance by M. Gnanamurali - S.Chand&Co. Ltd
4. EffectiveEnglish by E. Suresh Kumar&Others - Pearson

SEM/YEAR : **I SEM/1st Year**
COURSE CODE : **19VI102**
TITLE OF THE COURSE : **Mathematics-1**
L: T/A: P: C : **3: 0: 0: 3**

Course objectives : To introduce the students to mathematical tools used in various engineering branches

Course outcomes :

- An ability to apply knowledge of mathematics, science and engineering.
- An ability to identify, formulate and solve engineering problems.
- An ability to use the techniques , skills and engineering tools

Unit 1 **(10 hrs)**

LinearEquations

Solutionstolinearequations, Solutionstoquadratic equationsby factorization, Solutionstoquadratic equationsusingformula).Linear Algebra: Linear spaces, Subspaces, Linear independence, Bases and Dimensions, Orthogonality, Gram Schmidt Orthogonalization process

Unit 2 **(8hrs)**

Matrices & Determinants

MatrixDefinition,Addition,Subtraction, Multiplication andTransposeof Matrix, Definition of determinant,Propertiesandits Evaluation, Minors,Co-factors,Determinantof transpose, LinearequationSolution (Cramer'srule)

Unit 3 **(9 hrs)**

Complex Numbers - Introduction, representation of complex numbers, Representation on graph, Addition, Subtraction and multiplication, Complex conjugate, graph representation, Division of complex numbers, Polar form of complex number, Polar form of complex number, Conversion from polar to rectangular and vice-versa. **Vectors-**Introduction, Unit vector, Multiply vector by a scalar, Adding vectors algebraically and graphically, Magnitude and direction, Vector dot product and length, Vector cross product, Direction(right and rule),Area of parallelogram, Work done on moving object by a force (dot Product),Torque exerted by force (Cross Product)

Unit 4 **(10hrs)**

DifferentialCalculus

Definition and evaluation of limits, Definition of Derivative, Slope of tangent at a point on the curve, Differentiation of constant, e^x,x^n,a^x and log x, Differentiation of trigonometric functions, Differentiation of Sum, difference, product and quotient of functions, Application of differentiation-velocity and acceleration.

Statistics: Mean, Median and mode, Moving average, Grouping of data, Class interval, Range, Standard Deviation & Variance, Histogram, Skewness, Interpretation of skewness, Normal distribution.

Unit 5 **(8hrs)**

Sequence and series: Sequence, Series, Recursive and explicit formulas.

Set Theory: Definition of Sets, Venn Diagrams, Subset, Power Set, Cardinality and Cartesian products, Set Operations: AND,OR, NOT, Conditional statements, Univariate, Bi-variate and Multi variate data.

Permutation & Combination: Multiplication and addition principle of counting, Permutation, Combination, Exercise on permutation and combination

Text Books:

1. Erwin Kreyzig, Advanced Engineering Mathematics, Wiley, Tenth edition
2. Thomas and Finney, Calculus and Analytic Geometry, Pearson India, Ninth edition

Reference Books:

1. G.F.Simmons and S. Krantz, Differential Equations Theory, Techniques and Practice, Tata McGraw Hill.
2. W.E.Boyce and R.C.DiPrima, Elementary Differential Equations and Boundary Value Problems, Ninth Edition, Wiley Student Edition.

SEM/YEAR : **I SEM/1st Year**
COURSE CODE : **19VI103**
TITLE OF THE COURSE : **Applied Science**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives :

- To create awareness of correct usages of SIunits.
- To understand the relationship between laws and specific phenomena.
- To understand the method of composition and resolution of forces Study the condition of equilibriumofasystemofforcesRecognizemomentasone,whichgivesrotationeffect.
- To identify the acidic, basic or neutral nature of solution
- To understand about solar energy and its applications
- To understand the general properties and uses of certain organic compound
- To create awareness of phenomenon Modern Physics& on wave motion
- To get exposure on laser

Course outcomes :

- Students can understand the importance of force and energy
- Moments and its applications are learnt
- Students are able to understand properties of solid and fluids
- Students are able to identify the acid and basic nature of solution
- Students got exposure on laser

UNIT 1 **(08 hours)**

PHYSICAL WORLD, FORCE & MOTION ENERGY

Physical Quantities Types of systems of units, Fundamentals of derived quantities, SI units Dimension Linear motion Displacement, velocity, acceleration. Equations of motion Problems Newton's laws of motion. Momentum (Linear) Law of conservation of momentum Force Inertia. Work power, Energy Law of conservation of energy.

UNIT 2 **(06 hours)**

Composition andresolution of forces: Definition, law of parallelogram of forces, triangle law of forces, polygon law of forces.

EQUILIBRIUM OF FORCES: Introduction. System of forces Principle of equilibrium Lami's Theorem Problems Moments and its applications. Couple.

UNIT 3 **(05 hours)**

PROPERTIES OF SOLIDS AND FLUIDS

Physical properties, chelical properties, mmechanical properties, eelectrical properties, Optical properties.**Lubrication and lubricants:** Basics of lubrication, Types of lubricants, Selection of lubricant

UNIT 4 **(05 hours)**

HEAT

Definition of heat Thermometry. Platinum resistance thermometer, Thermos couple. Pyrometer Calorimetry Specific heat capacity Heat Transfer **Optical fiber:** Optical fiber, types, working principle,

application

UNIT 5 **(06 hours)**

Laser

Introductionandpropertiesoflaser, typesandapplication

Renewable energy

PV panels, specifications, Mppt, Wind turbine types, working of wind turbine, Types of batteries, PV system requirement calculations,

Text Books:

1. Principle of physics for class XI and XII by V.K.Mehata and Rohit Mehta, as per Karnataka state PUC syllabus S.Chand and Company, New Delhi
2. Engineering chemistry for Diploma by Ranjan Kumar Mahapatra (PHI Learning Pvt. Ltd., New Delhi)
3. Basic Physics by Kongbam ChandramaniSingh (PHI Learning Pvt. Ltd., New Delhi)
4. Principle of physics by P.V.Naik (PHI Learning Pvt. Ltd. New Delhi)

SEM/YEAR : **I SEM/1st Year**
COURSE CODE : **19VI104**
TITLE OF THE COURSE : **Problem Solving Techniques**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives:

- To understand the basic computers and component of computer
- To understand about various classes of computers, speed and memory
- To gain knowledge about input and output devices
- To learn about data storage devices.

Course outcomes:

- Students are able to learn about components of computer
- Students are able to identify the various data storage devices and its applications
- Acquire the skills about Operating systems and GUI

UNIT 1 **(6 hours)**

Introduction to Algorithm

What isan algorithm? Characteristics of anAlgorithm

UNIT 2 **(6 hours)**

Method for Developing an Algorithm

Sequence structure, Selection structure, repetition structure, Flowcharts, Flowchart Constructs, flowchart Example

UNIT 3 **(6 hours)**

Pseudocode(orProgram DesignLanguage)

PseudocodeLanguageConstructs5, Computation/Assignment, Input/Output, Selection, Repetition, PseudocodeExample

UNIT 4 **(6 hours)**

Programming using C

How todevelopaprogram usingC language, Simpleprogramexamples

UNIT 5 **(6 hours)**

Problem solving

IntroducingComputationalThinking, What isCT? ExploringAlgorithms, ComputationalThinkingis a problem-solvingprocess thatincludesthe followingcharacteristics. Finding Patterns, Developing Algorithms, Decomposition, Abstraction, Pattern Recognition, Designing algorithms, Computer Hardware vs Computer Software, Final Project: Applying Computational Thinking,

Text Books:

i) Computer Fundamentals – by P.K.Sinha, BPB Publications

Reference Books:

i) Computer Programming – by P.Kumar Wiley publication

ii) “Computer Fundamentals and Programming in C ”, - by Reema Thareja, Oxford Press, 2014

SEM/YEAR : **I SEM/1st Year**
COURSE CODE : **19VI105**
TITLE OF THE COURSE : **Basics of Electrical & Electronics**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives :

- To effectivelyusedigitalmulti-meter,functiongeneratorandoscilloscope.
- To analyse the working of a diode and its characteristics
- To understand the characteristics of different electronic devices.
- To understand the types of rectifiers and their working

Course outcomes :

- Students are able to understand the
- Students are able to identify the types of rectifier.

UNIT 1 **(6 hours)**

Atomic Structure and Introduction toelectron current

Atom-Electron orbit& Energylevels, Conceptof electricfriction(resistance),currentand voltage with definition(s) Unit, OhmsLaw, a)Temperatureeffecton resistance,(b) Ideal Vg sourceand currentsource, Power,Energy,and energyin Kilo watthouri.e.,Unitwith examples,

Resistors and Kirchoff's law

Resistance in series,Resistance in Parallel and related problems, Open circuitand shortcircuits, Kirchoff's voltage law with problems, Kirchoff's current law with problems,

UNIT 2 **(6 hours)**

Capacitors & Fundamentals of AC

Capacitance ofaCapacitor, Principle ofCapacitance, Di-electric strength,effectofdielectricmaterial on capacitance ofa capacitor and types, Capacitorsin series and Parallel Combination, Different Waveforms, cycle, frequency, Time period, Instantaneous value, rms value, peak value, peak to peak value, amplitude

Basic Semiconductor andP.N.junction Theory

Energy bands in conductors, semiconductor sand insulators, Conduction in conductors and semiconductors, P-Type &N-type Semiconductor, PNjunction–Unbiasedand biased PN junction Forward Biasing and ReverseBiasing

UNIT 3 **(6 hours)**

Semiconductor Diodes, ZenerDiodes andLED

Introduction to P.N.-junction diodes, Diode characteristics &Descriptionofdiode equation, Zenerdiodes characteristics & parameters, Lightemitting diodes,itsworking principle characteristics& Application, Half wave rectifier, Full wave rectifier, Full wave bridge rectifier,

UNIT 4 **(7 hours)**

DigitalBasics

Introduction to digital system, Difference between digitaland analog signals, Numbersystem–differenttypes, Conversion ofDecimal to Binaryand vice versa, Conversion of Decimal to hexadecimal and vice versa, Conversion of binary to hexa decimal and vice versa, Binarycoded decimal, ASCII,EBCDIC,

Complementarithmetic [1's,2's], Binaryaddition

UNIT 5 **(05 hours)**

LogicGates
Introduction oflogic gates, Inverter- OR-AND-NOR– NAND symbol and truth table, XOR -XNOR gates, Construction oflogic circuits using gates

Text Books:

1. Electronic Circuits: Fundamentals and Applications by Michael Tooley BA Elsevier Ltd., Third Edition,2006
2. Electronic Devices and Circuits, Allan Motter shed, PHI.

Reference Books:

1. Robert. L. Boylestad and L. Nashelsky, Electronic Devices and circuit Theory, Pearson Education,9th edition, 2005
2. David A Bell, Electronic Devices and Circuits, PHI,5th edition ,2007
3. Millman & Halkias, Electronics Devices and Circuits, McGraw Hill.

SEM/YEAR	**: I SEM/1st Year**
COURSE CODE	**: 19VI106**
TITLE OF THE COURSE	**: Basics of Electrical & Electronics LAB**
L: T/A: P: C	**: 0: 0: 4: 6**

Course Objectives:

- To understand Circuit operation of different types of voltage regulation circuits, including series.
- To explain the construction and characteristics of diodes, bipolar junction transistors and optical devices.

Course outcomes:

- Ability to understand and analyse, linear and digital electronic circuits.

List of experiments:

1. Familiarizationof toolkit
2. SolderingPractice
3. FamiliarisationofCRO
4. Familiarisationof functionGenerator
5. Familiarisation of Digital Multi meters
6. Colour coding of the resistor
7. Verification of Ohm'slaw
8. Verification of KVLandKCL
9. Studyof diodedatasheetandV.I Characteristicsof diodes
10. Studyof ZenerdatasheetandV.I CharacteristicsofZenerdiodes
11. Rectifiers-Half-wave and centre-tapped full-wave rectifier
12. Bridgerectifierwith capacitorfilter
13. FamiliarisationofLogicInverter(TTL)
14. Familiarisationof ANDGate(TTL)
15. FamiliarisationofOR Gate(TTL)
16. Familiarisationof NAND Gates(TTL)
17. Familiarisationof NOR Gates(TTL)
18. Familiarisationof EXORGates(TTL)
19. UniversalProperty of NANDandNOR Gates

SEM/YEAR	**: I SEM/1st Year**
COURSE CODE	**: 19VI107**
TITLE OF THE COURSE	**: Basics of Computer Lab**
L: T/A: P: C	**: 0: 0: 4: 6**

Course Objectives:

- To learn about DOS commands
- To increase typing speed and confidence
- To create bio-data with suitable alignments
- To create the presentation& to create the email

Course outcomes:

- Student can able to learn about DOS Commands
- Students are able to increase the typing speed and confidence
- Students are able to create the bio-data, power point presentation and email on their own.

List of experiments:

Exercise 1: ComponentsofComputer

1. Input devices andoutput devices
2. Functionalunits ofcomputer Functionalunits ofcomputer

Exercise 2: DOS Commands

1. Write the syntax and definition of following commands: cls, cd, copy, copy con, Mem, Tree, ver, exit, find, sort, time, edit, erase, date, del, dir, md, rd, type.
2. Write the syntax for appending the content of two files, copy the output of dir command to file, listing of files and directories: dir/b, dir/l, dir/on, dir/w, definition of following commands: dir/ad, dir/oe, dir/p, dir/ar.

Exercise 3: Typing Tutorial

1. Familiarize typing in standard QWERTY keyboards.
2. Touch Typing Course: In this course, Trainee will learn the positions of the letter keys and common punctuation by heart, after completing the course you will be able to type with all ten finger without looking at the keyboard.
3. Speed Building course: This course is designed to increase your typing speed and confidences. The Trainee will focus on the keys for each finger, type longer texts and train with some of the most common English words
4. Numbers, Special marks and 10-key pad.4.1: Numbers Course: This two lesson course teaches how to type numbers on the number row 4.2: Special Marks Course: Extend Trainees skills to cover special marks, including Internet characters.
5. Mathematical symbols and brackets: 10-key Number pad Course: Learn to use the 10-key number pad with touch typing technique.

Exercise 4: Creating Document

1. Create the document in word pad with following information Name, qualification, city, date of birth, phone number, and increase the size of font to 24, make it bold ,put the heading as information and align it centre.
2. Create your bio data in note pad with suitable formats.
3. Demonstrate procedure for creating, naming, renaming of a folder in computer and familiarize properties like changing the icon, hiding a folder and changing attributes.

