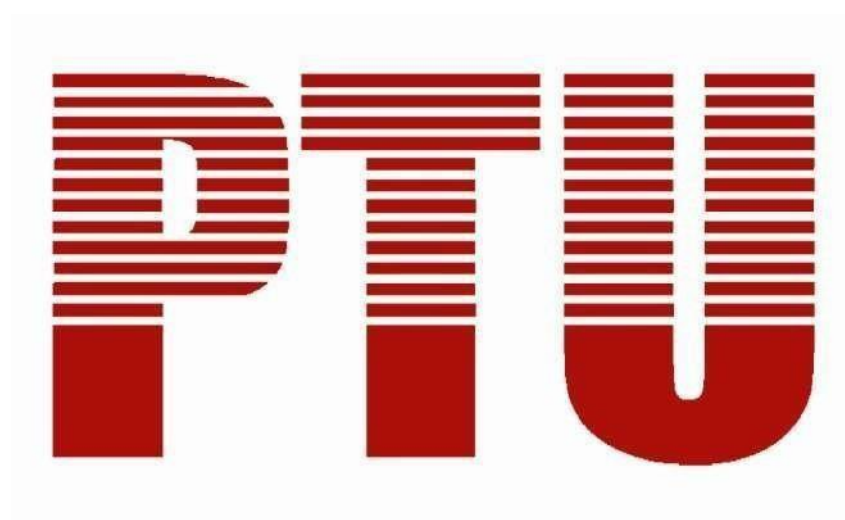


Scheme & Syllabus of
Bachelor of Vocational Studies
(B.Voc.)
Data & WebAnalytics

Batch 2025



By Department of Academics
IKG Punjab Technical University

IKGujralPunjabTechnicalUniversityJalandhar
B.Voc. (Data&WebAnalytics), Batch-2021

Semester1st

Course Code	CourseTitle	LoadAl location		MarksDi stribution		Total	Credits
		L	P	Internal	External		
BVDW101-21	Introduction toInternet&MS-Office	3	0	40	60	100	3
BVDW102-21	ProgrammingFundamentalsinC++	3	0	40	60	100	3
BVDW103-21	CommunicativeEnglish	3	0	40	60	100	3
BVDW104-21	BasicITSkills	3	0	40	60	100	3
BVDW105-21	Introductionto Internet & MS-OfficeLaboratory	0	3	30	20	50	1.5
BVDW106-21	Programming FundamentalsinC++ Laboratory	0	3	30	20	50	1.5
BVDW107-21	TestEngineer(SSC/Q1301)	OnJobTraining(OJT)in Collaboration withMoUindustry			200	200	15
Total		12	6	220	480	700	30

*Thequalificationpacksmayvaryfrominstitutetoinstitute.

Semester2nd

Course Code	CourseTitle	LoadAl location		MarksDi stribution		Total	Credits
		L	P	Internal	External		
BVDW201-21	Database ManagementSystems	3	0	40	60	100	3
BVDW202-21	Internet Toolsand Applications	3	0	40	60	100	3
BVDW203-21	ComputerArchitecture	3	0	40	60	100	3
BVDW204-21	Mathematics	3	0	40	60	100	3
BVDW205-21	DatabaseManagem ent SystemsL aboratory	0	3	30	20	50	1.5
BVDW206-21	Internet ToolsandApplic ationslab	0	3	30	20	50	1.5
EMC-101-25	Entrepreneurs hip Setup and Launch**	0	4	30	20	50	2
On- JobTraining/QualificationPack*							
BVDW207-21	Web Developer(SSC/Q0503)	OnJobTraining(OJT)in Collaboration withMoUindustry			200	200	15
Total		12	6	220	480	700	30

**The department of Higher Education and Languages, Government of Punjab endeavor to AI-powdered entrepreneurship learning platform on the said course. The Institute /Campus shall appoint an assistant professor as faculty coordinator.

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B.Voc. (Data&WebAnalytics), Batch-2021

Semester3rd

Course Code	CourseTitle	LoadAl location		MarksDi stribution		Total	Credits
		L	P	Internal	External		
BVDW301-21	ProgrammingwithPython	3	0	40	60	100	3
BVDW302-21	IntroductiontoBigData	3	0	40	60	100	3
BVDW303-21	ComputerFundamentals	3	0	40	60	100	3
BVDW304-21	Advanced HTML & JavaScript	3	0	40	60	100	3
BVDW305-21	Programming with PythonLab	0	2	30	20	50	1
BVDW306-21	Advanced HTML & JavaScriptLab	0	2	30	20	50	1
BVDW307-21	IntroductiontoBigDataLab	0	2	30	20	50	1
On-JobTraining/QualificationPack*							
BVDW308-21	Junior SoftwareDevelo per(SSC/Q0508)	OnJobTraining(OJT)i n Collaboration withMoUindustry		200		200	15
Total		12	6	250	500	750	30

Semester4th

Course Code	CourseTitle	LoadAl location		MarksDi stribution		Total	Credits
		L	P	Internal	External		
BVDW401-21	Data Warehouse & DataMining	3	0	40	60	100	3
BVDW402-21	DataAnalyticsusingR	3	0	40	60	100	3
BVDW403-21	DataStructures	3	0	40	60	100	3
BVDW404-21	DigitalMarketing	3	0	40	60	100	3
BVDW405-21	DataAnalyticsusingRLab	0	3	30	20	50	1.5
BVDW406-21	DataStructuresLab	0	3	30	20	50	1.5
On-JobTraining/QualificationPack*							
BVDW407-21	OnJobTrainingwithMoU IndustrybasedofdataAnalyticsor DigitalMarketing.				200	200	15
Total		12	6	220	480	700	30

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Semester 5th

Course Code	CourseTitle	LoadAI location		MarksDi stribution		Total	Credits
		L	P	Internal	External		
BVDW501-21	Probabilityandstatistics	3	0	40	60	100	3
BVDW502-21	ComputerNetworks	3	0	40	60	100	3
BVDW503-21	ProgrammingwithPHP	3	0	40	60	100	3
BVDW504-21	LinuxOperating System	3	0	40	60	100	3
BVDW505-21	ProgrammingwithPHPLab	0	2	30	20	50	1
BVDW506-21	LinuxOperatingSystem Lab	0	2	30	20	50	1
BVDW507-21	ComputerNetworksLab	0	2	30	20	50	1
On-JobTraining/QualificationPack*							
BVDW508-21	OnJobTrainingwithMoU IndustrybasedofdataAnalyticsor DigitalMarketing.				200	200	15
Total		12	6	220	480	700	30

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B.Voc. (Data&WebAnalytics), Batch-2021

Semester 6th

Course Code	CourseTitle	LoadAl location		MarksDi stribution		Total	Credits
		L	P	Internal	External		
BVDW601-21	Advanced Web Technologies	3	0	40	60	100	3
BVDW602-21	Business Intelligence	3	0	40	60	100	3
BVDW603-21	Data Visualization	3	0	40	60	100	3
BVDW604-21	Web Analytics	3	0	40	60	100	3
BVDW605-21	Data Visualization Lab	0	2	30	20	50	1
BVDW606-21	Advanced Web Technologies Lab	0	2	30	20	50	1
BVDW607-21	Web Analytics Lab	0	2	30	20	50	1
On-Job Training/Qualification Pack*							
BVDW608-21	OnJob Training with MoU Industry based on data Analytics or Digital Marketing.				200	200	15
Total		12	6	220	480	700	30

IKGujralPunjabTechnicalUniversityJalandhar**B.Voc. (Data&WebAnalytics), Batch-2021**

CourseCode:BVDW101-21

CourseName:IntroductiontoInternet&MS-Office

Program: B. Voc.	L:3 T:0P:0
Branch: Data&WebAnalytics	Credits:3
Semester: 1st	Contacthours: 33
Theory/Laboratory: Theory	Status(Elective/Core): Core
Internalmax.marks: 40	Externalmax.marks: 60
Totalmarks: 100	

CourseOutcomes:

CO#	Courseoutcomes
CO1	Todevelopanunderstanding&practicalexposuretoMSOfficeusedasbusiness tool.
CO2	To equip the students with the relevant skills and working knowledge of various officemanagementtools
CO3	TodevelopanunderstandingofthepracticesandtechnologyrequiredfortheInternet.

Detailedcontents	Contact hours
Unit1: Introduction>Aboutinternet anditsworking,business useofinternet,services.Internet Protocol: Introduction, file transfer protocol (FTP), Gopher, Telnet,otherprotocolslike HTTP and TCPIP. WWW:Introduction, workingofWWW,Webbrowsing(opening,viewing, savingand printing a webpage andbookmark)	9
Unit2: MicrosoftWord:Interface,Toolbar,Workingwithadocument(Create,open,Save, Export etc.), Working with text, Images and Tables, Page layout(Headers and footers, Margins, Page and line numbers), Mail Merge,Automatingtasks(Smartdocuments,Macros),Fileformats andExport features.	8
Unit3: MS-Excel:Introduction,ComponentsofExcelHistory, Creating,Saving,Opening,Spreadsheet, Formatting numbers and Text, Graph and Chart FormattingCommands, Menu Bar, Toolbars, Producing Charges, Protecting Cell Macro andPrinting Operation, Spell Checking, Cell Editing, Calculation of various FinancialandStatisticalFunctionsusing Formulas.	8
Unit4: Microsoft Power Point: Interface, Working with a document (Create, open, Save,Export etc.), Creating and editing power point presentations (Slideshows,Animations, Transitions,graphicsandcharts),FileformatsandExportfeatures.	8

Text Books:

1. UnderstandingTheInternetbyKieth Sutherland,Butterworth-Heinemann.
2. InternetTechnologiesbyS. K. Bansal, APHPublishingCorporation.
3. MS-Office2007TrainingGuidebyS.Jain, BPBPpublication.