Exercise 5: Applications

1. How to open DOS, NOTEPAD, PAINT, CALCULATOR, and WORDPAD THROUGH RUN.?
2. How to create shortcuts, disappearing the desktop items, auto hide the task bar?
3. What is Status bar, Menu bar, Taskbar, Standard Toolbar, and specify their locations.
4. What is the extension of the following application: WordPad, Notepad, and Paint?

Exercise 6: MS-Office

1. Create your CV (Bio Data) in MS-word with suitable alignments.
2. Create the paint file insert the picture in it by choosing from different place and modify it in WordPad.
3. What is Border and Shading? Write the steps for applying Border & Shading to a Paragraph in WordPad.
4. What is Bullets and Numbering? Write the steps for applying Bullets and Numbering, and its different types in WordPad
5. What is spelling and grammar check. Write the steps for this and different option present in it in WordPad.
6. What is the use of Find and Replace and Go to option? Write the steps for that with example in WordPad.
7. Write the steps for inserting Symbols and special characters and inserting Date and Time, File, Object with example in WordPad.
8. Demonstratethestepstocreateandenterrecords mailmerge
9. Type the invitation for calling your friends on the occasion of your birthday using mail merge, WordArt, select the field names yourself.
10. Write the steps for creating a table. Explain merge cells and split cells options.
11. Open Ms-Excel and insert 10 sheets, apply different backgrounds to different sheets, fill different colours in different cells.
12. Open Ms-Excel insert 4 sheets hide the sheet 2 and 3 and apply different colour to sheet tabs.
13. Demonstrate mathematical function in MS-Excel.
14. How to insert Rows, Columns, Cells and Worksheet in MS-Excel?
15. Create the presentation about you daily activity
16. Create the presentation of your organization company with suitable diagrams.

17. Create the presentation to explain any technology with suitable diagrams.
18. Create the presentation for any educational organization which should consist of hyperlinks, custom animation, slide transition
19. Create the DATABASES for the Company consisting of the tables: EMPLOYEE, DEPARTMENT, DESIGNATION, ACCOUNTS. And the fields are as follows EMP: Name, City, Add, Phno, Place, and Id. DEPARTMENT: Id, Dep Name, and Location. DESIGNATION: Id, Qualification, Experience, Skills. ACCOUNTS: Id, Basics, DA, HRA, PF. (MAKE ID AS PRIMARYKEY) and create the query to select the fields as: EMP=ID, NAME, PHNO, PALCE. DEP=DEPNAME, LOCATION. DESIG=QUALIFOCATION, EXP.ACCOU=TOTAL, BASICS, DA, PF.

Exercise 7: Internet

1. Write the steps to create the email.
2. Write the steps to search the details about historical places in internet.
3. Write the steps to create a mail and send it your friend.
4. Write the steps to create a mail which should attach some data and send it to your friend.

SEM/YEAR	**: I SEM/1st Year**
COURSE CODE	**: 19VI108**
TITLE OF THE COURSE	**: Web Programming lab**
L: T/A: P: C	**: 0: 0: 4: 6**

Course Objectives:

- Define the basics and principles of Web page design
- Visualize the basic concept of HTML
- Develop the concept of web publishing
- Introduce basics concept of CSS.

Course outcomes:

- Ability to understand and develop the website.

List of experiments:

1. Write a program in C language to display 'hello world'. AnalyzeSubmain(), Compilation and execution process of a C program.
2. Write a program in C language to perform arithmetic operation like+,-, X,/and% And display the result. (i) by declaring in to type variables.(ii) by declaring float type variables.(iii) by declaring double type variables.(iv) by declaring long int type variables.(v) by declaring unsigned int type variables
3. WriteaprograminC languagetocalculatetheareaof thecircle.Formulafor Calculating area is where r is the radius and is a constant.
4. WriteaprograminC languagetofindwhetheraninput numberiseven orodd.
5. WriteaprograminC languagetofindwhetheraninput numberispositiveor Negative
6. WriteaprograminC languagetofindthegreatestamongthreeinput numbers.
7. WriteaprograminC languagetocheck whetheranenteredalphabetisvowel, consonant, digit or special character.
8. WriteaprograminC languagetointerchange thevaluesof twonumeric variables Without using a third variable.
9. WriteaprograminC languagetoprintcountingnumbersfrom1to100 using 'for loop'.
10. WriteaprograminC languagetoprintalloddnumbers lessthan 100 using 'while loop'.
11. WriteaprograminC languagetoprintall even numbers lessthan 100 using 'while loop'.
12. Writea program toprintalltheASCII valuesandtheirequivalent characters Using a while loop.
13. WriteaprograminC languagetofindthesumofdigitsofaninput numberless than99999.
14. WriteaprograminC languagetofindthesumoffirst andlast digitofanyinput numberlessthan 999999.
15. WriteaprograminC languagetoreverseany input numberlessthan99999
16. WriteaprograminCtogenerateFibonacciseries 0,1,1,2,3,5,8,….<1000.
17. WriteaprograminC languagetofindsumofseries(1^2) +(2^2) +…+(n^2),where n<25.

18. WriteaprograminC languagetodisplaytheoutput asgivenbelow usingproper loops

1234

234

34

4

19. Write a program in C language to find all the factors of an input numberless than 1000.

20. WriteaprograminC languagetofindwhetheraninput numberisprimeor composite.

21. Write a program in C language to display a menu as given below and Execute Arithmetic operations. Useswitchcase. Menu

Addition …….. 1

Subtraction.....2

Multiplication.....3

Division.....4

Modulo Division...5

Enteryour choice...(0/1/2/3/4)

22. Writeaprogramtoprint theprime numbersup toagivenlimit. Alsoprint the numberof prime numbers present in thegivenlimit(Usenestedloops,break and continue).

23. Writeaprogramtoenter thenumberstilltheuserwantsandattheenditshould displaythe count of positive,negativeandzerosentered.

HTML

24. CreateaHTMLdocument usingthefollowingtags<html>,<head>,<title>,<body>

25. Create a HTML document which contains the following properties: Headings, paragraphs and breaks, divisions andcentering quotations, preformatted text,insertedanddeletedtext,characterentities,comments,blocklevel elements- block quotetag,text-levelelements, fonttags.

26. Create a HTML document for creating lists-ordered list, unordered list and definitionlist.

27. Createa HTMLdocumenttoimplement nested list

28. Create 6 HTML pages, make one as main and make other 5 as sub pages. Create links in main page to link to all subpages and create link in all subpages for moving throughout the pages and to came back to main page

29. Create a html document containing images by using<img>tag.

30. Create an HTML document to implement Image map.

31. Create a HTML document and give different colors for text, set back ground color, background image.

32. Create an HTML document to create the following tables (Table with caption, Headings ,Row span, Col span, Cell padding, Cell spacing, Add background color, back ground image in a table, Border properties)

33. CreateanHTMLdocumentanddividethepageintoframesusevertical frameand horizontalframe, includepagesin alltheframes,givelinks in the pageandopen the link in theframe,usetarget

34. CreateanHTMLdocument toimplementinlineframe

35. CreateanHTMLdocumentandattachaudio,video,animation,PDFformatusing <embed>

36. CreateanHTMLdocumentaddaformin that andadd formelements suchas,field set,legend,labels,text box, textarea,radiobutton,check box, drop downlist, selectmenu,fileuploads,submit button,reset button

37. Createa HTMLdocumenttoaddingstyletoadocument(usedifferentselectors)

38. createaHTMLdocumentforaddingstyle toadocument
a)Inlinestylesheet b)Embeddedstyle sheetc)Externalstylesheet
d)Importe)link
39. Createa HTMLdocumenttoinclude CSSbackground properties.
40. Createa HTMLdocumenttoinclude CSSTextproperties
41. Createa HTMLdocumenttoinclude CSSlistproperties
42. Create a HTML document to include CSS fancy Table
43. Createa HTMLdocumenttoinclude CSSBoxModel
44. Createa HTMLdocumenttoinclude CSSBorder properties
45. Createa HTMLdocumenttoinclude CSSOutline
46. Createa HTMLdocumenttoinclude CSSPositioning properties
47. CreateaHTMLdocumenttoimplementCSSpseudo-class.Adddifferentcolorstoa hyperlink, add other style to hyperlinks

2nd Semester Syllabus

SEM/YEAR : II SEM/1st Year
COURSE CODE : 19VI201
TITLE OF THE COURSE : Python
L: T/A: P: C : 2: 0: 0: 2

Course Objectives:

1. Master the fundamentals of writing Python scripts.
2. Learn core Python scripting elements such as variables and flow control structures.
3. Discover how to work with lists and sequence data.
4. Write Python functions to facilitate code reuse.
5. Use Python to read and write files.
6. Make their code robust by handling errors and exceptions properly
7. Work with the Python standard library
8. Explore Python's object-oriented features
9. Search text using regular expressions

Course Outcomes:

1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
2. Interpret Object oriented programming in Python
3. Design and develop Client Server network applications using Python

Unit 1: Introduction to Python (6 Hrs)

History and Features of Python, Installing Python, Very Simple Programs, Variables, Python Data types and Operators: Python data types, Numbers, Python Strings, Functions and methods**,** Lists, working with list, Functions and methods, Tuples, working with tuples, Functions and methods, Dictionaries, working with dictionary, Functions, Python Basic operators, Python Program Flow Control: Conditional and control statements, Loops, For Loops in ranges, string, list and directory

Unit 2: Python Functions, Modules and Packages (6Hrs)

Calling a function, Types of functions ,Function Arguments ,Anonymous functions, Global and local variables, Importing module, Importing own module as well as external modules, Packages, Composition, Powerful Lambda function in python. Python Input, Output and File operations: Printing on screen, Reading data from keyboard, Opening and closing files, Reading and writing Files, Renaming and deleting file. Manipulating file pointer using seeks. Exception Handling: Exceptions, Assertions in Python, Exception Handling, try, except clause and try-finally clause

Unit 3: Python Object Oriented Programming – Oops (6Hrs)

OOPs concepts, Classes and objects, Attributes, Inheritance, Overloading, Overriding, Data Hiding, Encapsulation and polymorphism. Regular Expressions: Character matching and searching in regular expressions, Extracting data using regular expressions, Regular Expression modifiers, Patterns. CGI Programming: CGI,CGI architecture, Environment variable, CGI Examples, HTTP Header, GET and POST methods

Unit 4:Databases (6Hrs)

Introduction, database connection, executing queries, performing transactions.Networking: Socket, Socket Module, Methods, Client and server, Internet modules. Sending Email: Sending Email using SMTP, Sending an HTML e-mail using Python, Sending Attachments as an E-mail

Unit 5: GUI programming (6 Hrs)

Python - GUI Programming (Tkinter), Tkinter Programming, Tkinter Widgets, Attributes. Web Scraping: Project: mapIt.py with the web browser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive. Working with Excel Spreadsheets: Installing the openpyxl Module, Reading Excel Documents. Working with PDF and Word Documents: Read PDF Documents, Extracting Text from PDFs, Decrypting PDFs, Creating PDFs

Text Books:

1. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning,
2. Learning Python 2nd edition by MARK LUTZ, David Ascher, O; Reilly Publications
3. Python Programming: A Complete Guide for Beginners to Master, Python Programming Language by Brain Draper

SEM/YEAR **: II SEM/1st Year**
COURSE CODE **: 19VI202**
TITLE OF THE COURSE **: Mathematics II**
L: T/A: P: C **: 2: 0: 0: 2**

Course Objectives:

1. Solve mathematically technical problems and apply the concepts of Mathematics to engineering problems
2. Awareness of correlation and regression.
3. Know the basic concepts of statistics.
4. Understand and use concepts of Integration and Differential Equations and its applications
5. Know the solution of percentage, ratios and proportions.

Course Outcomes:

1. Solve system of Probability and Statistics
2. Solve problem of Analytical Geometry
3. Describe and Develop Correlation and Regression analysis model

Unit 1:

RATIOS, PERCENTAGE AND PROPORTIONS **(02 Hrs)**

Ratios, proportion and percentage

Unit 2:

ANALYTICAL GEOMETRY **(05Hrs)**

Rectangles and Squares, Parallelogram, Triangle, Rhombus, Trapezium, Circle, Sector and Arc, Cartesian Co-Ordinates, Equation of axis, Distance, Midpoint, Slope, Condition for Perpendicularity and parallelism, Equation of straight line

Unit 3:

INTEGRALCALCULUS AND DIFFERENTIAL EQUATIONS **(9Hrs)**

Integrals of functions, rules of integration, Integration by parts Definite Integrals Area under plane curves – simple problems Differential equations

Unit 4:

CORRELATION AND REGRESSION **(06 Hrs)**

Meaning of correlation and Regression, Correlation Analysis, Regression Analysis, Simple Linear Regression

Unit 5:

PROBABILITY AND DISTRIBUTION **(8Hrs)**

Probability, Sample and Event Space, Conditional Probability, Data Types, Uniform Distribution, Normal Distribution, Binomial Distribution, Poisson distribution.

Text Books:

1. Thomas, Weir and Hass(2009), Thomas's Calculus, Twelfth edition, Pearson, India
2. Goon A.M., Gupta M.K. &Dasgupta B: Fundamentals of Statistics, Vol. 1, The World Press Pvt. Ltd., Kolkata.
3. Thomas's Calculus, G.B.Thomas, M.Weir, J. Hass, Pearson , 12th edition

SEM/YEAR : **II SEM/1st Year**
COURSE CODE : **19VI203**
TITLE OF THE COURSE : **Software Engineering**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

- This course is introduced to give the students necessary knowledge,
- understanding and Design aspects in Software Engineering
- Understand software development life cycle models, process models, and various design engineering techniques
- Understand the importance of testing and use different types of testing techniques.

Unit 1 **(6hrs)**

The software Problem: Software Problem - Cost, Schedule and quality, Scale and Change. Software Process - Process and Project, Component Software Processes Software development

Unit 2 **(6hrs)**

Software process: Process Models, Waterfall, Prototyping, Iterative development, Rational Unified Process, Time boxing Model, Extreme programming and Agile processes, Using process model in a project, Project Management Process.

Unit 3 **(6hrs)**

Software requirements analysis and specifications: Value of good SRS, Requirement process, Requirement Specification, Desirable Characteristics of an SRS, Components of an SRS, Structure of a Requirements Documents, Functional Specification with use cases, Basics, Examples, Extensions, Developing use cases, Other Approaches for Analysis, Data Flow Diagram, Validation.

Unit 4 **(6hrs)**

Software architecture &: Role of Software Architecture, Architecture Views, Component and Connector view, Components, Connectors, Example, Architecture styles for C&C View, Pipe and Filter, Shared data Style, Client Server style, Some other styles, Documenting Architecture Design, Evaluating Architectures.

Unit 5 **(6hrs)**

Planning a software project: Planning a software project -Effort Estimation, Top-Down Estimation Approach, Bottom-Up Estimation Approach, Project Schedule and Staffing, Quality Planning, Risk Management Planning, Risk Management Concepts, Risk Assessment, Risk Control, A Practical Risk Management Approach, Project Monitoring Plan, Measurements, Project Monitoring and tracking, Detailed Scheduling

Text Book:

Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition. McGraw Hill International Edition.

SEM/YEAR **: II SEM/1st Year**
COURSE CODE **: 19VI204**
TITLE OF THE COURSE **: Data Structures**
L: T/A: P: C **: 2: 0: 0: 2**

Course Objectives:

1. Know various techniques of Data structures
2. Creating Stacks and Queues.
3. Design Trees
4. Implement Graphs

Course Outcomes:

1. To understand and explain linear and dynamic allocation of memory using array and linked list
2. To design programs for queue, stacks, sorting, Searching using linear data structures.
3. To use nonlinear data structures to create make Tree, Graphs

Unit 1: Introduction **(8 Hrs)**

Functions and various implementation of functions. Passing values, array, structure, pointer to a function, Structures , structure variables, pointer to structure variables, Pointers, Double pointer, NULL Pointer, void pointer, Dynamic memory allocation. **Stacks:** The Stack introduction, Definition and operations on stack. Insert/push operation, delete and pop operation and display, Representation of stacks in C using arrays implementing various operation of stack using C, Stack application: Conversion of expressions with implementation using C, Conversion from infix to postfix, Conversion from infix to prefix, Evaluation of postfix expression, Evaluation of prefix expression. **Queues:** Introduction, operation and application of queues, Different types of queues - Sequential representation of queues, Ordinary queue, Circular Queue, Priority queue, Double Ended queue, Input Restricted Deque. Output Restricted Deque.

Unit 2: Linked Lists **(6 Hrs)**

Introduction, Singly linked list with operations in lists, Creating ordered list, merging two ordered list, Circular single linked list, Circular single linked list with header node, Doubly linked list and Circular double linked list, Application of linked lists, Addition of two long integers, Evaluation of a polynomial, Addition of two polynomials, Advantage and disadvantage of different lists

Unit 3: Trees **(6 Hrs)**

Introduction, Definition, storage representation of a binary tree, Terminologies associated with trees, Operations on binary tree: Insertion, Traversal, Searching, Copying a Tree, Binary search Tree: Insertion, Searching, Deletion, Application of Trees: Searching, Sorting, Conversion of Expression, Creating binary tree for postfix expression (Expression Tree)

Unit 4: Graphs **(5 Hrs)**

Introduction- what is graphs, Definition, Basic operations on Graph, Directed graph and Undirected graph, Representation of graph- Adjacency Matrix and Adjacency List, Representation of graph- Adjacency Matrix, Representation of graph- Adjacency List, Advantages and disadvantages of Adjacency Matrix and Adjacency List, Graph categories – Sparse graph and Dense graph, Graph Traversal – BFS and DFS, Depth First Search, Breadth First Search

Unit 5: Sorting and Searching **(5 Hrs)**

Introduction, Bubble Sort, Merge sort, Radix sort, Quick sort, Insertion Sorts Simple insertion sorts, Shell sort, Heap sort, Priority Queue using heap, Basic search techniques, algorithmic notation, Searching, searching an ordered Table, Binary search, Interpolation search, Tree

searching: Binary search

Text Books:

1. Introduction to Data Structures using C by A. M Padma Reddy
2. Data Structures using C and C++ by Tanenbaum, Tata McGraw Hill Publishers
3. The Definitive Guide, Fifth Edition By David Flanagan (Author)
   Professional JavaScript for Web Developers (Wrox Programmer to Programmer) second edition by Nicholas C. Zakas (Author)
4. Data Structures through C by YeshwantKanitkar

SEM/YEAR **: II SEM/1st Year**
COURSE CODE **: 19VI205**
TITLE OF THE COURSE **: Data Base 1**
L: T/A: P: C **: 2: 0: 0: 2**

Course Objectives:

1. Understand the Database concepts
2. Design the database with planning and coding
3. Normalize the database
4. Administration of data and data base
5. Solve queries related to the database

Course Outcomes:

4. Ability to Install, configure, and interact with a relational database management system
5. Ability to master the basics of SQL and construct queries using SQL
6. Ability to design and develop a large database with optimal query processing

Unit 1: Introduction to Database System **(5 Hrs)**

File System versus a DBMS, Purpose of Database system, Database Applications, Basic concepts and definitions

Unit 2: Data Models **(6 Hrs)**

Entity-Relationship Model, Object Oriented Model, Network Model, Hierarchical Model, Relational Model.**Normalization:** What is Normalization? First Normal form, Second Normal form, Third Normal form, Boyce-codd Normal Form

Unit 3: SQL **(8 Hrs)**

Introduction to SQL, DDL Commands, DML Commands, DCL Commands, TCL Commands, User defined data type, Where Clause operators, Order By, Group By, Having Clauses, DISTINCT, TOP Keywords, Aggregate functions, Built-in functions-numeric, string and Date Functions

Unit 4: Advance SQL **(6 Hrs)**

SQL Constraints, Sub Queries, Identity column, SQL Joins, Views, Index, Triggers

Unit 5: Transact-SQL **(5 Hrs)**

Stored Procedure, Function, Control Structures, Conditional Processing using IF statements, While loop, Exception handling by TRY…CATCH, Error functions used within CATCH block

DATA ADMINISTRATION

Database Administrator, Concurrency control, Database Recovery, Database Security

Reference Books:

1. SQL Server 2008 r2 - Black Book
2. SQL Server – Patrick Paul
3. SQL Server 2008 programming – Robert vieira
4. J. Date, A. Kannan and S. Swamynathan, “An Introduction to Database Systems”, 8thed, Pearson Education, 2006
5. Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2003

SEM/YEAR : **II SEM/1st Year**
COURSE CODE : **19VI206**
TITLE OF THE COURSE : **Mathematical Foundations of Data Science & Analytics**
L: T/A: P: C : **2: 0: 0: 2**
Course Objectives:

The course will introduce students to the fundamental mathematical concepts required for a program in data science

Course Outcomes:

1. Demonstrate understanding of basic mathematical concepts in data science, relating to linear algebra, probability, and calculus.
2. Employ methods related to these concepts in a variety of data science applications.
3. Apply logical thinking to problem-solving in context.
4. Demonstrate skills in writing mathematics.

Module1: Basics of Data Science **(5Hrs)**

Introduction: Typology of problems; Importance of linear algebra, statistics and optimization from a data science perspective; structured thinking for solving data science problems.

Module2: Fundamental structures **(05Hrs)**

Functions - surjections, injections, inverses, composition. Relations - reflexivity, symmetry, transitivity, equivalence relations. Sets - Venn diagrams, complements, Cartesian products, power sets, finite and infinite sets, introduction to lattices. Abstract orders: quasi-order, partial order, well-order, (Advanced, optional topics: Zorn's lemma, Koenig's theorem.)

Module3: Logic **(8 Hrs)**

Propositional and predicate logic: syntax, semantics, soundness, completeness, unification, inferencing, resolution principle, proof system. Proof techniques (negation, contradiction, contraposition, mathematical induction) and the structure of formal proofs: efficiency of proof-systems.

Module4: Linear Algebra **(07Hrs)**

Matrices and their properties (determinants, traces, rank, nullity, etc.); Eigenvalues and eigenvectors; Matrix factorizations; Inner products; Distance measures; Projections; Notion of hyperplanes; half-planes.

Module5: Number Theory **(5Hrs)**

Elementary number theory, fundamental theorem of arithmetic, gcd, unique factorization, Euler's function, modular arithmetic, Fermat's little theorem, Chinese remainder theorem, modular exponentiation, RSA public key encryption.

Text Books:

1. **C. Liu and D. P. Mohapatra, Elements of Discrete Mathematics, 3/e, Tata-McGraw Hill, 2008.**
1. G. Strang (2016). Introduction to Linear Algebra, Wellesley-Cambridge Press, Fifth edition, USA.

Reference Books:

1. Cathy O'Neil and Rachel Schutt (2013). Doing Data Science, O'Reilly Media
2. E. Lehman, F. T. Leighton, and A. R. Meyer, Mathematics for Computer Science, 2013
3. A. Aho and J. Ullman, Foundations of Computer Science, W. H. Freeman, 1992.
4. T. Koshy, Discrete Mathematics with Applications, Academic Press, 2003.
5. J. Hein, Discrete Structures, Logic, and Computability, 3/e, Jones and Barlett, 2009

SEM/YEAR	**: II SEM/1st Year**
COURSE CODE	**: 19VI207**
TITLE OF THE COURSE	**: SQL Lab**
L: T/A: P: C	**: 0: 0: 4: 6**

Course Objectives:

1. To provide a sound introduction to the creation of problem statements from real life situations.
2. To give a good formal foundation on the relational model of data and usage of Relational Algebra.
3. To introduce the concepts of basic SQL as a universal Database language.
4. To enhance knowledge to advanced SQL topics like embedded SQL, procedures connectivity through JDBC.
5. To enable the design of an efficient database using normalization concepts.
6. To enable students to be create indexes for databases for efficient retrieval

Course Outcomes:

1. Construct problem definition statements for real life applications and implement a database for the same.
2. Write queries in SQL to retrieve any type of information from a data base

List of Programs

1. Demo on Creating Databases
2. Demo on Modify Databases
3. Demo on database and files Viewing a Database
4. Demo on Renaming a Database
5. Demo on Deleting Database
6. Demo on database and files
7. Demo on database and files groups
8. Creating tables with different Data types
9. Demo on altering the table
10. Creating tables with User Defined Data Types
11. Dropping User Defined Data Types
12. Demo on Data Manipulation Language with different types Inserting values
13. Demo on Data Manipulation Language with different types updating values
14. Demo on Data Manipulation Language with different types Deleting Rows
15. Demo on Truncating a Table, Demo on Deleting a Table
16. Writing a Basic select statement,Writing a Basic select statement using where clause
17. Write a query to perform Arithmetic Operations
18. Write a query to perform Relational operators
19. Write a query to perform Logical operators
20. Write a query to perform Special operators
21. Generate query using TOP and DISTINCT keywords
22. Generate query to perform ORDER BY clause
23. Generate query to perform GROUP BY and HAVING clauses
24. Generate query using String functions, Generate query using Date functions
25. Generate query using Mathematical Functions, Generate query using Aggregate functions
26. Creating tables with different types of Constraints
27. Perform demo on Nested sub queries, Perform demo on Correlated Sub queries
28. Perform demo on sub queries with Operators, Generate a query to create an identity column
29. Perform demo on Cross Join, Perform demo Natural Join

30. Perform demo Equi Join, Perform demo on inner Join
31. Perform demo on outer Join, Write a query to creating Views
32. Write a query to retrieve Results from Views
33. How to Altering Views, Write a query to Dropping Views
34. Write a query to Renaming Views
35. Write a query to Manipulating Data through Views
36. Write a query to Implementing Indexes with different types of indexes
37. Creating Triggers
38. Write programs to declare different types of variables with different data types
39. Write program to Printing Messages
40. Write program to Implementing Stored Procedures
41. Write program on Types of Stored Procedures
42. Write program on Types of Parameters
43. Demo on Altering a Stored Procedure
44. Demo on how to Viewing a Stored Procedure
45. Demo on Deleting a Stored Procedure
46. Write a program to Create a function
47. Demo on IF statement and WHILE loop
48. Demo on exception handling and Demo on Explicit Transaction
49. Demo on Implicit Transactions

Reference Books:

1. SQL Server 2008 r2 - Black Book
2. SQL Server – Patrick Paul
3. SQL Server 2008 programming – Robert vieira

Reference Website:

1. www. msdn.microsoft.com
2. www.tutorialspoint.com
3. www.techonthenet.com

SEM/YEAR : **II SEM/1st Year**
COURSE CODE : **19VI208**
TITLE OF THE COURSE : **Java Lab**
L: T/A: P: C : **0: 0: 4: 6**

Course Objectives:

1. 1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions
2. To understand the importance of Classes & objects along with constructors, Arrays and Vectors
3. Discuss the principles of inheritance, interface and packages and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4. To understand importance of Multi-threading & different exception handling mechanisms.

Course Outcomes:

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.

List of Programs

1. Write a program to display your Information on the Console.
2. WAP to use the Conditional Statements.
3. WAP to use the Control Statements.
4. WAP to pass Command Line Arguments & display the same on the console.
5. WAP to declare a String Array of with varying Width & display the content of the Array in the same manner in which the data is stored.
6. WAP to demonstrate the use of Operators.
7. WAP to demonstrate Pass By Value & passing the Objects as Parameters.
8. WAP to demonstrate Method Overloading & Method Overriding.
9. WAP to demonstrate Constructor Overloading.
10. WAP to use Abstract Classes.
11. Create a Package & Import the same in the other class.
12. Demonstrate the use of Access Modifiers with the help of Packages.
13. WAP to demonstrate Multiple Inheritance with the help of Interfaces.
14. WAP to handle the Exceptions.
15. WAP to use ‘finally’ & the Nested ‘try’ block.
16. Demonstrate the use of ‘try’, ‘catch’, ‘finally’, ‘throw’ & ‘throws’ in Exception handling.
17. Create your own Exception class & throw the same in the other class.
18. WAP to demonstrate the Life Cycle of Thread.
19. WAP to Create Multiple Threads & set the Priorities.
20. WAP to demonstrate Thread Synchronization.
21. WAP to take the Input from the User using Basic IO & display the output.
22. WAP to demonstrate the use of static Methods & static Blocks.
23. Demonstrate the use of transient in Serialization.
24. Usage of String & String Buffer.
25. WAP to create a Process & display the output given by that Process.
26. WAP to set the System Properties.
27. WAP to use Array List, Sort the Elements, retrieve the values & the Keys from the Map.
28. Programs to work with Collection Interfaces & Classes.
29. WAP to retrieve all the File Properties & display the same.