ReferenceBooks:

1. ComputerBasicsand BeyondbyMichaelA.Price.
2. MS-Office2007for DummiesbyWallaceWang,WileyPublishingInc.

IKGujralPunjabTechnicalUniversityJalandhar
B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode:BVDW102-21

CourseName:ProgrammingFundamentalsinC++

Program: B. Voc.	L:3 T:0P:0
Branch: Data& WebAnalytics	Credits:3
Semester: 1st	Contacthours: 33
Theory/Laboratory: Theory	Status(Elective/Core): Core
Internalmax.marks: 40	Externalmax.marks: 60
Totalmarks: 100	

CourseOutcomes:

CO#	Courseoutcomes
CO1	Tolearn programmingfromrealworldexamples.
CO2	TounderstandObjectorientedapproachforfindingSolutionstovariousproblemswith the helpofC++language.
CO3	Tocreatecomputerbasedsolutionstovariousreal-worldproblems usingC++.
CO4	Tolearnvarious conceptsofobjectorientedapproachtowardsproblemsolving.

Detailedcontents	Contact hours
Unit1: Fundamentals:Character set,IdentifiersandKeyWords, Datatypes, Constants,Variables, Expressions,Statements,SymbolicConstants. Operations and Expressions: Arithmetic operators, Unary operators, RelationalOperators,LogicalOperators,AssignmentandConditionalOperators. DataInputandOutput:singlecharacterInput,singlecharacteroutput,enteringinput data,writing outputdata.	9
Unit2: Control Statements: Preliminaries, While, Do-while and For statements, Nestedloops, If-else,Switch,Break-Continuestatements. Functions: Declaring and defining function, Local, global variables, Passingargumentto function,Referencearguments,Overloadingfunctions.	8
Unit3: ObjectOrientedProgramming:Objects&Classes,Constructor&Destructor,Operator overloading, Overloading unary operators, Overloading binaryoperators,Data conversion,Pitfalls operatoroverloadingandconversion.	8
Unit4: Inheritance: Derived class and Base Class, Derived Class Constructors,Overriding member functions, Inheritance in the English distances class, classhierarchies,PublicandPrivateinheritance,Levelofinheritance. Polymorphism:Problemssingleinheritance,Multipleinheritance.	8

Text Books:

1. ObjectOrientedProgrammingwithC++, E.Balagurusami,4thEdition,TMG.

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3.Fundamentals of Computers. Delhi:Prentice-Hall.

2. Object Oriented Progg.in TurboC++, Robert Lafore, 4th Edition Galgotia Publications.

Reference Books:

1. Computer Basics and Beyond by Michael A. Price.

2. Mastering C++ by KR Venugopal and Raj Kumar Buyya.

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B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode: **BVDW103-19**

CourseName: **CommunicativeEnglish**

Program: B.Voc.	L: 3 T: 0 P: 0
Branch: Data&WebAnalytics	Credits: 3
Semester: 1st	Contact hours: 33
Theory/Laboratory: Theory	Elective status: Core
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO#	Course outcomes
CO1	To introduce students to the theory, fundamentals and tools of communication.
CO2	To help the students become the independent users of English language.
CO3	To develop vital communication skills integral to their personal, social and professional interactions.
CO4	The syllabus shall address the issues relating to the Language of communication.
CO5	Students will become proficient in professional communications such as interviews, group discussions, office environments, important readings skills and writing skills.

Detailed contents	Contact hours
Unit 1-1 (Introduction) - Theory of Communication, - Types and modes of Communication	9
Unit-2 (Language of Communication) - Verbal and Non-verbal (Spoken and Written) - Personal, Social and Business - Barriers and Strategies - Intra-personal, Inter-personal and Group communication	8
Unit-3 (Reading and Understanding) - Close Reading - Comprehension - Summary Paraphrasing - Analysis and Interpretation - Translation (from Hindi/Punjab to English and vice-versa) - Literary/Knowledge Texts	8
Unit-4 (Writing Skills) - Documenting - Report Writing - Making notes - Letter writing	8

Text Books:

1. Fluency in English -Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.

Reference Books:

1. Practical English Usage by Michael Swan. OUP. 1995.
2. Communication Skills by Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

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CourseCode:**BVDW104-19**

CourseName: **BasicITSkill**

Program: B.Voc.	L: 3 T: 0 P: 0
Branch: Data&WebAnalytics	Credits: 3
Semester: 1st	Contacthours: 33
Theory/Laboratory: Theory	Electivestatus: Core
Internalmax.marks: 40	Externalmax.marks: 60
Totalmarks: 100	

CourseOutcomes:

CO#	Courseoutcomes
CO1	Understandingtheconceptofinputand outputdevicesofComputers.
CO2	Learn the functional units and classify types of computers, how they processinformationandhowindividualcomputersinteractwithothercomputingsystem sanddevices.
CO3	Learnbasicwordprocessing,SpreadsheetandPresentationGraphicsSoftwareskill s.
CO4	StudytousetheInternetsafely,legally,andresponsibly.
CO5	TodevelopanunderstandingandpracticalexposuretodifferentITtoolsusedasanaidin business and ecommerce.

Detailedcontents	Contact hours
Unit1 : HumanComputerInterface,ConceptsofHardwareandSoftware;DataandInformation. Functional Units of Computer System: CPU, registers, system bus, main memoryunit, cache memory, SMPS, Motherboard, Ports and Interfaces, expansion cards,ribboncables, memorychips, processors. Devices:Inputandoutputdevices,keyboard,mouse,joystick,scanner,OCR,OMR,barcode reader, web camera, monitor, printer,plotter. Memory:Primary,secondary.	9
Unit2: Types of Languages: Machine, assembly and High level Language; Operatingssystemas user interface,utility programs. Word processing: Editing features, formatting features, saving, printing, tablehandling,pagesettings,spell-checking,macros,mail-merge,equationeditors.	8
Unit3: Spreadsheet: Workbook, worksheets, data types, operators, cell formats, freezepanes, editing features, formatting features, creating formulas, using formulas, cellreferences,replication, sorting,filtering, functions,Charts &Graphs. Presentation Graphics Software: Templates, views, formatting slide, slides withgraphs,animation, using special features,presenting slide shows.	8
Unit4: TheImpactofComputingandthe Interneton Society. Electronic Payment System: SecureElectronicTransaction, Types ofPaymentSystem:DigitalCash,ElectronicCheque,SmartCard,Credit/DebitCardE-Money,ImmediatePayment System(IMPS).	8

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TextBooks:

1. IntroductiontoInformationTechnology, ITLEducationSolutionslimited,PearsonEducation.
2. ComputerFundamentals, A.Goel,2010,PearsonEducation.
3. FundamentalsofComputers, P.K.Sinha&P. Sinha,2007, BPB Publishers.

ReferenceBooks:

1. IntroductiontoComputersbyPeterNorton.
2. ComputersTodaybyD. H. Sanders,McGrawHill.
3. ComputersbyLarrylong&Nancylong,12thedition,PrenticeHall.

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B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode:**BVDW105-19**

CourseName:**IntroductiontoInternet&MS-OfficeLaboratory**

Program: B.Voc	L:0 T:0P:3
Branch: Data&WebAnalytics	Credits:1.5
Semester: 1st	
Theory/Laboratory: Laboratory	Percentageofnumerical/designproblems:-
Internalmax.marks: 30	Durationofendsemester exam(ESE):-
Externalmax.marks: 20	Status(Elective/Core): Core
Totalmarks: 50	

CourseOutcomes:

CO#	Courseoutcomes
CO1	FamiliarizingwithOpenOffice(Wordprocessing,Spreadsheets andPresentation).
CO2	Toacquireknowledgeoneditor, spreadsheetandpresentationsoftware.
CO3	Thestudentswillbeabletoperformdocumentationandaccountingoperations.
CO4	Studentscanlearnhowtoperformpresentationskills.

Task 1:	Microsoft Word: To familiarize with parts of Word, to create and save a document, to set page settings, create headers and footers, to edit a document and save it, to use copy, cut and paste features, to use various formatting features such as bold face, italicize, underline, subscript, superscript, line spacing, etc. To use spelling and grammar checking feature, to preview print a document. To create a table with specified rows and columns, to enter data in a table, to select a table, a row, a column or a cell, to insert new row and/or a column, to delete a row and/or a column, to split and merge a row, column or a cell. To understand the mail-merge and to use mail merge feature of MS-Word.
Task 2:	Microsoft Excel: To familiarize with parts of Excel window, to create and save a workbook with single and/or multiple worksheets, to edit and format text as well numbers, to apply operations on range of cells using built-in formulae, to preview and print a worksheet, to insert new row and/or column in a worksheet, to delete a row and/or column in a worksheet, to create a variety of charts, to import and export data to or from worksheet.
Task 3:	Microsoft PowerPoint: To familiarize with parts of PowerPoint, to create and save a new presentation, to apply design templates to a presentation, to insert, edit and delete a slide, to use different views of slides, to use slide show from beginning or from the current slide, to preview and print a presentation, to check spellings in a presentation, to add clip art and pictures in a slide, to add chart, diagram and table in a slide, to set animation for a selected slide and/or for entire presentation, to create slide master and title master, to create a custom show.