30. WAP to demonstrate the various Input & Output Streams (Character Streams, Byte Streams, Object Streams).
31. WAP for Serializing the Objects & to Deserialize the same.
32. WAP to display your information on to the Applet Window.
33. WAP to pass your information to the Applet & display the same on to the Applet Window (Using param tag).
34. Demonstrate various Methods of Graphics class.
35. Create a GUI Form (Applet) using all the possible awt Controls.
36. Create a GUI Application form using all the possible awt Controls.
37. Create a Notepad with all the functionalities.
38. WAP to demonstrate various Events in Java.
39. WAP using Anonymous classes & Adapter classes.
40. WAP to Communicate from one System to other, using Networking (TCP/IP).
41. WAP to Communicate from one System to other, using Networking (UDP).
42. WAP to call the Method from a Remote System using RMI.

Reference books:

1. The complete reference Java 2 - Patrick Naughton
2. Pure Java 2 -Techmedia
3. Java 2 - Sun Microsystems
4. Java 2 - O'Reilly
5. Java Programming - Balaguruswamy

SEM/YEAR : **II SEM/1st Year**
COURSE CODE : **19VI209**
TITLE OF THE COURSE : **Python Lab**
L: T/A: P: C : **0: 0: 4: 6**

Course Objectives:

1. Basics of Python programming
2. Decision Making and Functions in Python
3. Object Oriented Programming using Python
4. Files Handling in Python
5. GUI Programming and Databases operations in Python
6. Network Programming in Python

Course Outcomes:

1. Interpret Object oriented programming in Python
2. Design and develop Client Server network applications using Python
3. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python

SL NO	MAJOR TOPICS
1.0	**Introduction to Python**
1.1	Write a python program to find the square Root
1.2	Write a python program to calculate the Area of a Triangle
1.3	Write a python program to solve quadratic Equation
1.4	Write a python program to swap Two Variables
2.0	**Python Data types and Operators**
2.1	Write a python program to sum all the items in a list.
2.2	Write a python program to program to add two matrices
2.2	Write a python program to multiply two matrices
2.3	Write a python program to check Whether a string is palindrome or not
2.4	Write a program to demonstrate operators in python
3.0	**Python Program Flow Control**
3.1	Write a python program to check if a number is positive, negative or zero
3.2	Write a python program to check prime number
3.3	Write a python program to find the factorial of a number
3.4	Write a python program to display the multiplication Table
3.5	Write a python program to print the Fibonacci series
3.6	Write a python program to check Armstrong number
4.0	**Python Functions, Modules And Packages**
4.1	Write a python program to find numbers divisible by another number by using functions.
4.2	Write a python program to find factors of number
4.3	Write a python program to find factorial of number using recursion

4.4	Write a python program to display powers of 2 using anonymous function
4.5	Write a python program to find Factors of Number by importing module.
4.6	Write a python program to demonstrate calculator using package
5.0	**Python Input ,Output and File operations**
5.1	Write a python program to read from one file and copy to another file.
5.2	Write a python program to rename and delete the file.
5.3	Write a python program to demonstrate input and raw_input functions
6.0	**Exception Handling**
6.1	Write a python program to perform zero division error.
6.2	Write a python program to demonstrate exception handling while opening a file where you do not have write permission.
7.0	**Python Object Oriented Programming – Oops**
7.1	Write a python program to demonstrate on creating a class, creating instance objects and accessing attributes
7.2	Write a python program to demonstrate Inheritance.
7.3	Write a python program to demonstrate Overriding
7.4	Write a python program to demonstrate Overloading
8.0	**Regular Expressions**
8.1	Write a Python program to check that a string contains only a certain set of characters (a-z, A-Z and 0-9).
8.2	Write a Python program that matches a string that has an*a* followed by zero or more b's and an *a* followed by three 'b'.
8.3	Write a Python program that matches a word at the beginning of a string.
8.4	Write a Python program to check for a number at the end of a string.
8.5	Write a Python program to remove leading zeros from an IP address.
8.6	Write a Python program to replace all occurrences of space, comma, or dot with a colon.
9.0	**CGI Programming**
9.1	Write a CGI program to pass values using HTML form and submit button by GET and POST Method
10.0	**Databases**
10.1	Write a python program to create a database and perform insert operation
10.2	Write a python program to perform update operation on database
10.3	Write a python program to perform delete operation on database
11.0	**Networking**
11.1	Write a python program to create a socket and demonstrate on socket methods.
12.0	**Sending Email**
12.1	Write a python program to send an email.
13.0	**GUI programming**

13.1	Create a GUI window and add different widgets
14.0	**Working with Excel Spreadsheets**
14.1	Write a python program to demo on retrieve the Worksheet object for a sheet named 'Sheet1'?
14.2	Write a python program to demo on retrieve the Worksheet object for the workbook's active sheet?
14.3	Write a python program to demo on retrieve the value in the cell C5?
14.4	Write a python program to demo on set the value in the cell C5 to "Hello"?
14.5	Write a python program to demo on retrieve the cell's row and column as integers?
14.6	Write a python program to demo on get_highest_column() and get_highest_row() sheet methods return, and what is the data type of these return values?
14.7	Write a python program to demo on function to get the integer index for column 'M'.
14.8	Write a python program to demo on function needed to get the string name for column 14,
14.9	Write a python program to demo on retrieve a tuple of all the Cell objects from A1 to F1?
15.0	**Working with PDF and Word Documents**
15.1	Write a python program to demo on modes do the File objects for PdfFileReader() and PdfFileWriter()need to be opened in?
15.2	Write a python program to demo on acquire a Page object for page 5 from a PdfFileReader object?
15.3	Write a python program to demo on PdfFileReader variable stores the number of pages in the PDF document?
15.4	Write a python program to demo on methods do you use to rotate a PDF page?
15.5	Write a python program to demo on method returns a Document object for a file named demo.docx
15.6	Write a python program to demo on the difference between a Paragraph object and a Run object?
15.7	Write a python program to demo on you obtain a list of Paragraph objects for a Document object that's stored in a variable named doc?
16.0	**Web Scraping**
16.1	Write a python program to demo on Downloading Files from the Web with the requests Module
16.2	Write a python program to demo on Downloading Files from the Web with the requests Module and save in hard disk
17.0	**Working with CSV Filesand JSON Data**
17.1	Write a python program to demo on read file from CSV file.
17.2	Write a python program to demo on read file from JSON file

DAYANANDA SAGAR UNIVERSITY

Shavige Malleshwara Hills, Kumaraswamy Layout,

Bengaluru - 560114, Karnataka.

SCHOOL OF ENGINEERING

SCHEME & SYLLABUS
FOR
BACHELOR OF VOCATION

SPECIALIZATION: IT (DATA ANALYTICS)

(3rd & 4th Sem)

3RD SEMESTER

GENERAL EDUCATION COMPONENTS :12 CREDITS,180H				
SL.	**COURSE CODE**	**COURSE NAME**	**CREDITS**	**HOURS**
1.	19VI301	ORACLE &DATA WARE HOUSING	2	30
2.	19VI302	COMPUTER NETWORKS	2	30
3.	19VI303	SOFTWARE ENGINEERING& SOFTWARE TESTING	2	30
4.	19VI304	DESIGN THINKING	1	15
5	19VI305	ARTIFICIAL INTELLIGENCE	2	30
6	19VI306	COMPUTING SYSTEMS	1	15
7	19VI307	STATISTICAL FOUNDATION OF DATA SCIENCE & ANALYTICS	2	30
SKILL COMPONENTS :18 CREDITS,270H				
8	19VI308	COMPUTER NETWORK LAB	4	60
9	19VI309	SOFTWARE TESTING LAB	4	60
10	19VI310	ORACLE LAB	6	90
11	19VI311	ARTIFICIAL INTELLIGENCE LAB	4	60

4th Semester

GENERAL EDUCATION COMPONENTS :12 CREDITS,180H				
SL.NO.	**COURSE CODE**	**COURSE NAME**	**CREDITS**	**HOURS**
1.	19VI401	DYNAMIC WEBSITE	2	30
2.	19VI402	R PROGRAMMING	2	30
3.	19VI403	INFORMATION SYSTEM & ORGANIZATION	2	30
4.	19VI404	ADV. JAVA	2	30
5	19VI405	ENTERPRISE APPLICATIONS - BASICS OF ERP CRM	2	30
6	19VI406	DATA HANDLING AND VISUALIZATION	2	30
SKILL COMPONENTS :18 CREDITS,270H				
7	19VI407	DYNAMIC WEBSITE LAB	5	75
8	19VI408	R PROGRAMMING LAB	5	75
9	19VI409	ADV. JAVA LAB	4	60
10	19VI410	DATA HANDLING AND VISUALIZATION LAB	4	60

SEM/YEAR : **III SEM/2nd Year**
COURSE CODE : **19VI301**
TITLE OF THE COURSE : **Oracle &Data Ware housing**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Course outcomes

Unit 1 **6hrs**

Introduction to Oracle Database: Feature of RDBMS, Advantages of RDBMS over FMS ad DBMS, The 12 rules (E.F Codd's Rules –RDBMS), Need for Database Design, Support of Normalization

Introduction to SQL: DDL and DML, DESCRIBE command, Restricting and sorting data, Using group functions, Sub queries, Set operators, Using manipulating data

Unit 2 **6hrs**

PL/SQL: Introduction to PL/SQL, Features and benefits of PL/SQL, PL/SQL block and syntax, Data types , variables and constants, Conditional statements Loops, Subprograms , Procedure, Function, Cursors, Types: Implicit and explicit cursor, Passing parameter into cursor Exception, Types of exception, Declaring exception, RAISE_APPLICATION_ERROR , procedure, Triggers, Packages

Unit 3 **6hrs**

Data Warehousing: Introduction to data warehousing, Historical Information About Data Warehouses, How does a data warehouse differ from database, Difference between Operational database Systems and Data Warehouses. Advantages and Disadvantages of Data warehousing

Unit 4 **6hrs**

Principles of Dimensional Modelling: ER Modelling Verses Dimensional Modelling, The STAR Schema, STAR schema Keys, Advantages of STAR Schema, The Snowflake Schema, The Fact Constellation

Unit 5 **6hrs**

Data warehouse architecture: Steps for the Design and Construction of Data Warehouses, A Three – Tier Data Warehouse Architecture, OLAP in the Data Warehouse, Demand for OLAP, Major Features and Functions

OLAP Models

Reference books:

1. Oracle 9i - Complete reference
2. SQL,PL/SQL – The Programming language of Oracle,3 rd Revised Edition-Ivan Bayross
3. Database Management System – Navathe
4. Principles of Database – Jeffrey D.Ullman
5. Oracle Database 11g PL/SQL Programming (Oracle Press) - Michael Mclaughlin

SEM/YEAR **: III SEM/2nd Year**
COURSE CODE **: 19VI302**
TITLE OF THE COURSE **: Computer Networks**
L: T/A: P: C **: 2: 0: 0: 2**

Course objectives

Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Course outcomes

Unit 1 **6hrs**

Introduction to Networks: What is a network? Real world networks, The OSI seven-layer model, **Network Protocols and Standards:** Communications and network protocols and the OSI model, Protocols in real world networks, The Internet

Unit 2 **6hrs**

Wireless Networking Standards: Wireless devices, Wireless networking standards, Issues for wireless networks, Wireless networking protocols, **Network Topology and Architecture:** Network topology concepts, Common network topologies and their application, Topologies and protocols

Unit 3 **6hrs**

Network Media and Connectors: Network media, Network connectors, selecting media and connectors, **Network Hardware:** Network hardware, Hardware selection, creating a network

Unit 4 **6hrs**

Wireless Network Hardware: Wireless network hardware, Wireless hardware selection creating a wireless network, Security Software, Network security threats, Security countermeasures Security software, Firewalls, Functions of a firewall, Types of firewall

Unit 5 **6hrs**

Network and Server Software: Network software requirements, Wireless network software requirements, Configuring network software Voice over IP and, Video Conferencing Voice over IP (VoIP), Video conferencing, Installing and configuring voice and video networks **Virtual Private Networks:** Virtual private networks (VPN), Advantages and disadvantages of VPN

Reference Books:

Computer Networks III and IV Edition – Andrew S. Tanenbaum, PHI

SEM/YEAR : **III SEM/2nd Year**
COURSE CODE : **19VI303**
TITLE OF THE COURSE : **Software Engineering& software testing**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Course outcomes

Unit 1 **6hrs**

The software Problem & Software process: Software Problem - Cost, Schedule and quality, Scale and Change. Software Process - Process and Project, Component Software Processes Software development Process Models, Waterfall, Prototyping, Iterative development, Rational Unified Process, Time boxing Model, Extreme programming and Agile processes, Using process model in a project, Project Management Process.

Unit 2 **6hrs**

Software requirements analysis and specifications: Value of good SRS, Requirement process, Requirement Specification, Desirable Characteristics of an SRS, Components of an SRS, Structure of a Requirements Documents, Functional Specification with use cases, Basics, Examples, Extensions, Developing use cases, Other Approaches for Analysis, Data Flow Diagram, Validation.