RecommendedHardware&Software:

Intel Core i-3 / i-5 / i-7 processor with a speed of minimum 2 GHz, RAM 2 GB or higher, HDD 200 GB or higher, LED/LCD screen and Microsoft MS Office 2003/XP/2007

TestBooks:

1. IT Tools, R.K. Jain, Khanna Publishing House.
2. Introduction to Information Technology, IT Education Solutions limited, Pearson Education.

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B.Voc. (Data&WebAnalytics), Batch-2021

CourseName:**ProgrammingFundamentalsinC++Laboratory**

Program: B.Voc.	L: 0 T: 0 P:3
Branch: Data&WebAnalytics	Credits: 1.5
Semester: 1st	Percentageofnumerical/designproblems:-
Theory/Laboratory: Laboratory	Durationofend semester exam(ESE):-
Internalmax.marks: 30	Externalmax.marks: 20
Totalmarks: 50	Status(Elective/Core): Core

CourseOutcomes:

CO#	Courseoutcomes
CO1	Tolearnprogrammingfromrealworldexamples.
CO2	To understandObjectorientedapproachforfindingSolutionstovariousproblemswith the helpofC++language.
CO3	To createcomputerbasedsolutionstovariousreal-worldproblemsusingC++.
CO4	To learnvarious concepts ofobjectorientedapproachtowardsproblemsolving.

Task 1 :	Writeaprogramtoentermarkof6differentsubjects andfindoutthetotalmark(Using cinandcoutstatement).
Task 2 :	Write a function using reference variables as arguments to swap the values of pair of integers.
Task 3 :	Write a function to find largest of three numbers.
Task 4 :	Write a program to find the factorial of a number.
Task 5 :	Define a class to represent a bank account which includes the following members as Data members: a) Name of the depositor b) Account Number c) Withdrawal amount d) Balance amount in the account Member Functions: e) To assign initial values: i. To deposit an amount, ii. To withdraw an amount after checking the balance & iii. To display name and balance.
Task 6 :	Write a program for single inheritance.
Task 7 :	Write a program for use of constructor and destructors.
Task 8 :	Write a program for Multiple inheritances.
Task 9 :	Write a program for Multilevel inheritance
Task 10:	Write a program for file handling.

Recommended Hardware & Software:

Intel Core i-3 / i-5 / i-7 processor with a speed of minimum 2 GHz,
RAM 2 GB or higher, HDD 200 GB or higher, LED/LCD screen and

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BorlandC++ /TurboC++

Text Books:

1. TheC++ProgrammingLanguage,BjarnaStroustrup,ThirdEdition,Addison WesleyPublishingCompany.
2. ObjectOrientedProgrammingUsingC++,Salaria,R.S, FourthEdition,KhannaBookPublishing.

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Couse Code: EMC - 101

CourseName: **Entrepreneurship Setup and Launch**

Introduction:

This semester lays the foundation for the learner to understand what entrepreneurship is, beyond just starting a business. It introduces key ideas like problem-solving, value creation, and self-awareness. The learner will begin exploring basic business concepts while discovering their own interests and strengths.

Learners Objective:

1. Understand the core concepts of entrepreneurship through relatable, real-life examples.
2. Begin to see themselves as problem-solvers and creators.
3. Learn about business paths and choose one to try based on interest or local fit.
4. Launch a micro-hustle (online or offline) to earn their first income.
5. Build confidence and self-belief by doing.

Outcome: By the end of this semester, learners will start a simple business activity, earn their first income, and build belief in their ability to do business.

Guiding Principles/Approach:

This syllabus is built on principles of **experiential learning, growth mindset development, and identity-first learning**. Drawing from learning science and behavior design, the course shifts students from passive learning to *active doing*, where they try out small business activities in real contexts. The design helps students not just learn entrepreneurship but begin to see themselves as entrepreneurs. Emphasis is placed on *small wins, peer collaboration, and locally relevant opportunities* to ensure learning feels achievable and connected to their realities. The curriculum focuses on conceptual understanding without heavy theory, combining *practical action, reflection, and collaboration*. *By making progress visible and success feel possible, it plants the seeds of self-reliance, initiative, and long-term motivation.*

SemesterSyllabus:

Format:12weeks,4hours/week|2credits

RevenueTarget:₹10,000

Week	Learning Goal	MeasurableOutcome
1	Understandwhatentrepreneurship isand who can be an entrepreneur	Studentsdefineentrepreneurshipintheir ownwordsandlist 2entrepreneursfrom theirlocalareaor community
2	Connectpersonalidentity to entrepreneurship(strengths, interests, struggles)	Studentscreatea“value map”showinghow askill/interest/problemfromtheirlifecould become a business opportunity
3	Learn about 5 business paths: contentcreation,drop-shipping, cloudkitchen/foodbusiness,gig economyand localservices	Students explore 1–2 examples from each domainandshareonethey’re mostcurious to try and why

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4	Choose a path and generate a basic business idea	Students write down a clear offer (what, for whom, why) and one way to reach their customer
5	Take first real action: message, post, pitch, or sell	Students reach out to serve 1 real potential customer and record what happened
6	Reflect on first attempt and share with peers	Students share their result, a challenge faced, and one idea to improve next time
7	Improve and try again: aim for first ₹100	Students apply a change, try again, and aim to make their first ₹100 or get meaningful response
8	Learn how to identify and understand your target customer	Students talk to 2 potential customers or observe them and list 3 insights about their needs
9	Learn how to serve your target audience better	Students improve one part of their offer (product, delivery, messaging, or interaction) based on customer feedback or need
10	Explore core entrepreneurial values (resilience, honesty, effort)	Students reflect on 1 value they're building and show it in a business task or peer story
11	Focus on earning and staying consistent	Students complete a second earning task and track their consistency (e.g., same product or message for 3 days)
12	Reflect on earnings, grit, and how to keep going	Students record total earnings, one resilience moment, and one support system or habit they'll continue with

Weekly Component:

Component	Duration	Description
Learning Module	~1.5hrs	- Introduces key concepts in a simple and engaging way - Includes examples, and 1–2 interactive discussions or quizzes
Action Lab	~2hrs	- Hands-on task on the weekly concept - Includes step-by-step guidance, templates, and worksheets - Ends with a submission (e.g., video, reflection, or proof of action)
Resources	Self-paced	- Supplementary videos, short readings, real-life stories, and tools to deepen understanding at their own pace

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EvaluationCriteria

Evaluation Component	Description	Weightage
WeeklyTask Completion	Timelysubmissionofweeklytasksincluding reflections,activities,quizzesetc.	40%
Target Completion	Performance-basedevaluationonhitting revenueor profittargets (e.g.,generating₹10,000revenue)	30%
FinalProject	Acomprehensiveprojectbasedonthe semester's theme	30%

Week1:WhatisEntrepreneurship?WhoCanBeanentrepreneur?

INTRODUCTION:CouldYouBeanentrepreneur?

When people hear “entrepreneur,” they often think it means having a company, investors, or an MBA. Some even believe it's only for toppers or those with high grades. But entrepreneurship is more about mindset than qualifications: it's about seeing a problem and doing something about it. Like someone who starts selling snacks because their school canteen is always shut, or a friend who fixes broken chargers for others. If you've ever spotted a need and thought, “I can solve this,” - you've already taken your first step.

Component1:LearningModule(~1.5hours)Unit1:

Whatis Entrepreneurship?

1. *Solving problems or creating value in exchange for money.*
2. *Entrepreneurship is not just about starting a company: it's about initiative, resourcefulness, and value creation.*
3. *Different types of entrepreneurs: small shop owners, street vendors, YouTubers, local tailors, mechanics, and more.*
4. *Entrepreneurs build opportunities instead of waiting for them.*

Simple Slide/Visual Aid Tip:

A circle that says "Problem", an arrow pointing to "Solution", then an arrow to "Earn". That's entrepreneurship.

<A video that visually shows how entrepreneurship starts with spotting a problem (e.g., long food lines), creating a solution (e.g., pre-order lunch service), and earning from it: illustrating the simple flow: Problem → Solution → Earn>

MCQ1

Q:What best describes entrepreneurship?

- A. Getting a job in a company
- B. Solving problems for others and earning from it 
- C. Studying business in college
- D. Buying expensive things

Feedback:

1. *Correct! Entrepreneurs solve problems or offer value and get paid for it.*
2. *Not quite! Entrepreneurship is about creating something useful, not just getting a job or studying.*

Unit2:WhoCanBeanentrepreneur?

Entrepreneurship starts with spotting a problem, finding a solution, and creating value. Today, anyone with a phone and an internet connection can start a business: money helps, but mindset and initiative matter more at the start.

You just need:

1. A problem to solve
2. A simple skill or product
3. The courage to start small

Examples Carousel (Swipeable cards)

1. **Pooja (India)** – Sell shand maderakhison Instagram, learned designing on YouTube.
Problem she saw: Expensive or generic rakhi in the market; no personal touch.
2. **Luis (Mexico)** – Repairs used phones in his garage, now has loyal customers.
Problem he saw: Many people couldn't afford new phones or didn't trust local repair shops.
3. **Sana (Kolkata)** – Started tiffin delivery from her home kitchen, now earns ₹500/day.
Problem she saw: Office workers struggled to find affordable, homemade meals.
4. **Sal Khan (USA)** – Started Khan Academy with YouTube lessons to help his cousin.
Problem he saw: His cousin needed help with math, but good learning resources were hard to access.

MCQ

Q: Which of these can be a form of entrepreneurship?

- A. Making reels on skin care tips and selling homemade face packs 
- B. Buying new clothes from malls
- C. Studying engineering
- D. Playing games without sharing or streaming

Feedback:

1. Correct! Sharing useful tips + selling a product = solving a need!
2. Try again! Entrepreneurship is about creating value and helping others.

Reflection Prompt

1. If you had to earn ₹100 this week, what would you do?

Component 2: Action Lab (~2

hours) Task

Find & Learn from 2 Entrepreneurs Near You

Steps (Checklist):

1. Look around your neighborhood or online: find 2 people who earn through their own work
2. Ask or observe:

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- a) Whatdotheydo?
- b) Howdothey earn?

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- c) Whatmakesthementrepreneurial?
3. Usethe**EntrepreneurTrackerTemplate**(availableintheresourcestab)

FinalDeliverable

Learnersubmits:

1. Ashortdefinitionofentrepreneurship(intheirwords)
2. 2entriesfromtheEntrepreneurTracker(name,whattheydo,what learner learned)

→Submittedinthesubmissionstab.

SupplementaryResources(Optional)

1. [DannyO'Neill-Gettingstarted|Entrepreneurship|KhanAcademy](#)
2. [TheBetterIndia–Storiesoflocalentrepreneurs](#)

Week2: Can I Be an entrepreneur?

INTRO–What Makes an entrepreneur?

You don't need a suit, a degree, or a lot of money to be an entrepreneur.

You need one thing: a mind set. Entrepreneurs notice problems around them; and do something about it. From the boy fixing bikes outside his house to the girl teaching dance on Instagram, they all started small. What matters most is not what you have: it's how you think and act.

Component 1: Learning Module

e (~1.5 hours) Unit 1: What

Makes an entrepreneur?

Key Concepts:

1. **Entrepreneurs are driven by curiosity:** they ask questions, explore possibilities, and seek better ways to do things.
2. **They take initiative:** they act, experiment, and create using limited resources with creativity and courage
3. **They learn by doing:** embracing mistakes as stepping stones to progress.
4. **They take full ownership:** one day they're the marketer, the delivery person, and the customer support, all in one.
5. **They are resilient:** they persist through challenges, adapt to change, and keep moving forward with purpose.

Real-Life Examples:

1. Nithin & Nikhil Kamath (Zerodha) – Started India's largest stock brokerage without formal degrees or external funding, just deep curiosity about stock markets and a desire to simplify investing.
2. *Qualities: Took initiative early and stayed persistent through challenges.*
3. Prajakta Koli (Mostly Sane) – Started by making comedy sketches about everyday Indian life: family, school, relationships; and became one of India's top digital creators.
4. *Qualities: Stayed consistent, adapted over time, and built strong audience trust.*
5. Tilak Mehta (PapernParcels) – As a teenager, launched a courier startup using Mumbai's dabbawala network for delivery.
6. *Qualities: Thought creatively and acted with confidence at a young age.*

Unit2:StartSmall:BuildIdeasfromWhatYouKnow

In the last unit, you learned that entrepreneurs don't just have ideas; they act, solve problems, and use what they have.

But the big question now is:

“What can I offer?”

That's where the Value Map comes in. It helps you take your first step toward thinking and acting like an entrepreneur: in your own way.

What is a Value Map?

A Value Map connects three simple things:

A. What people are around you need

→ *Look around: is there something people often struggle with or something that could be better?*

B. What you enjoy or are willing to try

→ *You don't need to be an expert. Start with small things you like doing: talking to people, fixing, organizing, helping, designing, or learning something new.*

→ *Even if you're just curious about something: that's enough to begin.*

C. What solution you can create

→ *Use what you enjoy or are learning to try solving a real need around you: even in a small way*

Visuals:

3 overlapping circles:

1. “People Need”
2. “I Can”
3. “My Offer”

Examples:

1. People Need → Affordable meals

I Can → Cook + have access to home kitchen My Offer → ₹40 tiffin service

2. People Need → Study tips in Punjabi

I Can → Speak clearly + love teaching

My Offer → 3-minute video tip on Instagram

MCQ

Q: What's the first step to being an entrepreneur?

- A. Waiting for the perfect idea
- B. Solving a problem with your skills
- C. Buying a shop
- D. Studying for years

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Feedback:

1. *Correct!Entrepreneursstartbysolvingsmallproblemsusing whattheyalreadyhave.*
2. *Tryagain!It'snotaboutwaiting:it'sabout starting.*

ReflectionPrompt

1. Ifsomeonegaveyou ₹500 andaskedyouto earnfromit, whatwould you do?

Component2:ActionLab(~2 hours)

Task:CreateYourPersonalValueMapSteps(checklistin app):

1. Thinkof2–3problemspeoplefacearoundyou(hunger,phonerepair,boredom,etc.)
2. Listyourownskills,interests,orresources.
3. Matcheachproblemwithsomethingyoucouldoffer.
4. Usethe**ValueMapTemplate**intheresourcestoorganizeyourideas.

FinalDeliverable(SubmittedinApp):

1. Yourcompleted**ValueMap**(in3columns:Need,Skill,Offer)
2. Highlight**1idea**you'dliketoexploreforyourfuturehustle

SupplementaryResources(Optional)

1. "StartwithWhy"bySimonSinek
2. [10CharacteristicsofSuccessful Entrepreneurs|Business:Explained](#)

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CourseCode: **BVDW201-19**

CourseName: **DatabaseManagementSystems**

Program: B.Voc.	L: 3 T: 0 P: 0
Branch: Data&WebAnalytics	Credits: 3
Semester: 2nd	Contacthours: 33
Theory/Laboratory: Theory	Status(Elective/Core): Core
Internalmax.marks: 40	Externalmax.marks: 60
Totalmarks: 100	

CourseOutcomes:

CO#	Courseoutcomes
CO1	Understandthebasicconcepts ofDBMS.
CO2	Formulate,usingSQL,solutionsto abroadrange ofquery anddataupdate problems.
CO3	Demonstrateanunderstandingofnormalizationtheoryandappliesuchknowledgetothenorm alization ofadatabase.
CO4	Understandthe conceptofTransactionandQuery processinginDBMS.

DetailedContents	Contacthours
Unit-I: IntroductionofDBMS,DataModelingforaDatabase,ThreelevelArchitectureof DBMS,ComponentsofaDBMS.IntroductiontoDataModels, Hierarchical, Network and Relational Model, Comparison ofNetwork,Hierarchical, Relational & EntityRelationship Model.	9
Unit-II Relational Database, Relational Algebra and Calculus, SQL Fundamentals,DDL, DML, DCL, PL/SQL Concepts, Cursors, Stored Procedures, StoredFunctions,DatabaseTriggers.	8
Unit-III IntroductiontoNormalization,First,Second,ThirdNormalForms,Dependency Preservation,Boyce-CoddNormalForm,Multi- valuedDependenciesandFourthNormalForm,JoinDependenciesandFifth NormalForm,Domain-keynormalform(DKNF).	8
Unit-IV DatabaseRecovery,ConcurrencyManagement,DatabaseSecurity, IntegrityandControl. Structure&Design of aDistributedDatabase.	8

TextBooks:

1. An Introduction to Database System by Bipin C. Desai, Galgotia Publications Pvt Ltd-
NewDelhi,Revised Edition,(2012).
2. An Introduction to Database Systems by C. J. Date, A. Kannan & S. Swamynathan,
8thEdition,Pearson Education,(2006).

ReferenceBooks:

1. SQL, PL/SQL The Programming Language of Oracle”, Ivan Bayross, BPB Publications,
4thRevisedEdition(2009).
2. Database System Concepts by Abraham Silberschatz, Henry F. Korth& S. Sudharshan,
TataMcGraw Hill, 6thEdition, (2013).
3. DatabaseManagementSystems,RaghuRamakrishnan,McGraw-Hill,3rd Edition,2014.

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B.Voc. (Data&WebAnalytics), Batch-2021

CourseName:**Internet Tools &Applications**

Program: B.Voc.	L: 3 T: 0 P: 0
Branch: Data&WebAnalytics	Credits: 3
Semester: 2nd	Contacthours: 33
Theory/Laboratory: Theory	Status(Elective/Core): Core
Internalmax.marks: 40	Externalmax.marks: 60
Totalmarks: 100	

CourseOutcomes: Studentswillbeableto

CO#	Courseoutcomes
CO1	UnderstandbasicconceptsofInternet.
CO2	Designawebpage.
CO3	UnderstandvariousapplicationsofInternet.

Detailed contents	Contact hours
Unit-I Internet: Internet, its advantages, disadvantages, internet facilities through WWW and HTML, Internet Protocols, TCP/IP, FTP, newsgroups, remote logins, chat group etc.	2hours
Unit-II WWW: Client side, Server side, web browsers, web pages, locating information on the web. E-Mail: Architecture, various aspects, the user agent, message format, message transfer, e-mail privacy. Domain Name Server and its working	3hours
Unit-III HTML: Introduction to HTML, Web structure of HTML document. Starting an HTML document: Head element, body element, style element, Script element, Text formatting, using lists to organize information. Organizing Data with Table: Basic table Structures, individual cells and headings, vertical controls, database considerations, displaying real data with a table.	3hours

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Table Layout and Presentation: Table Syntax, two column layout, staggered body with an index, traditional newspaper layout.	
Unit-IV Uniform Resource Locators (URLs): Absolute URLs, Relative URLs, fragment URLs, Types of URL Schemes- HTTP, mailto, news, FTP, Telnet, File etc. Using Hyper Links and Anchors: Uses to Hyper Links, Structure of Hyper Links, Links to specialized contents. Images: Adding Images to webpage, using images as links, creating menus with image maps, image formats- GIF, JPEG etc.	3hours

Text Books:

1. Corner, Internet networking with TCP-IP: Principles, Protocols and Architecture, PHI.
2. Stephan Mack, Janan Platt, HTML4.0 No Experience Required, BPB Publication.
3. Rick Darnell et al, HTML4 Unleashed, Techmedia Publications.