Unit 3 **6hrs**

Software architecture & Planning a software project : Role of Software Architecture, Architecture Views, Component and Connector view, Components, Connectors, Example, Architecture styles for C&C View, Pipe and Filter, Shared data Style, Client Server style, Some other styles, Documenting Architecture Design, Evaluating Architectures. Planning a software project -Effort Estimation, Top-Down Estimation Approach, Bottom-Up Estimation Approach, Project Schedule and Staffing, Quality Planning, Risk Management Planning, Risk Management Concepts, Risk Assessment, Risk Control, A Practical Risk Management Approach, Project Monitoring Plan, Measurements, Project Monitoring and tracking, Detailed Scheduling

Unit 4 **6hrs**

Design, Coding & Testing: Design Concepts, Coupling, Cohesion, the Open-Closed Principle

Function Oriented Design, Structure Charts, Structured Design Methodology, Example, Object Oriented Design, OO Concepts Unified Modelling Language (UML), A Design Methodology, Examples. Detailed Design, Logic/Algorithm Design, State Modelling of Classes, Verification. **Coding & Testing:** Coding - Programming Principles and Guidelines, Structured Programming, Information Hiding, Some Programming Practices, Coding Standards, Incrementally Developing Code, An incremental coding process. Test Driven development, Pair Programming, Managing

Evolving Code, Source Code Control and Build, Refactoring, Unit Testing, Testing procedural units, Unit testing of Classes, Code Inspection, Planning, Self-review, Group review meeting, Testing - Testing Concept, Error, Fault and Failure Test Case, Test Suite and Test Harness, Psychology of Testing, Levels of Testing, Testing Process, Test Plan, Test Case Design, Test Case Execution

Unit 5 **6hrs**

Software Testing Life Cycle and Testing Techniques: Test Planning & Test Case Design, Test Execution &Test Summary Report, Bug Report, Static Testing Technique, Reviews and Types of reviews. Dynamic Testing Techniques, Black Box Testing, White Box Testing, Test case Design Techniques, ECP & BVA, Cyclomatic Complexity, Types of defects, Bug Reporting & Tool Used, Bug Life Cycle, Functional Testing- Database Testing, Regression Testing ,Retesting etc, Non Functional testing- Usability Testing, Security Testing etc

Text books

1. Software Engineering –A Precise Approach, Pankaj Jalote, edition 2010, Wiley India, ISBN: 9788126523115.

2. https://en.wikipedia.org/wiki/DevOps

3. http://www.informationweek.com/devops/agile-vs-devops-10-ways- theyre-different/d/d-id/1326121

References:

1. Software Engineering A Practitioners Approach, Roger S Pressman, 2010, Tata McGraw Hill Publishing Co Ltd, ISBN 9780070701137

2. Software Engineering, Sajan Mathew, 2009 Reprint, S Chand publications.

3. Software Engineering Principles and Practices, Rajesh Narang.Mc Graw Hill Education.

4. Software Engineering, Subramanian Dutt, 2015 Pearso

SEM/YEAR **: III SEM/2nd Year**
COURSE CODE **: 19VI304**
TITLE OF THE COURSE **: Design Thinking**
L: T/A: P: C **: 1: 0: 0: 1**

Course objectives

Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Unit 1 **3hrs**

WHAT IS DESIGN THINKING AND WHY IS IT SO POPULAR: What is Design Thinking and Why Is It So Popular? Design Thinking: New Innovative Thinking for New Problems, Obstacles to Problem Solving and Innovation in Design Thinking Wicked Problems: 5 Steps to Help You Tackle Wicked Problems by Combining, Systems Thinking with Agile Methodology, Essential Design Thinking Videos and Methods

Unit 2 **3hrs**

THE DESIGN THINKING PROCESS: Stages in the Design Thinking Process, Stage 1 in the Design Thinking Process: Empathize with Your Users, Stage 2 in the Design Thinking Process: Define the Problem and Interpret the Results, Stage 3 in the Design Thinking Process: Ideate, Stage 4 in the Design Thinking Process: Prototype

Unit 3 **3hrs**

EMPATHISE WITH THE PEOPLE YOU DESIGN FOR: The Power of Empathy, Design Thinking: Getting Started with Empathy, How to Develop an Empathic Approach in Design Thinking, Empathy – How to Improve Your Designs by Developing Empathy for Your Target Group, Probes for Context Mapping – How to Design and Use Them

Unit 4 **3hrs**

DEFINE THE DESIGN CHALLENGE: Stage 2 in the Design Thinking Process – Define the Problem by Synthesising Information, Methods to Help You Define Synthesise and Make Sense in Your Research, Affinity Diagrams – Learn How to Cluster and Bundle Ideas and Facts, Empathy Map – Why and How to Use It, Personas – A Simple Introduction

Unit 5 **3hrs**

IDEATE: What is Ideation – and How to Prepare for Ideation Sessions? Understand the Elements and Thinking Modes that Create Fruitful Ideation Sessions, Create Some Space – for Ideation Sessions and Design Thinking, Introduction to the Essential Ideation Techniques which are the Heart of Design Thinking.
PROTOTYPE AND TEST: The Key Benefits of Prototyping, Design Thinking: Get Started with Prototyping, Prototyping in Design Thinking: How to Avoid Six Common Pitfalls, What Kind of Prototype Should You Create? Prototyping: Learn Eight Common Methods and Best Practices, Building a Strong business Model – A case Study, The fundamental problem of new products/ start-ups, Cast Study – Great business Ideas and Success, Case Study – Failure and dealing with Failure

SEM/YEAR : **III SEM/2nd Year**
COURSE CODE : **19VI305**
TITLE OF THE COURSE : **Artificial Intelligence**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Course outcomes

Unit 1 **6 hrs**

Introduction to Artificial Intelligence and Machine Learning: Artificial Intelligence: Introduction to Artificial Intelligence: Machine Learning: Walk-through, Data Analytics: Application and use cases. **Introduction to Python:** Overview, Environment setup, Basic Syntax, Basic Operators, Loops, Strings, List, **Open source Tools for Data Analytics implementation -** Data Analytics Tools: Numpy, Data Analytics Tools: Pandas, Data Analytics Tools: Matplotlib

Unit 2 **7 hrs**

Exploring and Implementation of Data Analytics Tools on Real Datasets & Machine Learning Algorithms: Inferring useful information from Non-synthetic Databases: Two case studies in Data Analytics using different Real Databases where we observe and implement following data processing methods using open source tools. **Introduction to Machine Learning:** Build and Setup, Machine learning fundamentals, Relation between AI, Machine Learning and Deep Learning, Types of Machine Learning Algorithm, Popular Machine Learning Algorithms using Scikit-learn library: Simple Linear & Multiple Linear Regression Algorithm, Regression: Model Evaluation & Evaluation Metrics, Hands-on Session

Unit 3 **6 hrs**

Supervised Machine Learning in Classification (Decision Tree and K-NN Algorithms): Popular Machine Learning Algorithms using Scikit-learn library Classification Algorithms, Evaluation Metrics in Classification, Decision Trees Algorithms, Hands-on Session, K-NN Algorithms, Hands-on Sessions

Unit 4 **5 hrs**

Supervised Machine Learning in Classification (Logistic Regression and SVM Algorithms): Logistic Regression Algorithms, Hands-on Session, SVM Algorithms, Hands-on Session

Unit 5 **6 hrs**

Unsupervised Machine Learning & Deep Learning: Open source Tools for Machine Learning implementation, Popular Machine Learning Algorithms using Scikit-learn library Clustering Algorithms - K-Mean Clustering Algorithms, Hands-on Session, **Introduction to Deep Learning -** Origin and evolution of Deep learning Applications and use cases on Deep Learning

References

1. https://medium.com/machine-learning-for-humans/why-machine-learning-matters-6164faf1df12
2. https://www.import.io/post/defining-data-extraction-for-business/
3. https://www.simplilearn.com/machine-learning-tutorial

SEM/YEAR **: III SEM/2nd Year**
COURSE CODE **: 19VI306**
TITLE OF THE COURSE **: Computing Systems**
L: T/A: P: C **: 1: 0: 0: 1**

Course objectives

Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Unit 1 **6hrs**

Introduction to Computer Systems : Types of computer : Personal, mini, mainframe, mobile, Network, supercomputer, multiprocessor
History of modern computers: Environments, Functions of components
Computing Environments: - Home, business, computer gaming, networking, real-time, communication
Von Neumann architecture :- Example processors,- Fetch execute cycle

Unit 2 **7hrs**

Hardware : Standard architecture - CPU, main memory (RAM, ROM), Backing storage, I/O, Current implementation of standard architecture, CPU, motherboard, Power supply, cooling, backing store(hard disk, optical disks), memory types, interfaces (PCI,AGP, PCI Express), NIC, graphics card, sound.
Peripherals and System Building: Printers, & plotters, cameras & scanners; keyboard, mouse, touch screen/pad; monitors, display adapters; multimedia, devices; storage media; networking; portable drives, plug and play components; performance factors

Unit 3 **6hrs**

Software, Installation and Configuration : Systems software, Operating systems, Utility programmes, Library programmes, Translator programmes, Applications software Standard packages, Customised packages, Special purpose software, Bespoke software, Alternative Operating Systems, Alternative operating systems, UNIX/Linux, OS X, Android

Unit 4 **5hrs**

System Testing : Test plan, Test documentation, Fault detection, diagnostics, troubleshooting, Software, Maintenance, Software problems, Automatic updates & Upgrades, Utility software & security software

Unit 5

6hrs

Hardware Maintenance : Preventative maintenance, Upgrade v replace, File Management, File systems operation and organisation - FAT, NTFS, ext, Directories/folders, Security, sharing and access rights, Data Protection, Backup, File/folder, organisation

References

Advances in Computing Systems and Applications Proceedings of the 3rd Conference on Computing Systems and Applications

Editors: **Demigha**, Oualid, **Djamaa**, Badis, **Amamra**, Abdenour (Eds.)

SEM/YEAR	**: III SEM/2nd Year**
COURSE CODE	**: 19VI307**
TITLE OF THE COURSE	: Statistical Foundations of Data Science and Analytics
L: T/A: P: C	**: 2: 0: 0: 2**

Course Objectives: This course will cover the statistical foundation for our discussion on data science

Course Outcomes: On successful completion of this course students will be able to:

1. Fundamental skills in data analytics
2. Over view of Statistical analysis and applications.
3. Over view of Sampling Theory and applications.
4. Over view of Various Statistical Methods
5. Over view of Regression analysis.

Module 1: Descriptive Statistics **4 Hrs**

Frequency Distributions, Graphic representation of a frequency Distribution, Measures of Central Tendency, Requisites for a Ideal Measure of Central Tendency, Mean (Arithmetic, Geometric and Harmonic), Median, Mode, Selection of an Average, Partition Values: Practical Learning Using Python.

Module 2: Over view of Mathematical Expectations **8 Hrs**

Mathematical Expectation, Expectation of a Function of a Random Variable, Addition Theorem of Expectation, Multiplication Theorem of Expectation, Expectation of a Linear Combination of Random Variables, Covariance, Variance of a Linear Combination of Random Variables, Moments of Bi-variate Probability Distributions, Conditional Expectation and Conditional Variance, Business Case studies: Practical Learning Using Python.

Module 3: Sampling and Large Sample Tests 8 **Hrs**

Overview of Sampling, Types of Sampling (Purposive, Random, Simple, Startified), Parameter and Statistic, Tests of Significance, Hypothesis (Null and Alternative), Errors in Sampling, Critical Region and Level of Significance, Test of Significance for Large Samples, Sampling of Attributes, Sampling of Variables, Unbiased Estimates population mean and variance, Standard Error of Sample Mean, Test of Significance (Single Mean, Difference means and Difference of Standard Deviations). Practical Learning Using Python

Module 4: Testing of Hypothesis **6 Hrs**

Introduction, Statistical Hypothesis (Simple and-Composite), Steps in Solving Testing of Hypothesis Problem, Optimum Tests Under Different Situations, Neyman-Pearson lemma, Likelihood Ratio Test (One Normal, Two Normal and Several Normal Populations). Tools: Minitab

Module 5: **4 Hrs**

Mini Project

Text Books:

S.C.Gupta, V.K. Kapoor: Fundamentals of Mathematical Statistics a Modern Approach, 10th Edition 2000.

SEM/YEAR : **III SEM/2nd Year**
COURSE CODE : **19VI308**
TITLE OF THE COURSE : **Computer Network Lab**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives
Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

LIST OF PROGRAMS :

1. **Introduction to network and hardware components:** Overview of Networks and layered communications, understanding of Network equipment wiring details, CAT6 UTP EIA/TIA 568A/B . straight and cross-over wiring with testing.
2. **Software familiarization :** Packet Tracer installation for windows and Ubuntu, Packet Tracer familiarization, wiring connection and tool selection concepts
3. **Command line key word :** network command, configuration commands.
4. **Overview of Intellectual protocol :** IP Addressing, sub-netting, Static IP concepts setting, dynamic IP concepts
5. **Switch Configuration :** Basic configuration, small network configuration, small office setup and packet sending and receiving
6. **Router configuration :** Basic configuration, small network configuration, small office setup and packet sending and receiving, Packet sending and receiving between to network, Observing Static and Dynamic Routing.
7. Creating of a LAN and connectivity test in the LAN, creation of VLAN and VLAN trunking.
8. Implementation of Dynamic/interior/exterior routing (RIP, OSPF, BGP).
9. Firewall Implementation, Router Access Control List (ACL).
10. Examining Network Address Translation (NAT).
11. Packet capture and header analysis by wire-shark (TCP, UDP, IP).
12. DNS, Web, DHCP, FTP server configuration.
    Network establishment with private and public IP

Reference

1. Computer Networks III and IV Edition – Andrew S. Tanenbaum, PHI

SEM/YEAR : **III SEM/2nd Year**
COURSE CODE : **19VI309**
TITLE OF THE COURSE : **Software Testing Lab**
L: T/A: P: C : **2: 0: 0: 2**

LIST OF PROGRAMS :

1. Understand The Automation Testing Approach (Theory Concept).
2. Using Selenium IDE, Write a test suite containing minimum 4 test cases.
3. Understanding Test Automation. Using Selenium write a simple test script to validate each field of the registration page (Eg: Facebook Registration Page)
4. Install Selenium server and demonstrate it using a script in Java/PHP.
5. Conduct a test suite for any two web sites.
6. Write and test a program to login a specific web page.
7. Write test cases to validate a mobile number using one time pin identification (OTP)
8. Write and Test a program to find out list of employees having salary greater than Rs 50,000 and age between 30 to 40 years.
9. Write and test a program to update 10 student records into table into Excel file.
10. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
11. Write and test a program to provide total number of objects present / available on the page.
12. Write and test a program to get the number of list items in a list / combo box.
13. Write and test a program to count number of items present on a desktop.
14. Understanding the use of bug tracking and testing tool Bugzilla and Jira.
    Open ended Experiment: Mini Project – Not for exam but to compulsory to be included in Record. (Test cases for Admission form, Shopping cart, Travel Booking, Hotel Booking, Utility Bill Payment.).