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B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode: **BVDW203-21**

CourseName: **ComputerArchitecture**

Program: B.Voc.	L: 3 T: 0 P: 0
Branch: Data&WebAnalytics	Credits: 3
Semester: 2nd	Contacthours: 33
Theory/Laboratory: Theory	Status(Elective/Core): Core
Internalmax.marks: 40	Externalmax.marks: 60
Totalmarks: 100	

CourseOutcomes:

CO#	Courseoutcomes
CO1	To know about the basic functioning of various parts of computer system from hardware point of view and interfacing of various peripheral devices used with the system.
CO2	To learn numbers system and various types of micro-operations of processor.
CO3	To learn the communication of various components through common bus.
CO4	To learn how to design Combinational & Sequential circuits.

DetailedContents	Contacthours
Unit-I Logic Gates: AND, OR, NOT, NAND, NOR, XOR, XNOR, NAND & NOR as Universal Gates, Logic Gates Applications. Boolean Algebra: Introduction, Theorems, Simplification of Boolean Expression using Boolean Algebra, SOP & POS Forms, Realization of Boolean Expression using Gates, K-Maps, Simplification of Boolean Expression using K-Maps.	9
Unit-II Combinational Logic Circuits: Half Adder & Half Subtractor, Full Adder & Full Subtractor, Parallel Binary Adder, Binary Adder/Subtractor. Combinational Logic Circuits: Multiplexers & Demultiplexers, Implementation of Boolean equations using Multiplexer and Demultiplexer, Encoders & Decoders	8
Unit-III Sequential Logic Circuits: Latch, Flip Flops- R-S Flip-Flop, J-K Flip-Flop, Race Around Condition, Removing Race Around Condition, Master-Slave JK Flip-Flop, D Flip-Flop, T Flip-Flop, Applications of Flip-Flops.	8
Unit-IV Introduction to Computer Organization: Introduction to Computer and CPU (Computer Organization, Computer Design and Computer Architecture), Stored Program Concept- Von Neumann Architecture, Harvard Architecture, RISC and CISC Architecture. Register Transfer and Microoperations: Introduction to Registers, Instruction Format, Types of Instructions- Memory Reference Instructions, Register Reference Instructions and Input-Output Instructions. Common Bus System: Introduction to Common Bus System, Types of Buses (Data Bus, Control Bus, Address Bus), 16-bit Common Bus System-- Data Movement among registers using Bus.	8

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TextBooks:

1. ComputerSystemArchitecture,M.M.Mano, ThirdEdition,PHI.
2. DigitalComputerElectronics,Malvino,SecondEdition,Mc-GrawHill.
3. ModernDigitalElectronics, R.P.Jain,Fourth Edition,TMH.

ReferenceBooks:

1. ComputerOrganizationandArchitecture,Stallings,EighthEdition, PHI.
2. ComputerOrganizationandArchitecture,J.P.Hayes,ThirdEdition,TMH.
3. DigitalandElectronicCircuits,T.C.Bartee,McGrawHill.

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B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode:**BVDW204-19**

CourseName:**Mathematics**

Program: B.Voc.	L:3 T: 0 P: 0
Branch: Data&WebAnalytics	Credits: 3
Semester: 2 nd	Contacthours: 33
Theory/Laboratory: Theory	Status(Elective/Core): Core
Internalmax.marks: 40	Externalmax.marks: 60
Totalmarks: 100	

CourseOutcomes:

CO#	Courseoutcomes
CO1	Representdatausingvariousmathematicalnotions.
CO2	Explainedifferenttermsused inbasic mathematics.
CO3	Describevariousoperationsandformulas usedtosolvemathematicalproblems.

DetailedContents	Contacthours
Unit-I SetIntroduction,Objectives,RepresentationofSets(RosterMethod,SetBuilderMethod),TypesofSets(NullSet,SingletonSet,FiniteSet,InfiniteSet,Equal Set, Equivalent Set, Disjoint Set, Subset, Proper Subset, Power Set,UniversalSet)andOperationwithSets(UnionofSet,IntersectionofSet, Difference of Set, Symmetric Difference of Set) Universal Sets, Complementof aSet.	9
Unit-II LogicStatement,Connectives,BasicLogicOperations(Conjunction,Disjunction, Negation)LogicalEquivalence/EquivalentStatements,Tautologiesand Contradictions.	8
Unit-III MatricesIntroduction,TypesofMatrix(RowMatrix,ColumnMatrix,Rectangular Matrix,SquareMatrix,DiagonalMatrix,ScalarMatrix,UnitMatrix,NullMatrix,ComparableMatrix,EqualMatrix),ScalarMultiplication, NegativeofMatrix,AdditionofMatrix,DifferenceoftwoMatrix,Multiplicationof Matrices, Transpose of aMatrix.	11
Unit-IV Progressions Introduction, Arithmetic Progression, Sum of Finite number ofquantitiesinA.P,ArithmeticMeans,GeometricProgression,GeometricMean.	11

TextBooks:

1. DiscreteMathematicsandIts ApplicationsbyKennethH. Rosen,McGrawHill, 6thEdition.
2. CollegeMathematics,Schaum'sSeries,TMH.

ReferenceBooks:

1. ElementaryMathematics,Dr.RDSharma.
2. ComprehensiveMathematics,Parmanand Gupta.
3. ElementsofMathematics,MLBhargava.

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B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode: **BVDW205-19**

CourseName:**DatabaseManagementSystemsLaboratory**

Program: B.Voc	L: 0 T: 0 P:3
Branch: Data&WebAnalytics	Credits: 1.5
Semester: 2nd	
Theory/Laboratory: Laboratory	Percentageofnumerical/designproblems:-
Internalmax.marks: 30	Durationofend semester exam(ESE):-
Externalmax.marks: 20	Status(Elective/Core): Core
Totalmarks: 50	

CourseOutcomes:

CO#	Courseoutcomes
CO1	Abletounderstand variousqueriesand their execution
CO2	Populateand queryadatabaseusingSQLDML/DDL commands.
CO3	Declareandenforceintegrityconstraintsonadatabase
CO4	ProgrammingPL/SQLincludingstoredprocedures,storedfunctions,cursors,packages
CO5	Abletodesignnewdatabaseandmodifyexistingonesfornewapplicationsandreasonaboutthe efficiency of theresult

Task1:	UsedofCREATE,ALTER,RENAME,DROP,INSERTINTO,DELETEandUPDATE statementinthedatabasetables(relations)
Task2:	Useofsimpleselectstatement,selectqueryontworelations,nestingofqueries,aggregatefunctions,substring comparison & order by statement
Task3:	WriteaPL/SQLcodetoaddtwonumbersanddisplaytheresult.Readthenumbersduringruntime.
Task4:	WriteaPL/SQLcodetofind sum of first10 natural numbers usingwhileand for loop.
Task5:	Writeaprogramto createatriggerwhichwill convertthename ofastudentto upper casebeforeinserting or updating the name column of student table.
Task6:	WriteaPL/SQLblock toincreasethesalary ofalldoctorsby 1000.
Task7:	WriteaPL/SQLcodetomultiply twonumbers usingprocedureinsidethe block.
Task8:	Design database for Student Management System for your college using E-R model andNormalization.
Task9:	DesignandDevelopConceptualDataModel(E-RDiagram)forLibraryManagementSystemwithallthenecessaryentities,attributes,constraintsandrelationships.Designand buildRelationalDataModelforapplicationspecifyingallpossibleconstraints.

RecommendedHardware&Software:

Intel Core i-3 / i-5 / i-7 processor with a speed of minimum 2 GHz, RAM 2 GB or higher, HDD200 GB or higher, LED / LCD screen and Oracle/ Microsoft SQL Server/ MySQL/ MicrosoftAccess.

TextBooks:

1. SQL,PL/SQLProgrammingLanguageof Oracle by4th RevisedEdition,IvanBayross.
2. OraclePL/SQLProgrammingby5th Edition,StevenFeuerstein andBillPribyl.

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B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode: **BVDW206-19**

CourseName: **InternetToolsandApplicationLab**

Program: B.Voc.	L: 0 T: 0 P:3
Branch: Data&WebAnalytics	Credits: 1.5
Semester: 2nd	Percentageofnumerical/designproblems:-
Theory/Laboratory: Laboratory	Durationofend semester exam(ESE):-
Internalmax.marks: 30	Externalmax.marks: 20
Totalmarks: 50	Status(Elective/Core): Core

CourseOutcomes: Studentswillbeableto

CO#	Course outcomes
CO1	UnderstandbasicconceptsofInternet.
CO2	Designawebpage.
CO3	UnderstandvariousapplicationsofInternet.

Instructions:

1	CreateawebpagetoshowthestructureofHTML
2	ShowtheuseofformattingtagsinHTML
3	Write HTML code to show the use of absolute and relative URL with AnchorTag
4	Createatableinwhichcolspanandrowspanelementsareused.
5	CreateawebpagetoshowtheuseofdifferenlistsavailableinHTML
6	CreateawebpagetoshowtheuseofframetaginHTML.
7	CreateawebpagetoshowtheuseofdifferentytypesofCSS
8	Createadmissionformforacollege
9	Showtheuseofimagnetagandshowimagesasbuttons
10	Createawebpagetoshowtheuseofimagemaps.

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1. Corner, Internet working with TCP-IP: Principles, Protocols and Architecture, PHI.
2. Stephan Mack, Janan Platt, HTML4.0 No Experience Required, BPB Publication.
3. Rick Darnell et al, HTML4 Unleashed, Techmedia Publications.

Course Name: Mathematics

Program: B.Voc.	L: 3 T: 1 P: 0
Branch: Data&WebAnalytics	Credits: 4
Semester: 1st	Contact hours: 44 hours
Internal max. marks: 40	Theory/Practical: Theory
External max. marks: 60	Duration of end semester exam (ESE): 3hrs
Total marks: 100	Elective status: core/elective: Core

Prerequisite: Student must have the knowledge of Basic Mathematics.

Co requisite: NA.

Additional material required in ESE: Minimum two exercises of each concept will be recorded in the file and the file will be submitted in End Semester Examinations.

Course Outcomes: After studying this course, students will be able to:

CO#	Course Outcomes
CO1	Represent data using various mathematical notions.
CO2	Explain different terms used in basic mathematics.
CO3	Describe various operations and formulas used to solve mathematical problems.

Detailed contents	Contact hours
<u>Unit-I</u> Set Introduction, Objectives, Representation of Sets (Roster Method, Set Builder Method), Types of Sets (Null Set, Singleton Set, Finite Set, Infinite Set, Equal Set, Equivalent Set, Disjoint Set, Subset, Proper Subset, Power Set, Universal Set) and Operation with Sets (Union of Set, Intersection of Set, Difference of Set, Symmetric Difference of Set) Universal Sets, Complement of a Set.	12 hours
<u>Unit-II</u> Logic Statement, Connectives, Basic Logic Operations (Conjunction, Disjunction, Negation) Logical Equivalence/Equivalent Statements, Tautologies and Contradictions.	10 hours

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Text Books:

Unit -III

Matrices Introduction, Types of Matrix (Row Matrix, Column Matrix, Rectangular Matrix, Square Matrix, Diagonal Matrix, Scalar Matrix, Unit Matrix, Null Matrix, Comparable Matrix, Equal Matrix), Scalar Multiplication, Negative of Matrix, Addition of Matrix, Difference of two Matrix, Multiplication of Matrices, Transpose of a Matrix.

12 hours

Unit-IV

Progressions Introduction, Arithmetic Progression, Sum of Finite number of quantities in A.P, Arithmetic Means, Geometric Progression, Geometric Mean.

10 hours

Text Books:

1. Discrete Mathematics and Its Applications by Kenneth H. Rosen, Mc Graw Hill, 6th Edition.
2. College Mathematics, Schaum's Series, TMH.

Reference Books:

1. Elementary Mathematics, Dr. RD Sharma
2. Comprehensive Mathematics, Parmanand Gupta
3. Elements of Mathematics, ML Bhargava

E Books/ Online learning material

1. www.see.leeds.ac.uk/geo-maths/basic_maths.pdf
2. www.britannica.com/science/matrix-mathematics
3. www.pdfdrive.com/schaums-outline-of-discrete-mathematics-third-edition-schaums-e6841453.html

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B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode:**BVDW-301-21**

CourseName:**Programming with Python**

Program: B. Voc.	L:3 T:0P:0
Branch: Data&WebAnalytics	Credits:3
Semester:3 rd	Contacthours: 33
Theory/Laboratory: Theory	Status(Elective/Core): Core
Internalmax.marks: 40	Externalmax.marks: 60
Totalmarks: 100	

CourseOutcomes:

CO#	Courseoutcomes
CO1	Explainenvironment,datatypes,operatorsusedinPython.
CO2	ComparePythonwithotherprogramminglanguages
CO3	Outlinetheuseofcontrolstructuresandnumerousnatedatatypeswiththeirmethods.
CO4	Designuserdefinedfunctions, modules,files,andpackagesandexceptionhandlingmethods.
CO5	WritesolutionsforObjectOrientedProgrammingConcepts.

Detailedcontents	Contact hours
Unit-I Introduction to Python Programming Language: Programming Language, History andOrigin of Python Language, Features of Python, Limitations, Major Applications ofPython, Getting, Installing Python, Setting up Path and Environment Variables, RunningPython, First Python Program, Python Interactive Help Feature, Python differences fromother languages. PythonDataTypes& Input/Output: Keywords,Identifiers,PythonStatement,Indentation,Documentation,Variables,MultipleAssi gnment, Understanding Data Type, Data Type Conversion, Python Input and OutputFunctions,Importcommand.[CO1, CO2]	9
Unit-II ControlStructures: Decisionmakingstatements,Pythonloops,Pythoncontrolstatements.PythonNat ive Data Types: Numbers,Lists,Tuples,Sets,Dictionary,Functions&MethodsofDictionary,Strings (indetailwiththeirmethodsandoperations). [CO3]	8
Unit-III PythonFunctions: Functions, Advantages of Functions, Built-in Functions, User defined functions,Anonymous functions, Pass by value Vs. Pass by Reference, Recursion, Scope andLifetimeof Variables. PythonModules: Module definition, Need of modules, Creating a module, Importing module, PathSearchingofaModule,ModuleReloading, StandardModules,PythonPackages.CO4, CO5]	9
Unit-IV ExceptionHandling: Exceptions,Built- inexceptions,Exceptionhandling,UserdefinedexceptionsinPython.FileManagementin Python: Operations on files (opening, modes, attributes, encoding, closing), read() & write()methods,tell()&seek()methods,renaming&deletingfilesin Python,directoriesin	7

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Text Books [CO4, CO5]

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1. ProgramminginPython,PoojaSharma,BPBPublications,2017.
2. CorePythonProgramming,R.NageswaraRao,2ndEdition,Dreamtech.

ReferenceBooks:

1. Python,ThecompleteReference,MartinC.Brown,McGraw HillEducation.
 2. 2.Pythonin aNutshell, A.Martelli, A.Ravenscroft, S.Holden, OREILLY.
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B.Voc. (Data & Web Analytics), Batch-2021

Text Book Code: BVDW302-21

Course Name: Introduction to Big Data

Program: B.Voc.	L: 3 T: 0 P: 0
Branch: Data & Web Analytics	Credits: 3
Semester: 3rd	Contact hours: 33
Theory/Laboratory: Theory	Status (Elective/Core): Core
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO#	Course outcomes
CO1	Discuss the need of handling Big Data
CO2	Set Environment for Big Data Handling
CO3	Explain the role of Hadoop and its components
CO4	Write basic Big Data Applications.

Detailed Contents	Contact hours
Unit I Getting an Overview of Big Data: What is Big Data? History of Data Management – Evolution of Big Data, Structuring Big Data, Elements of Big Data, Big Data Analytics, Careers in Big Data, Future of Big Data. [CO1] Exploring the Use of Big Data in Business Context: Use of Big Data in Social Networking, Use of Big Data in Preventing Fraudulent Activities, Use of Big Data in Detecting Fraudulent Activities in Insurance Sector, Use of Big Data in Retail Industry. [CO2] Understanding Hadoop Ecosystem: Hadoop Ecosystem, Hadoop Distributed File System, MapReduce, Hadoop YARN, Introducing HBase, Combining HBase and HDFS, Hive, [CO3]	9
UNIT-II Overview of HDFS. Architecture of HDFS, Advantages and disadvantages of HDFS, HDFS Daemons, HDFS Blocks, HDFS file write and read, NameNode as SPOF, Hadoop HA, heartbeats, block reports and re-replication, Safe mode of Namenode, Hadoop fs commands: cat, ls, put, get, rm, df, count, fsck, balancer, mkdir, du, copy from local, copy to local. [CO3]	8
UNIT-III Hadoop fs commands: expunge, chmod, chown, chgrp, setrep, stat. Hadoop dfsadmin commands. Introduction to Apache Pig, Need of Pig, Installation of Pig, Execution modes of Pig, Pig – Architecture, Grunt shell and basic utility commands, Data types and Operators in Pig, Analysing data stored in HDFS using Pig, Pig operators for Data analysis: Dump, Describe, Explain, Illustration, Store. [CO4]	8
UNIT- IV Group, cogroup, join, split, filter, distinct, foreach, orderby, limit operators. Functions in Pig: Eval functions, Load and store functions, Bag and tuple functions, String functions, Date time functions, Math functions, Case Studies: Analyzing various datasets with Pig. [CO4]	8

Reference Books:

1. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics, "Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley.

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2. Big-DataBlackBook,DTEditorialServices,WileyIndia

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3. MassiveOnlineOpenCourses(MOOCs):BigDataUniversity,UdacityandCoursera.
4. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of PolyglotPersistence",Addison-Wesley Professional, 2012.
5. TomWhite,"Hadoop: TheDefinitiveGuide",ThirdEdition,O'Reilley,2012.
6. EricSammer,"HadoopOperations",O'Reilley,2012".