Text Books

ISTQB Certification Study Guide, Dr. K.V.K.K. Prasad, Wiley-Dreamtech Press, ISBN: 9788177227116

References

1. Software Testing Principles and Practices, Srinivasn desikan, Goplaswamy Ramesh, Pearson, ISBN: 9788177581218

2. Software Testing Tools, Dr. K.V.K.K. Prasad, Wiley- Dreamtech Press, ISBN 10: 8177225324 ISBN 13: 9788177225327

3. Software Testing Concepts and Tools, Nageshwara Rao Pusuluri, DreamTech, ISBN 10: 8177227122 ISBN 13: 9788177227123

SEM/YEAR	**: III SEM/2nd Year**
COURSE CODE	**: 19VI310**
TITLE OF THE COURSE	: **Oracle Lab**
L: T/A: P: C	**: 2: 0: 0: 2**

LIST OF PROGRAMS :

1. Identify the syntax for creating a table.
2. Identify the syntax for defining constraints.
3. Identify the code for using the INSERT statement.
4. Identify the code for using the UPDATE statement.
5. Identify the code for using the DELETE statement.
6. Identify the SQL statement to retrieve data from tables.
7. Identify the arithmetic expressions used to perform operations on data.
8. Identify the use of the WHERE clause in restricting the result set of an SQL query.
9. Identify the use of the comparison operators used in a WHERE clause to restrict the query results.
10. Identify the rules of precedence associated with WHERE clause.
11. Identify the methods of the sorting result set of a query using the ORDER BY clause.
12. Identify substitution variables that are used while retrieving data by using SQL statements.
13. Identify guidelines for using the GROUP BY clause.
14. Identify the features of the ROLLUP operator and CUBE operator.
15. Identify the syntax for altering and dropping a table.
16. Identify features of views.
17. Identify syntax for performing various tasks for managing views.
18. Identify the syntax for creating and dropping synonyms.
19. Identify the syntax for creating and dropping indexes.
20. Identify the syntax for creating and using a sequence.
21. Identify the features of single row character functions.
22. Match the number functions with their purpose.
23. Identify the features of Date functions.
24. Identify features the functions used to convert data types.(to_char,to_num,to_date)
25. Identify the syntax for displaying dates in different formats.
26. Identify features of general functions.(NVL,NVL2)
27. Demonstrate the use of CASE expand DECODE functions.
28. Identify the use of nested functions in retrieving data from tables.
29. Identify use of single row and multiple row sub queries sub queries to retrieve from multiple tables.
30. Identify the syntax for performing multiple-column and correlated sub queries.

31. Identify the use of different types of join to retrieve data from multiple tables.
32. Identify the syntax of the unconditional INSERT ALL statement
33. Identify the syntax of the conditional INSERT ALL statement.
34. Identify the syntax of the conditional INSERT FIRST statement.
35. Identify the code for retrieving data hierarchically from a table.
36. Generate a query using the following SET OPERATORS, UNION, UNION ALL, INTERSECT, MINUS
37. Controlling User Access. Create User, Grant, Revoke
38. Identify features of various PL/SQL data types.
39. Identify the syntax for declaring PL/SQL variables using the %type attributes.
40. Identify features of bind variables and substitution variables.
41. Identify the syntax of the % ROWTYPE attributes.
42. Identify the syntax for creating a PL/SQL table based record.
43. Identify the syntax for creating a PL/SQL cursor based record.
44. Identify the syntax for creating a PL/SQL user defined record.
45. Identify the features of nested blocks.
46. Identify uses of PL/SQL operators.
47. Identify codes for manipulating data using DML statements in PL/SQL block.
48. Identify the syntax of decision making statement.
49. Identify the syntax of looping statement.
50. Identify the syntax for controlling implicit cursors and use the attributes.
51. Identify the syntax for controlling explicit cursors and use the attributes.
52. Identify the syntax for using cursor FOR loops, FOR UPDATE, WHERE CURRENT OF.
53. Identify guidelines for trapping system built in exceptions.
54. Identify guidelines for trapping user defined exceptions.
55. Identify the syntax for raise_application_error.
56. Identify the syntax for passing parameters to a stored procedure.
57. Identify tasks involved in using stored procedures.(IN,OUT,IN OUT)
58. Identify the syntax for creating PL/SQL function.
59. Trapping predefined and user defined exception in subprogram.
60. Identify sequence steps for developing PL/SQL packages.
61. Identify the code to create a trigger.
62. Write program to show use of new and old keywords in a trigger program.
63. Demonstrate the following TCL operations with suitable Example: COMMIT-COMMIT, SAVEPOINT, ROLLBACK

Reference :

- **SQL,PL/SQL The programming language of Oracle by Ivan Byross**
- **Oracle PLSQL programming by Steven Feuerstein**
- www.tutorialspoint.com
- **www.**oracle.com
- www.plsqltutorials.com

SEM/YEAR	**: III SEM/2nd Year**
COURSE CODE	**: 19VI311**
TITLE OF THE COURSE	: **Artificial Intelligence Lab**
L: T/A: P: C	**: 2: 0: 0: 2**

LIST OF PROGRAMS :

1. **SpaCy (in Python) – Case Study** : About spaCy and Installation, SpaCy pipeline and properties, Tokenization, Pos Tagging, Entity Detection, Dependency Parsing, Noun Phrases, Word Vectors, Integrating spaCy with Machine Learning, Comparison with NLTK and CoreNLP.
   Note : Algorithm used – SVM
   https://www.analyticsvidhya.com/blog/2017/04/natural-language-processing-made-easy-using-spacy-%E2%80%8Bin-python/

2. **Project 1**: Develop a Chat bot for NTTF admission activities. (Tools: chatfuel, python or any other sdk.)
   https://medium.com/analytics-vidhya/building-a-simple-chatbot-in-python-using-nltk-7c8c8215ac6e

3. **Dog Breed Identification – Case Study :** Classify Images Using TensorFlow,
   Task 1: Download the Pre-trained model. Task 2: Implement . Task 3: Remove the pre-training and retrain the model. Task 4: Evaluate
   https://medium.com/@RaghavPrabhu/a-simple-tutorial-to-classify-images-using-tensorflow-step-by-step-guide-7e0fad26c22
   https://github.com/RaghavPrabhu/Deep-Learning/tree/master/dogs_breed_classification

4. Project 2: **Build Image Classification Model for Identifying NTTF ID Card. Tools (Python packages: numpy, pandas, matplotlib)**
   https://www.analyticsvidhya.com/blog/2019/01/build-image-classification-model-10-minutes/

SEM/YEAR : **IV SEM/2nd Year**
COURSE CODE : **19VI401**
TITLE OF THE COURSE : **Dynamic Website**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Unit 1 **4hrs**

ReTake (Understanding web for 2019 & beyond): The need of web, What is web technology?, How web works? (HTTP, DNS), The History & future of Web. (PWAs). What is Full-stack web development? [MEAN stack]: Frontend (HTML/CSS with frontend frameworks), Backend (Node JS as server side scripting), DB (Mongo DB for storage)

Unit 2 **8hrs**

Frontend: HTML for frontend development-HTML DOM, Semantic HTML, SEO / Accessibility
CSS for frontend development -Basics of CSS, CSS layout (Grid, Flex Box), Media queries for responsive web design, What is CSS3?. **Javascript for frontend development** :Syntax and constructs, DOM Manipulation, Fetch API / HTTP, Modular programming (ES6), Package managers (NPM, Yarn), CSS Pre processors (SAAS, Less), CSS Frameworks (Bootstrap, Material Design). **Build tools :**Task runners (NPM scripting), Module bundlers (Webpack), Formatter (Prettier, JSlint), MVC Architecture and Angular JS

Unit 3 **8hrs**
What is server side scripting? : Scripting languages -Intro to Node.js (syntax, application & deployment), Comparison with other scripting languages (Ruby, Go lang). **Package manager NPM with Node.js** -Using NPM libraries, Creating NPM modules. **Best practices of Node JS** - Functional inheritance, Granular modeling, Error handling
Database : Intro to web Database for storage (Relational, NoSQL), Mongo DB - Overview, Advantages and Environment. **Using Mongo DB for web** :Data modeling, DB Operations
Advanced Mongo DB :Relationships, Atomic operations, Map reduce, Brief intro to Caching (Redis, Meme Cache)

Unit 4 **5hrs**

Web APIs : REST API (RESTful systems)- HTTP Verbs, CRUD & Paths, Brief intro to gRCP (REST Alternative). **Web Security :** What is web security? Why it's important ? , Understanding Different Auth Mechanisms – oAuth, Basic Authentication, Token authentication

Unit 5 **5hrs**

Web Servers : Introduction to Web servers, Create node server with express JS. **Extras (Testing, PWAs):** APIs for PWA (Storage, Web sockets, service workers), Performance enhancements (Using dev tools/ lighthouse), Testing using cypress/Jest

Reference:

https://github.com/kamranahmedse/developer-roadmap

SEM/YEAR : **IV SEM/2nd Year**
COURSE CODE : **19VI402**
TITLE OF THE COURSE : **R Programming**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Unit 1 **6hrs**

History and Overview of R : What is R?, What is S?, The S Philosophy, Back to R, Basic Features of R, Free Software, Design of the R System, Limitations of R, R Resources.
Getting Started with R & R Nuts and Bolts : Installation, Getting started with the R interface, Entering Input, Evaluation, R Objects, Numbers, Attributes, Creating Vectors Mixing Objects, Explicit Coercion, Matrices, Lists, Factors, Missing Values, Data Frames, Names, Summary

Unit 2 **6hrs**

Getting Data In and Out of R : Reading and Writing Data, Reading Data Files with read.table(),Reading in Larger Datasets with read.table, Calculating Memory Requirements for R Objects.
Using the reader Package & Using Textual and Binary Formats for Storing Data: Using the readr Package, Using Textual and Binary Formats for Storing Data, Using dput() and dump(),Binary Formats

Unit 3 **6hrs**

Interfaces to the Outside World : File Connections, Reading Lines of a Text File, Reading From a URL Connection.
Subsetting R Objects, Vectorized Operations & Dates and Times: Subsetting a Vector, Subsetting a Matrix, Subsetting Lists, Subsetting Nested Elements of a List, Extracting Multiple Elements of a List, Partial Matching, Removing NA Values, Vectorized Operations, Vectorized Operations, Dates and Times, Dates in R, Times in R, Operations on Dates and Times, Summary

Unit 4 **6hrs**

Managing Data Frames with the dplyr package: Data Frames, The dplyr Package, dplyr Grammar, Installing the dplyr package, select(),filter(),arrange(),rename(),mutate(),group_by(),%>%,Summary.

Control Structures & Functions : if-else, for Loops, Nested for loops, while Loops, repeat Loop, next, break, Summary, Functions in R, Your First Function, Argument Matching, Lazy Evaluation, The ... Argument, Arguments Coming After the ... Argument, Summary

Unit 5 **6hrs**

Scoping Rules of R : A Diversion on Binding Values to Symbol, Scoping Rules, Lexical Scoping: Why Does It Matter?, Lexical vs. Dynamic Scoping, Plotting the Likelihood, Summary, Coding Standards for R.
Loop Functions : Looping on the Command Line : lapply(),sapply(),split().Splitting a Data Frame- tapply() , apply(),Col/Row Sums and Means, Other Ways to Apply, mapply(),Vectorizing a Function, Summary

References:

https://www.tutorialspoint.com/r/r_overview.htm

https://www.w3schools.in/r/

https://www.guru99.com/r-tutorial.html

SEM/YEAR : **IV SEM/2nd Year**
COURSE CODE : **19VI403**
TITLE OF THE COURSE : **Information System & Organization**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Unit 1 **6hrs**

Organizations and Information Systems: Value chain and value system, Definitions of data, information and knowledge, Information Systems classification, influence on organizations structures and activities , Management View.
Social Contexts and Perspectives on IS : Common perspectives on the organizations, Impact of technology, Approaches to technology initiatives

Unit 2 **6hrs**

Internal IS and Enterprise Systems : Value chain and value system, Internal applications and IS, Enterprise systems (ES) and Enterprise, Applications Integration (EAI).
Organizational Strategy and IS : Organizational strategy, Aligning IS/IT to organizational strategy, Measuring success in strategy execution, Strategy execution and the Balanced Scorecard

Unit 3 **6hrs**

Evaluating IS: Tangible and intangible cost and benefits, Relevance of cost benefit measures to evaluating IS, Different aspects of evaluation, Interaction of evaluation and organisational contexts.
Cultural, Structural and Political Aspects of IS; IS and structure, Centralised and localised decision-making, Political and cultural aspects of IS, 'Structuration'

Unit 4 **7hrs**

People and IS Interpretation : Interpretation, use and sharing of information, Care and security of information, Ethics and stakeholders in IS, Data protection and legal principles
The 21st Century Organisation : How technology is changing working practices and possibilities, Contemporary vs future organisational forms, Changing relationships with the organisations, Management of distributed work.
User Acceptance and the Socio-technical Approach : User acceptance and the Technology Adoption Model, HCI principles in the design of IS interactions, Work design with socio-technical principles, User experience and IS design

Unit 5 **5hrs**

IS and the Customer : IS and customers, Customer Relationship Management (CRM), e-Business and e-Commerce.

IS and Organisational Change: Barriers to change, Change in organisations, Change models, IS and organisational change.

IS Benefit Management : Benefits management, Key module content

References:

1. Boddy, D., Boonstra ,A., Kennedy, G. (2008) Managing Information Systems : strategy and organisation 3rd ed. FT Pearson. ISBN-13: 978-0273716815
2. Hassall, J.C. (1999 and 2010), "Some Thoughts on Information Systems and Organisations ", unpublished monograph
3. Ingram, D. (2016) What Are the Advantages and Disadvantages of a Bureaucratic Organization Structure? Available from http://smallbusiness.chron.com/advantages-disadvantages-bureaucratic-organization-structure-2761.html (April, 2016)
4. Terry, L. (2011). The Management Theory of Max Weber. Available from http://www.business.com/management/management-theory-of-max-weber/ (April, 2016)
5. Plenhart, G (2016). Value Chain Management**.** Available from http://www.referenceforbusiness.com/management/Tr-Z/Value-Chain-Management.html (April, 2016)

SEM/YEAR **: IV SEM/2nd Year**
COURSE CODE **: 19VI404**
TITLE OF THE COURSE : **Advanced Java**
L: T/A: P: C **: 2: 0: 0: 2**

Course objectives
Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Course outcomes

Unit 1 **8hrs**

JDBC: Types of Drivers & categories, Interfaces and classes of java.sql package, Callable statement, Prepared statement, Error & warning management in JDBC, Cursor management in JDBC.
Servlets : History of web Applications, Introduction to Servlets, Servlet Architecture, Configuring the development environment, configuring and using the web server, Servlet Basics, Life cycle, Types of Servlets, Servlets & HTML, Thread safety, Session management, Cookies, Database connectivity, Connection pooling, Servlet Security, SSL

Unit 2 **6hrs**

JAVA Server Pages (JSP) : Introduction to JSP, JSP Architecture, Life cycle of JSP, JSP Scripting Elements , Directives, Creating a simple JSP, Implicit Objects, Java Beans with JSP, Session Management, JDBC with JSP.

Unit 3 **6hrs**

Introduction to Struts Framework: Configuring Struts Application, Struts configuration file, MVC architecture, Struts Controller components, ActionServlet, RequestProcessor, Action, ActionForward. Struts Model components, Struts View Components - ActionForm, ActionErrors, ActionMessage, DynaActionForm,

Unit 4 **6hrs**

Introduction to Hibernate Framework : Hibernate architecture, Hibernate core concepts, Overview of persistence lifecycle, Object-Relational mapping, Hibernate mappings, Configuring Hibernate, Working with Persistence objects Object identity, the importance of equals() and hashCode(),Simple Relationships

Unit 5 **4hrs**

Spring: Introduction to Spring , Spring Modules, Dependency Injection, Spring AOP(Aspects Oriented Programming).