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CourseCode: **BVDW303-21**

CourseName: **ComputerFundamentals**

Program: B.Voc.	L:3 T: 0 P:0
Branch: Data&WebAnalytics	Credits:3
Semester:3 rd	Contact hours: 33hours
Theory/Practical: Theory	Electivestatus:core/elective: Core
Internalmax.marks:40	Externalmax.marks: 60
Totalmarks: 100	

Prerequisite: InformationTechnology

Corequisite: -NA-

Additional material required in ESE: -NA-

CourseOutcomes: Studentswillbeable to

CO#	CourseOutcomes
CO1	ExplainimportanceofoperatingSystemincomputerscience.
CO2	Describedifferenttypes ofOperatingSystemanditsservices.
CO3	Buildanunderstanding ofthefundamentalconceptsofcomputernetworking.
CO4	Definebasicdata structureconcepts.

DetailedContents	Contact hours
Unit–I:OperatingSystem-I FundamentalsofOperatingsystem: Functionsofanoperatingsystem;Evolutionandtypesofoperatingsystems;Operatingssystemasaresourcemanager;Structureofoperatingsystem(Role ofkernel andShell). Process & Management: Program vs. Process; State transition diagram; CPUScheduling - Need of CPU scheduling, Different scheduling criteria's, schedulingalgorithms(FCFS, SJF, Round-Robin). [CO1]	9
Unit–II:OperatingSystem-II AdvancedOperatingsystems: IntroductiontoDistributedOperatingsystem,MultiprocessorOperating systemandReal TimeOperatingSystem. CasestudyofLinux, Window. [CO2]	9
Unit–III:ComputerNetworks Networks: Types- LAN, MAN and WAN; Topologies: Bus, Star, Ring, Mesh,Tree,Hybrid Network Reference Models: OSI Reference Model – Services, design issues &applications; TCP/IP Reference Model,Comparison of OSI and TCP/IP ReferenceModels. CommunicationChannels: Differenttypesoftransmissionmedia.[CO3]	7
Unit–IV:DataStructures Introductionto Data Structures: Classification of Data, Analysis and ComplexityofAlgorithm.Introductiontodifferenttypesofdatastructures.(array,linkedlist,stack,queue,treeandgraph).	8

SearchingandSorting: Searching:Linearandbinarysearch.Sorting:bubblesort,selecti onsort. [CO4]	
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RecommendedBooks:

1. Abraham Silberschatz and Peter Baer Galvin, Operating System Principles,SeventhEdition,Published byWiley-India.
2. Tanenbaum,Andrew,ComputerNetworks,,Fifth Edition,PHI.
3. Horowitz&Sawhaney: Fundamentals ofDataStructures,GalgotiaPublishers.
4. AhoAlfredV.,HopperofJohnE.,UllmanJeffreyD.,“DataStructuresandAlgorithms”,AddisonWesley
5. S.K.Basandra,ComputerToday,Galgotia.

Referencebooks :

1. Naresh Chauhan, Principals of Operating System, Published by OXFORD UniversityPress,India.
2. BehrouzA. Forouzan,DataCommunicationandNetworking,FourthEdition.
3. Stalling.DataandComputerCommunications,,NinthEdition,PHI.
4. KruseR.L.Data StructuresandProgram Designin C;PHI
5. YashwantKanetkar,UnderstandingPointersinC,BPBPublishations.
6. Horowitz, S. Sahni, and S. Rajasekaran, Computer Algorithms, Galgotia Pub. Pvt.Ltd., 1998.

IKGujralPunjabTechnicalUniversityJalandhar
B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode: **BVDW304-21**

CourseName: **AdvancedHTML & Java Script**

Program: B.Voc.	L: 3 T: 0 P: 0
Branch: Data&WebAnalytics	Credits: 3
Semester: 3rd	Contacthours: 33
Theory/Laboratory: Theory	Status(Elective/Core): Core
Internalmax.marks: 40	Externalmax.marks: 60
Totalmarks: 100	

CourseOutcomes:

CO#	Courseoutcomes
CO1	Organizedataonweb pages.
CO2	Create multiple sections or frames on a web pages
CO3	Design forms with special controls using HTML
CO4	Outline the key web designing concepts using javascript

DetailedContents	Contacthours
Unit-I: Lists inHTML Type of Lists (Unordered List (Bullets), Ordered Lists (Numbering), Definition Lists. Tables inHTML Introduction (Header, Data rows, The Caption Tag), Using the Width and Border Attribute, Using the Cellpadding Attribute, Using the Cellspacing Attribute, Using the BGCOLOR Attribute, Using the COLSPAN and ROWSPAN Attributes. [CO1]	9
Unit-II Linking Documents inHTML Links (External Document References, Internal Document References), Image As Hyper links. Frames inHTML Introduction to Frames: The tag, The tag, Targeting Named Frames. DHTML: Cascading Style Sheets, Style Tag. [CO2]	8
Unit-III Forms Used by a Web Site The Form Object, The Form Object's Methods (The Text Element, The Password Element, The Button Element, The Submit (Button) Element, The Reset (Button) Element, The Checkbox Element, The Radio Element, The Text Area Element, The Select and Option Element, The Multi Choice Select Lists Element). [CO3]	8
Unit IV Introduction to JavaScript JS Introduction, Where To, Output, Statements, Syntax, Comments, Variables, Operators, Arithmetic, Assignment, Data Types, Functions, Objects, Events, Strings, String Methods, Numbers, Number Methods, Arrays, Array Methods, Array Sort, Array Iteration, Dates, Date Formats, Date Get Methods, Date Set Methods, Math, Random, Booleans, Comparisons, Conditions, Switch, Loop For, Loop While, Break, Type Conversion, Bitwise, RegExp, Errors, Scope, Hoisting, Strict Mode. [CO4]	8

TextBooks:

1. Internet for Every One: Alexis Leon, 1st Edition, Leon Techworld, Publication, 2009.
2. Greenlaw R; Heppe, "Fundamentals of Internet and WWW", 2nd Edition, Tata McGraw-Hill, 2007.
3. Raj Kamal, "Internet & Web Technologies", edition Tata McGraw-Hill Education. 2009.

IKGujralPunjabTechnicalUniversityJalandhar
B.Voc. (Data&WebAnalytics), Batch-2021

CourseName:**Programmingwith Python Laboratory**

Program: B.Voc	L: 0 T: 0 P:3
Branch: Data&WebAnalytics	Credits: 1.5
Semester: 3rd	
Theory/Laboratory: Laboratory	Percentageofnumerical/designproblems:-
Internalmax.marks: 30	Durationofend semester exam(ESE):-
Externalmax.marks: 20	Status(Elective/Core): Core
Totalmarks: 50	

CourseOutcomes:

CO#	Courseoutcomes
CO1	OutlinevariousprogrammingconstructslikedatatypesandcontrolstructuresofPython.
CO2	Implementdifferentdatastructures
CO3	Implementmodulesandfunctions.
CO4	Illustrateconceptofobjectorientedprogramming.
CO5	Implementfilehandling.

Task1:	Compute sum, subtraction, multiplication, division and exponent of given variables input by theuser
Task2:	Computeareaoffollowingshapes:circle,rectangle,triangle,square,trapezoidandparallelogram
Task3:	Computevolumeoffollowing3Dshapes: cube,cylinder,coneandsphere
Task4:	Computeandprintrootsofquadratic equation $ax^2+bx+c=0$,wherethevaluesofa,b, andcare input bythe user.
Task5:	Print numbers upto Nwhich arenotdivisible by 3,6,9,, e.g., 1,2, 4, 5,7,....
Task6:	Writeaprogramtodeterminewhetheratriangleisisoscelesornot?
Task7:	Printmultiplicationtableofanumberinput bytheuser.
Task8:	Computesum of naturalnumbersfromonetonnumber.
Task9:	Print Fibonacciseries upton numbers e.g.0 1 1 23 58 13.....n
Task11:	Compute factorial ofagivennumber
Task12:	DesignaPythonclassnamedCircleconstructedbyaradiusandtwomethodswhichwillcomputetheareaandtheperimeterof a circle.
Task13:	DesignaPythonclass toreverseastring‘wordbyword’
Task14:	Construct aPythonprogram towriteandappendtexttofile anddisplaythetext
Task15:	DesignaPython programtoreadfirstnlinesof atextfile.

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B.Voc. (Data&WebAnalytics), Batch-2021

Text Books: BVDW305-21

Core Books:

1. ProgramminginPython,PoojaSharma,BPBPublications, 2017.
2. CorePythonProgramming,R.NageswaraRao,2ndEdiiton,Dreamtech.

ReferenceBooks:

1. Python,ThecompleteReference,MartinC.Brown,McGrawHill Education.
2. PythoninaNutshell,A.Martelli,A.Ravenscroft,S.Holden,OREILLY.