Text Book:

Advanced Java Programming Paperback – 21 April 2015 by Uttam Roy

SEM/YEAR : **IV SEM/2nd Year**
COURSE CODE : **19VI405**
TITLE OF THE COURSE : **Enterprise Applications - Basics of ERP CRM**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

Understand linear system of equations
Understand the structure of Matrices and Determinants
Infer different co-ordinate systems and applications of vectors.

Course outcomes

Unit 1 **6hrs**

Introduction to ERP : What is ERP?, Evaluation of ERP ,Reasons for the Growth of ERP, Structure of ERP, Various Modules of ERP, Advantages of ERP.

An Overview of Enterprise : An overview of Enterprise, Business Functions and Business, Processes, Business Modelling. Importance of Information: Characteristics of information; Types of information, Information System: Components of an information system; Integrated Management Systems.

Unit 2 **6hrs**

ERP and Related Technologies : Business Process Reengineering (BPR), Management Information, System, Decision Support Systems, Executive Information Systems, Data Warehousing, Data Mining, CRM,Supply Chain management.

Unit 3 **6hrs**

ERP System : Introduction to ERP System, Functional Module-Finance, Sales and Distribution, Materials Management, Production Planning, Quality Management, Human Resource, Plant Maintenance, Integration of ERP, Supply Chain and Customer Relationship Application.

Unit 4 **6hrs**

ERP Implementation Life cycle : ERP Tools and Software, Implementation Challenges, ERP Implementation Strategies, ERP Implementation Life Cycle, Implementation Methodologies, Pre-evaluation Screening ,Package Evaluation, Project Planning phase, Gap Analysis, Reengineering, Configuration, Implementation, Team Training, Post Implementation

Unit 5 **6hrs**

ERP Market: Introduction, ERP Market Place and Market Place Dynamics, Market, Overview, The Changing ERP Market, SAP AG, Oracle, Peoplesoft ,JD, Edwards. Future Directives in ERP.

Customer Relationship Management and ERP: Role of ERP in CRM, Concept of CRM: Objectives of CRM; Benefits of CRM; Components of CRM, Types of CRM

SEM/YEAR : **IV SEM/2nd Year**
COURSE CODE : **19VI406**
TITLE OF THE COURSE : **Data Handling and Visualization**
L: T/A: P: C : **2: 1: 0: 2**

Course objectives

- Explain what data visualization is and its importance in our world today
- Understand why Python is considered one of the best data visualization tools
- Describe matplotlib and its data visualization features in Python
- List the types of plots and the steps involved in creating these plots
- Critically synthesize the theory and practical application of visualization for problem solving.

Course Out comes

- Produce compelling and useful data visualizations.
- Apply quantitative modeling and data analysis techniques to the solution of real world business problems, communicate findings, and effectively present results using data visualization techniques.

Module 1: Data Collection Structures (6 Hrs)

Lists: Creating Lists, Accessing Values in Lists, Adding and Updating Lists, Deleting List Elements, Basic List Operations, Indexing, Slicing, and Matrices, Built-in List Functions and Methods,

Dictionaries: Creating Dictionaries, Updating and Accessing Values in Dictionaries, Deleting Dictionary Elements, Built-in Dictionary Functions, Methods, Tuples: Creating Tuples, Concatenating, Basic Tuples Operations,

.**Module 2: Data Frames (6 Hrs)**

Creating Data Frames from a Dict of Series or Dicts, Creating Data Frames from a Dict of Ndarrays/Lists, Creating Data Frames from a Structured or Record Array, Creating Data Frames from a List of Dicts, Creating Data Frames from a Dict of Tuples, Selecting, Adding, and Deleting Data Frame Columns, Indexing and Selecting Data Frames, Transposing a Data Frame, Data Frame Interoperability with Numpy Functions,

Module 3: Data Gathering and Cleaning (5 Hrs)

Cleaning Data, Checking for Missing Values, Handling the Missing Values, Reading and Cleaning CSV Data, Merging and Integrating Data, Reading Data from the JSON Format, Reading Data from the HTML Format, Reading Data from the XML Format

Module 4: The Importance of Data Visualization in Business Intelligence (8 Hrs)

Why Is Data Visualization Important? Why Do Modern Businesses Need Data Visualization? The Future of Data Visualization, How Data Visualization Is Used for Business Decision-Making: Faster Responses, Simplicity, Easier Pattern Visualization, Team Involvement, Unify Interpretation

Introducing Data Visualization Techniques:

Loading Libraries, Popular Libraries for Data Visualization in Python: Matplotlib, Plotly, Geoplotlib, Pandas, Introducing Plots in Python

Module 5: Data Visualization (5 Hrs)

Direct Plotting: Line Plot, Bar Plot, Pie Chart, Box Plot, Histogram Plot, Scatter Plot, Seaborn Plotting System: Strip Plot, Box Plot, Swarm Plot, Joint Plot, Matplotlib Plot: Line Plot, Bar Chart, Histogram Plot, Scatter Plot, Stack Plot, Pie Chart

Text Books:

Data Analysis and Visualization Using Python by Dr. Ossama Embarak, APress, 2018

SEM/YEAR : **IV SEM/2nd Year**
COURSE CODE : **19VI407**
TITLE OF THE COURSE : **Dynamic website lab**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

LIST OF PROGRAMS :

1. **Getting started with HTML :** Heading & paragraphs, Links, Images, Lists & Tables.
2. **Getting started with CSS :**Colors, Fonts and font family, Width height and backgrounds, Classes.
3. **The basic layout :** The structure of header, The layout of header, Padding, Structure and layout of footer, Structure and layout of header
4. **Forms :** The layout and structure of forms
5. **Responsive web design :** Using media queries & Graphics, Box- sizing, Responsive font size, Max/Min width attribute, IFrames, Filepaths, Drag & Drop, Web storage
6. **Getting started with Javascript :** Console.log (),Arithmatic calculations, Strings, Using and updating Variables, Constants, Template literals, If-else statements, Switch statements, Booleans & comparison operators, Iterations and loops, Arrays and it's elements, Objects and it's usage
7. **In depth Javascript with ES6 :** Classes and instances, Constructors, Methods, Inheritance, Overriding, Packages (Using NPM), Array methods (for each, find, filter)
8. **Angular JS :** Directives & expressions, Models, Data binding, Controllers, Scopes, Filters, Angular JS Services, HTTP with Angular js, Angular JS DOM, Angular JS API, Routing.
9. **Node JS :** Getting startes with HTTP server, Node modules, File system, Events
10. **Node js with Mongo DB :** Create Database, Create collection, Sort, Insert/Update/Delete/Drop, Join & Limit
11. **Chrome dev tools :** Console Logs, Run Javascript, Application Cache, Performance analysis, Optimize website speed

SEM/YEAR	**: IV SEM/2nd Year**
COURSE CODE	**: 19VI408**
TITLE OF THE COURSE	: **R Programming Lab**
L: T/A: P: C	**: 2: 0: 0: 2**

LIST OF PROGRAMS :

1. Write R program to demonstrate:
    a) How to Create Vector ,Mixing Objects
    b) Explicit Coercion
    c) Subsetting a vector
    d) Vectorized Operations

2. Write R program to demonstrate:
    a) Matrices
    b) Subsetting a matrix
    c) Dropping matrix
    d) Lists
    e) Subsetting Lists
    f) Subsetting nested elements of a list and extracting multiple
    g) elements of list

3. Write R program to demonstrate:
    a) Factors
    b) Missing values
    c) Dataframes,names
4. Write R program to demonstrate :
    a) Using dput()and dump()
    b) Binary Formats
    c) File Connections
    d) Reading lines of a TextFile and reading from a URL connection

5. Write R program to demonstrate :

a) Partial Matching
b) Removing NA values
c) dates and times and operations on it in R

6. Write R program for Installing dplyr package using:

a) select()
b) filter()
c) arrange()
d) rename()
e) mutate()
f) groupby()

7. Write R program to demonstrate:
a) Control Structure-if-else statements
b) For loops and Nested For loops
c) While loop,repeat loop,next,break

8. Write R program to demonstrate function i)using :
a) lapply()
b) sapply()
c) split()
d) tapply()
e) Vectorizing a function

9. Write R program to demonstrate :
a) Scoping Rules of R
b) Application Optimization
c) Plotting Likelihood
d) Using system.time()

10. Write R program to demonstrate Debugging using:
a) NaN
b) Using trackback()
c) Using debug()
d) Using recover()

11. Write R program to demonstrate :
a) Simulation using rnorm() ,clnorm(),pnorm(),pnorm(),rpois()
b) for setting the random numbers seed
c) for simulating a Linear Model
d) for Random Sampling

12. Project: Movie Recommendation System in R.
13. Project: Customer Segmentation using Machine Learning in R.
14. Project: Sentiment Analysis Model in R

15. Project: Uber Data Analysis Project in R
16. Project: Credit Card Fraud Detection in R

SEM/YEAR : **IV SEM/2nd Year**
COURSE CODE : **19VI409**
TITLE OF THE COURSE : **Adv. JAVA LAB**
L: T/A: P: C : **2: 0: 0: 2**

Course objectives

LIST OF PROGRAMS :

1. write a program to find the factorial of entered number?
2. write a program to display Floyd's triangle?
3. write a program to demonstrate constructor/method overloading?
4. write a program to demonstrate method overriding?
5. write a program to demonstrate multiple inheritance?
6. write a program to handle exceptions?
7. write a program to demonstrate the Life Cycle of Thread?
8. write a program to insert an element in array?
9. write a program to read a file?
10. Write a program to demo on linked list?
11. Write a program to demo on queue?
12. Write a program to demo on vector?
13. write a program to connect to a database using Connection, Statement and Result Set Interfaces.
14. write a program to demonstrate the use of CallableStatement.
15. write a program to demonstrate the use of PreparedStatement
16. write a program to demonstrate error & warning management in JDBC
17. write a program to implement cursor management in JDBC.
18. write a program to demonstrate the Servlet Life cycle and types of Servlets
19. write a program to demonstrate thread safety in servlets.
20. write a program to demonstrate session management in servlets using cookies
21. write a program to create servlet for Database connectivity and connection pooling
22. write a program to create servlet for servlet security and SSL.
23. write a program to create a simple JSP
24. write a program to demonstrate the life cycle of JSP
25. write a program to demonstrate the use of JSP Scripting Elements

26. write a program to demonstrate the use of JSP directives
27. write a program to use implicit objects in JSP
28. write a program to create the JSP for Session Management
29. write a program to demonstrate using JDBC with JSP
30. write a program to create a simple struts application
31. write a program to demonstrate the use of DynaActionForm
32. write a program to perform simple validation in a struts application
33. write a program to demonstrate the use of ActionErrors class
34. write a program to demonstrate the use of ActionMessage class
35. write a program to demonstrate the implementation of hibernate framework
36. write a program to find the factorial of entered number?
37. write a program to display Floyd's triangle?
38. write a program to demonstrate constructor/method overloading?
39. write a program to demonstrate method overriding?
40. write a program to demonstrate multiple inheritance?
41. write a program to handle exceptions?
42. write a program to demonstrate the Life Cycle of Thread?
43. write a program to insert an element in array?
44. write a program to read a file?
45. Write a program to demo on linked list?
46. Write a program to demo on queue?
47. Write a program to demo on vector?
48. write a program to connect to a database using Connection, Statement and Result Set Interfaces.
49. write a program to demonstrate the use of CallableStatement.
50. write a program to demonstrate the use of PreparedStatement
51. write a program to demonstrate error & warning management in JDBC
52. write a program to implement cursor management in JDBC.
53. write a program to demonstrate the Servlet Life cycle and types of Servlets
54. write a program to demonstrate thread safety in servlets.
55. write a program to demonstrate session management in servlets using cookies
56. write a program to create servlet for Database connectivity and connection pooling
57. write a program to create servlet for servlet security and SSL.
58. write a program to create a simple JSP

59.write a program to demonstrate the life cycle of JSP
60.write a program to demonstrate the use of JSP Scripting Elements
61.write a program to demonstrate the use of JSP directives
62.write a program to use implicit objects in JSP
63.write a program to create the JSP for Session Management
64.write a program to demonstrate using JDBC with JSP
65.write a program to create a simple struts application
66.write a program to demonstrate the use of DynaActionForm
67.write a program to perform simple validation in a struts application
68.write a program to demonstrate the use of ActionErrors class
69.write a program to demonstrate the use of ActionMessage class
70.write a program to demonstrate the implementation of hibernate framework

SEM/YEAR : **IV SEM/2nd Year**
COURSE CODE : **19VI410**
TITLE OF THE COURSE : **Data Handling and Visualization Lab**
L: T/A: P: C : **0: 0: 0: 3**

Course objectives

- Explain what data visualization is and its importance in our world today
- Understand why Python is considered one of the best data visualization tools
- Describe matplotlib and its data visualization features in Python
- List the types of plots and the steps involved in creating these plots

List of Programs:

Sl.No	Programs
1	Creating a 2-D Plot
2	Multiple Plots
3	Subplots
4	Layout and Spacing Adjustments
5	create different types of plots using matplotlib: • Histogram • Scatter Plot • Heat Map • Pie Chart • Error Bar
6	Seaborn

7	Data Visualization Using Tableau - 1 ƒ Introduction to Tableau ƒ Data Import and Management Data import o Extract and live o Data management – Join o Data management – Relationship o Data Management - Replace ƒ Data Type and Operation o Data type o Pivot and separate o Change type
8	Data Visualization Using Tableau - 2 Different types of data visualizations o Visual encoding o Bar chart and pie chart o Line chart o Multiple chart and distribution o Highlight tables o Scatter plot and trend lines
9	: Data Visualization Using Tableau - 3 ƒ Calculation and parameters o Table calculation o Forecast o Log distribution o Reference line o Table ƒ

	Dashboard and story Create dashboard o Tiled and floating o Telling the story

SCHEME AND SYLLABUS FOR

B.VOC - INFORMATION TECHNOLOGY (DATA ANALYTICS) - AY: 2019-2020

5th Semester

SL	PROGRAM CODE	COURSE CODE	TITLE OF THE COURSE	CREDITS	HOURS
GENERAL EDUCATION COMPONENTS : 12 CREDITS, 180HOURS					
1	P006	19VIXXX	Full Stack Development	2	30
2	P006	19VIXXX	Business Intelligence	2	30
3	P006	19VIXXX	English-Technical Writing	2	30
4	P006	19VIXXX	Information System Analysis	2	30
5	P006	19VIXXX	Principles of Business Operations	2	30
6	P006	19VIXXX	Big Data & Analytics (Elective -1)	2	30
SKILL COMPONENTS : 18 CREDITS , 270 HOURS					
7	P006	19VIXXX	Full Stack Development Lab	5	75
8	P006	19VIXXX	Business Intelligence Lab	2	30
9	P006	19VIXXX	IoT Lab (Arduino/Raspberry Pi, Intel)	4	60
10	P006	19VIXXX	Business IT Project	7	105
Audit Course					
11	P006	19VIXXX	Constitution of India and Ethics		

6th Semester

SL	PROGRAM CODE	COURSE CODE	TITLE OF THE COURSE	CREDITS	HOURS
GENERAL EDUCATION COMPONENTS : 4 CREDITS, 60HOURS					
1	P006	19VIXXX	Machine Learning (Elective – II)	4	60
SKILL COMPONENTS : 26 CREDITS , 390 HOURS					
2	P006	19VIXXX	PROJECT (INTERNAL/EXTERNAL)	26	390

5th Semester

SEM/YEAR	**: V SEM/3rd Year**
COURSE CODE	**: 19VIXXX**
TITLE OF THE COURSE	**: Full Stack Development**
L: T/A: P: C	**: 2: 0: 0: 2**

Course Outcomes:

Upon completion of the course, the student will be able to

1. Explain the concepts of full stack web development
2. Illustrate High level programming and jQuery concepts
3. Make use of Node.js and MongoDB Driver for web development
4. Develop app using angular concepts
5. Establish version control in Git Hub

Unit-1 **6hrs**

Introduction: Getting Started With HTML - HTML5, Video & Audio, Canvas, SVG, Web Storage, Drag & Drop, Geo Location, Basic Styling using CSS 5 – Basic Styling, Positioning & Background Images, Bootstrap – Setup, Templates, Navbar, Typography, Forms & Tables

Unit-II **6hrs**

High level programming: Variables, Arrays, Objects, Loops, Conditionals, Switches, Functions, Events, Form validating, Ajax, jQuery: Selectors & Mouse events, Form events, DOM Manipulation, Effects & Animation, Traversing & Filtering.

Unit-III **6hrs**

Part-A: Node.js: Getting Started With Node, Installation and Simple Server - Project using Simple Node Server, Express Setup and Routing, Template Engines - Project using template Engine. Part-B: Node MongoDB Driver - Setup, Middleware & Routes - Starting the Project, Creating the UI, Form Validation and User Register, Password Encryption, Login Functionality, Access Control & Logout

Unit-IV: App Development using Angular **6hrs**

Getting Started With Angular, Angular 2 App From Scratch, Angular 2 App From The Quick start, Components & Properties, Events & Binding with ngModel, Fetch Data From A Service, Submit Data To Service, Http Module & Observables, Routing.

Unit-V: Git & Version Control **6hrs**

Getting Started with Git, Working with A Local Repository, Branches and Merging, Working with A Remote Repository, Test project with all test cases, finding bugs, check previous versions, deploying procedures, documentation

Textbooks:

1. Northwood, Chris. The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer. Apress, 2018.
2. Mulder P. Full Stack Web Development with Backbone.js: Scalable Application Design with 100% JavaScript. "O'Reilly Media, Inc."; 2014 Jun 10.

References:

1. Ihrig CJ, Bretz A. Full stack Javascript development with MEAN. SitePoint; 2014 Dec 24.

SEM/YEAR : **V SEM/3rd Year**
COURSE CODE : **19VIXXX**
TITLE OF THE COURSE : **Business Intelligence**
L: T/A: P: C : **2: 0: 0: 2**

OBJECTIVES:

The student should be made to:

- Be exposed with the basic rudiments of business intelligence system
- understand the modeling aspects behind Business Intelligence
- understand of the business intelligence life cycle and the techniques used in it
- Be exposed with different data analysis tools and techniques

UNIT I: BUSINESS INTELLIGENCE **6hrs**

Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

UNIT II KNOWLEDGE DELIVERY **6hrs**

The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.

UNIT III EFFICIENCY **6hrs**

Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis, outlier analysis

UNIT IV BUSINESS INTELLIGENCE APPLICATIONS **6hrs**

Marketing models – Logistic and Production models – Case studies.

UNIT V FUTURE OF BUSINESS INTELLIGENCE 6hrs

Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology

TEXT BOOK:

1. Efraim Turban, Ramesh Sharda, Dursun Delen, “Decision Support and Business Intelligence Systems”, 9 th Edition, Pearson 2013.

REFERENCES:

1. Larissa T. Moss, S. Atre, “Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making”, Addison Wesley, 2003.

2. Carlo Vercellis, “Business Intelligence: Data Mining and Optimization for Decision Making”, Wiley Publications, 2009.

3. David Loshin Morgan, Kaufman, “Business Intelligence: The Savvy Manager‟s Guide”, Second Edition, 2012.

4. Cindi Howson, “Successful Business Intelligence: Secrets to Making BI a Killer App”, McGraw-Hill, 2007.

5. Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, “The Data Warehouse Lifecycle Toolkit”, Wiley Publication Inc.,2007

SEM/YEAR : **V SEM/3rd Year**
COURSE CODE : **19VIXXX**
TITLE OF THE COURSE : **English Technical Writing**
L: T/A: P: C : **2: 0: 0: 2**

Course Outcomes

By the end of the course, students should be able to:

- Identify and understand the facets and functions of the primary genres of technical writing, including letters, memos, emails, resumes, reports, proposals, technical descriptions, and technical definitions
- Produce professional caliber technical documents
- Analyze and adapt to the constraints of specific rhetorical situations, including audiences, purposes, and uses
- Write documents that are accessible and reader-centered
- Produce documents both collaboratively and independently
- Develop and administer user tests; analyze and synthesize user test data
- Refine writing style for clarity, concision, coherence, cohesion, and emphasis

Unit 1: **6hrs**

Writing Introductory Emails workshop, Audience and Purpose Activity, Professional Letter Activity

Unit 2: **6hrs**

Application Letter Activity, Analyzing Job and Internship Descriptions, Resume Activity, Peer Review Application Packet, Technical Description Podcast Discussion, Mini-lecture on technical descriptions

Unit 3: **6hrs**

Document analysis activity, Writing Workshop, Peer Review, -Brainstorming instructional assignment ideas

Unit 4: **6hrs**

Form groups for instruction manual project, Group podcast series description, Team feedback, Script revisions, Audacity workshop

Unit 5: **6hrs**

Conduct usability test, Finalize edits to instruction manual based on data gathered from User-Testing, Course wrap up discussion, Fill out student work release forms.

SEM/YEAR : **V SEM/3rd Year**
COURSE CODE : **19VIXXX**
TITLE OF THE COURSE : **Information System Analysis**
L: T/A: P: C : **2: 0: 0: 2**

Objectives:

After studying this course student will be able to:

Analyze any system, identify system boundaries and interfaces, capture user requirements by applying different techniques, generate logical design of user requirements using various structured design tools, understand various quality assurance issues related to system.

Unit 1: **6hrs**

Introduction to Information Systems Development: System Analyst, System Analysis & Design, Categories of Information Systems, System Development Strategies, Implementation and Evaluation, Managing the application development portfolio-Information system Planning, Managing project review & Selection, Information Systems & User-groups Committee Methods

Unit 2: **6hrs**

Analysis: Preliminary Investigation, Scope of Study, Conducting the investigation, Testing Project Feasibility, Handling infeasible projects

Unit 3: **6hrs**

Tools for System Requirements: Requirement Determination, Activities, Types. Fact-finding techniques: Interview, Questionnaire, Record Review, Observation. Tools for documenting Procedures and Decisions: Decision Trees, Decision Tables, Structured English

Unit 4: **6hrs**

Structured Analysis Development Strategy: Features, Data Flow Tools, Tools for Structured Design: Data Flow Diagrams, Data Dictionaries. Application Prototypes: Purpose, Steps, Use, Tools. Prototype example, Computer Aided System Tools: Role, Categories, CASE Tools.

UNIT 5: **6hrs**

Analysis To Design transition: Objectives, Features. Element of Design: Output, Files, Database Interaction, Input, Control, Procedures, Program Specifications.

Text Book:

Analysis and Design of Information Systems, Excel Books Private Limited, New Delhi

SEM/YEAR : **V SEM/3rd Year**
COURSE CODE : **19VIXXX**
TITLE OF THE COURSE : **Principles of Business Operations**
L: T/A: P: C : **2: 0: 0: 2**

OBJECTIVES:

To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization .

Unit 1: **6hrs**

Definition of Management – Science or Art – Manager Vs Entrepreneur – types of managers – managerial roles and skills – Evolution of Management – Scientific, human relations , system and contingency approaches – Types of Business organization – Sole proprietorship, partnership, company-public and private sector enterprises – Organization culture and Environment – Current trends and issues in Management.

Unit 2: **6hrs**

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.

Unit 3: **6hrs**

Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Job Design – Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management.

Unit 4: **6hrs**

Foundations of individual and group behaviour – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication – communication and IT.

Unit 5: **6hrs**

System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

Text Books:

1. Robert Kreitner & Mamata Mohapatra, “Management”, Biztantra, 2008.
2. Harold Koontz & Heinz Weihrich “Essentials of management” Tata Mc Graw Hill, 1998.
3. Tripathy PC & Reddy PN, “Principles of Management”, Tata McGraw Hill, 1999.

SEM/YEAR	**: V SEM/3rd Year**
COURSE CODE	**: 19VIXXX**
TITLE OF THE COURSE	**: Big Data Analytics (Elective I)**
L: T/A: P: C	**: 2: 0: 0: 2**

OBJECTIVES:

- Optimize business decisions and create competitive advantage with Big Data analytics
- Introducing Java concepts required for developing map reduce programs
- Derive business benefit from unstructured data
- Imparting the architectural concepts of Hadoop and introducing map reduce paradigm
- To introduce programming tools PIG & HIVE in Hadoop echo system.

UNIT-I **6hrs**

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT-II **6hrs**

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, RecordReader, Combiner, Partitioner

UNIT-III **6hrs**

Hadoop I/O: The Writable Interface, WritableComparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom comparators

UNIT-IV **6hrs**

Pig: Hadoop Programming Made Easier, Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

UNIT-V **6hrs**

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data

TEXT BOOKS:

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC

2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly

3. Hadoop in Action by Chuck Lam, MANNING Publ.

4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss

REFERENCE BOOKS:

1. Hadoop in Practice by Alex Holmes, MANNING Publ.

2. Hadoop MapReduce Cookbook, SrinathPerera, ThilinaGunarathne

SEM/YEAR	**: V SEM/3rd Year**
COURSE CODE	**: 19VIXXX**
TITLE OF THE COURSE	**: Full Stack Development Lab**
L: T/A: P: C	**: 0: 0: 5: 5**

List of Experiments

1. Write code in HTML5 to develop simple webpage.
2. Write CSS5 & HTML5 Code to show Dropdown Menu.
3. Write HTML5, CSS and Javscript code to Create one-page website having different menu items.
4. Write a program in CSS to show your city with building and moving cars.
5. Write a program to validate web form using javascript.
6. Write jquery code to show website slider.
7. Show version control in Github.
8. Write a program in javascript to Create a user login system.
9. Create a website showing jquery slider.
10. Write a program to show user details using HTML, CSS & AJAX
11. Write a program to display options in a search engine using Ajax.

SEM/YEAR	**: V SEM/3rd Year**
COURSE CODE	**: 19VIXXX**
TITLE OF THE COURSE	**: Business Intelligence Lab**
L: T/A: P: C	**: 0: 0: 2: 2**

List of Experiments:

1. Import the legacy data from different sources such as (Excel, SqlServer, Oracle etc.) and load in the target system.
2. Perform the Extraction Transformation and Loading (ETL) process to construct the database in the Sqlserver / Power BI.
3. Data Visualization from ETL Process
4. Creating a Cube in SQL server 2012
5. Apply the what – if Analysis for data visualization. Design and generate necessary reports based on the data warehouse data.

SEM/YEAR	**: V SEM/3rd Year**
COURSE CODE	**: 19VIXXX**
TITLE OF THE COURSE	**: IOT Lab**
L: T/A: P: C	**: 0: 0: 4: 4**

List of Experiments:

1. Introduction to Arduino platform and programming
2. Interfacing Arduino to Zigbee module
3. Interfacing Arduino to GSM module
4. Interfacing Arduino to Bluetooth Module
5. Introduction to Raspberry PI platform and python programming
6. Interfacing sensors to Raspberry PI
7. Communicate between Arduino and Raspberry PI using any wireless medium
8. Setup a cloud platform to log the data
9. Log Data using Raspberry PI and upload to the cloud platform
10. Design an IOT based system

SEM/YEAR	**: V SEM/3rd Year**
COURSE CODE	**: 19VIXXX**
TITLE OF THE COURSE	**: Business IT Project**
L: T/A: P: C	**: 0: 0: 6: 7**

A business project is **a project specifically intended to achieve a business objective**. For example, an IS or IT project may have as its objective implementing a new general ledger system. ... This type of project is focused on achieving objectives determined during the business planning or strategic process

Other common examples of IT projects include **designing an organization's IT infrastructure, deploying systems and software**, and employing IT security measures etc.

6th Semester

SEM/YEAR : VI SEM/3rd Year
COURSE CODE : 19VIXXX
TITLE OF THE COURSE : Machine Learning (Elective II)
L: T/A: P: C : 4: 0: 0: 4

OBJECTIVES:

- Familiarity with a set of well-known supervised, unsupervised and semi-supervised
- learning algorithms.
- The ability to implement some basic machine learning algorithms
- Understanding of how machine learning algorithms are evaluated

UNIT - I: 10hrs

The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning. Binary classification and related tasks: Classification, Scoring and ranking, Class probability estimation

UNIT- II: 12hrs

Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning. Concept learning: The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts

UNIT- III: 12hrs

Tree models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. Rule models: Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning

UNIT -IV: 13hrs

Linear models: The least-squares method, The perceptron: a heuristic learning algorithm for linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, going beyond linearity with kernel methods. Distance Based Models: Introduction, Neighbors and exemplars, Nearest Neighbors classification, Distance Based Clustering, Hierarchical Clustering.

UNIT- V: 13hrs

Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimizing conditional likelihood

Probabilistic models with hidden variables. Features: Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai Ben David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.