IKGujralPunjabTechnicalUniversityJalandhar**B.Voc. (Data&WebAnalytics), Batch-2021**CourseCode: **BVDW306-21**CourseName:**AdvancedHTML&JavaScriptLaboratory**

Program: B.Voc	L: 0 T: 0 P:3
Branch: Data&WebAnalytics	Credits: 1.5
Semester: 3rd	
Theory/Laboratory: Laboratory	Percentageofnumerical/designproblems:-
Internalmax.marks: 30	Durationofend semester exam(ESE):-
Externalmax.marks: 20	Status(Elective/Core): Core
Totalmarks: 50	

CourseOutcomes:

CO#	Courseoutcomes
CO1	Designpageswith simpletag sin HTML
CO2	Createweb pageswith Audioand Videocontentinit
CO3	Illustratethemovementfrom onewebpagetoanother
CO4	Implementadvancedwebdesigningconceptsusingjavascript.
CO5	Executeasmall webbasedprojectforthebenefitofsociety

Task1:	CreateasimpleHTMLpagetodemonstratetheuseofdifferenttags
Task2:	Designindexpage ofa bookonwebdesigning.
Task3:	DisplayLetter Headofyourcollegeona webpage.
Task4:	CreateaHyperlinktomovearoundwithinasinglepageratherthantoloadanotherpage.
Task5:	DisplayletterusingdifferentTextformattingTags
Task6:	DesignTime Tableofyourdepartmentandhighlightsofmostimportant periods
Task7:	UseTablestoprovidelayout toyour webpage.
Task8:	EmbedAudioand Videointo your web page.
Task9:	Divideawebpageverticallyandhorizontallyanddisplaylogoofyourcollegeinleftpaneandlogoof universityin rightpane.
Task11:	Designfrontpageofhospitalwithdifferentstylesheets.
Task12:	Writeaprogramtcreatealloginform.Onsubmittingtheform,theusershouldgetnavigatedtoaprofile pageusingJavaScript.
Task13:	WriteacodetcreateaRegistrationForm.Onsubmittingtheform,theusershouldbeaskedtologinwith the newcredentials using JavaScript.
Task14:	WriteanHTMLcodetcreateyourInstitutewebsite/Departmentwebsite/Tutorialwebsiteforspecificsubject.Also useJava Script for validation

ReferenceBooks:

1. GreenlawR;HeppE, "Fundamentals of Internetandwww", 2ndEdition, Tata.McGraw-Hill, 2007.
2. ABeginner'sGuidetoHTML<http://www.Ncsa.Nine.Edit/General/Internet/www/a.html.prmter>.

IKGujralPunjabTechnicalUniversityJalandhar
B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode: **BVDW307-21**

CourseName:**Introduction to BigDataLaboratory**

Program: B.Voc	L: 0 T: 0 P:3
Branch: Data&WebAnalytics	Credits: 1.5
Semester: 4th	
Theory/Laboratory: Laboratory	Percentageofnumerical/designproblems:-
Internalmax.marks: 30	Durationofend semester exam(ESE):-
Externalmax.marks: 20	Status(Elective/Core): Core
Totalmarks: 50	

CourseOutcomes:

CO#	Courseoutcomes
CO1	SettingupenvironmentforhandlingBigData.
CO2	Workwithfilesanddirectories.
CO3	ImplementbasicapplicationsforBigData.

Task1:	Installationof Hadoop.
Task2:	Filemanagementtasksin Hadoop. • createdirectory • listcontentsofdirectory • uploadand downloadafileinHDFS • seecontentsofafile • copyafilefrom sourcetodestination • movefilefromsourcetodestination,etc.
Task3:	Installationofpig
Task4:	Exercisestoworkondifferent datatypesandoperatorsinpig.
Task5:	Exercisestoimplementdifferent functionsinpig.
Task6:	AnalyzingdatasetswithPig.

ReferenceBooks:

1. Michael Minelli, Michelle Chambers, and AmbigaDhiraj, "Big Data, Big Analytics, "Emerging BusinessIntelligenceand AnalyticTrendsfor Today's Businesses",Wiley.
2. Big-DataBlackBook,DTEditorialServices,WileyIndia
3. MassiveOnlineOpenCourses(MOOCs):BigDataUniversity,UdacityandCoursera.
4. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of PolyglotPersistence",Addison-Wesley Professional, 2012.
5. TomWhite,"Hadoop: The DefinitiveGuide",ThirdEdition,O'Reilley,2012.
6. EricSammer,"HadoopOperations",O'Reilley,2012".

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B.Voc. (Data&WebAnalytics), Batch-2021

CourseCode: BVDW401-21

CourseName:Data Warehouseand Mining

Program: B.VocWeb&DataAnalytics	L: 3 T: 1 P: 0
Branch: ComputerApplications	Credits: 4
Semester: 4 th	Contacthours: 44hours
Theory/Practical: Theory	Percentageofnumerical/designproblems: 20%
Internalmax.marks: 40	Durationofendsemesterexam (ESE): 3hrs
Externalmax.marks: 60	Electivestatus: Elective
Totalmarks: 100	

Prerequisite: -NA-

Corequisite:-NA-

AdditionalmaterialrequiredinESE: -NA-

CourseOutcomes:Aftercompletingthiscourse,studentswillbeableto:

CO#	Courseoutcomes
CO1	Highlighttheneed ofDataWarehousing &Mining
CO2	DifferentiatebetweentheTransactionalandAnalyticaldatamodels.
CO3	Identifythereallifeapplicationswheredata miningcanbe applied.
CO4	Applydifferent datamining algorithmson widerangeofdata sets.
CO5	Explaintheroleof visualizationindatarepresentationandanalysis.

DetailedContents	Contacthours
Unit-I Needforstrategicinformation,differencebetweenoperationalandInformationaldata stores(OLAP vs OLTP). Datawarehousedefinition,characteristics,Datawarehouseroleandstructure ,Datawarehousearchitecture,Approachestobuildadatawarehouse, Building a data warehouse, Metadata & its types, OLAPOperations,OLAP servers,[CO1]	11
Unit-II DataPre-processing:Need,DataSummarization,Methods.Denormalization,Multidimensional datamodel,Schemasformulti-dimensional data (Star schema, Snowflake Schema, Fact ConstellationSchema,Differencebetween different schemas. [CO2]	11
Unit-III DataMining:Definition,DataMiningprocess,Dataminingmethodology, Data mining tasks, Mining various Data types & issues.Attribute-Oriented Induction, Association rule mining, Frequent itemsetmining,TheApriori Algorithm, [CO3]	12
Unit-IV Overviewofclassification,Classificationprocess,Decisiointree,DecisionTree Induction,AttributeSelection Measures.[CO4]IntroductiontoClustering,Typesofclusters,Clusteringmethods,Datavisualization&itstools,Implementationofclassificationandclusteringalgorithmsusing WEKA (open Sourcetool).[CO5]	10

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B.Voc. (Data&WebAnalytics), Batch-2021

TextBooks:

1. DataWarehousing,Data Mining&Olap byBerson,TataMcgraw-Hill.
2. Han J., Kamber M. and Pei J., Data mining concepts and techniques, Morgan KaufmannPublishers(2011)3rd ed.
3. PudiV.,KrishanaP.R.,DataMining,Oxford Universitypress,(2009)1sted.
4. AdriaansP.,ZantingeD., Datamining,Pearsoneducationpress(1996),1sted.
5. PooniahP.,DataWarehousingFundamentals,WileyintersciencePublication,(2001),1sted.

CourseCode: BVDW402-21

CourseName:Data Analytics usingR

Program: B.VocWeb&DataAnalytics	L: 3 T: 1 P:0
Branch: ComputerApplications	Credits:4
Semester: 4 th	Contacthours: 44hours
Theory/Practical: Theory	Percentageofnumerical/designproblems: 20%
Internalmax.marks: 40	Durationofendsemesterexam (ESE): 3hrs
Externalmax.marks: 60	Electivestatus: Elective
Totalmarks: 100	

Prerequisite:Logicsofbasicprogrammingterminologies.

Corequisite:Simulationstudy.

Additional material required in ESE: -NA-

CourseOutcomes:

CO#	CourseOutcomes
CO1	IdentifythekeycomponentsofR programmingLanguage.
CO2	Definethe conceptofdataScience.
CO3	Differentiatebetweenvectorsandarrays.
CO4	Outlinetheusageofdata frames,lists, factors,tablesandRstructures.
CO5	Explaintheneed andutilization ofvariousvisualizationtools.

DetailedContents	Contacthours
Unit-I RProgrammingFundamentals: IntroductiontoR,InstallingR,Windows/Linux/Mac Installation, Setting up Path, Using Packages, andRunning R: Interactive Mode, Batch Mode, Getting Help, Startup and ShutDown.[CO1] Vectors: Scalars, Vectors, Arrays and Matrices, Declarations, Recycling,Common Vector Operations, Using all() and any(), Na and Null Values,Filtering,ifelse() Function.[CO3] MatricesandArrays: CreatingMatrices,GeneralMatrixOperations,Applying Functions to Matrix Rows and Columns, Adding & DeletingMatrixRowsandColumns,DifferenceBetweenMatrixandVector.[CO3]	11
Unit-II Lists: CreatingLists,GeneralListOperations,AccessingListComponentsandValues,ApplyingFunctionstoLists,RecursiveLists. DataFrames:	11

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CreatingDataFrames,MergingDataFrames,ApplyingFunctionstoDataFrames.[CO4] FactorsandTables:Introduction,CommonFunctionsusewithFactors,Workingwith Tables.[CO4] RProgrammingStructures:ControlStatements,ArithmeticandBooleanOperators, DefaultValuesforArguments,Return Values,Recursion.[CO4]	
Unit-III ObjectOrientedProgramming:ConceptofClasses,S3Classes,S4Classes,S3Versus S4 Classes, Managing Objects.[CO1] Input/Output: Accessing Keyboard and Monitor, Reading and WritingFiles,Accessing theInternet. String Manipulation: Overview of String Manipulation Functions [grep(),nchar(), paste(), sprintf(), substr(), strsplit(), regexpr(), gregexpr(), Regularexpression].[CO5]	12
Unit-IV Graphics:CreatingGraphs,CustomizingGraphs,SavingGraphstoFiles,Creating3D Plots. Debugging:Principles of Debugging,Use ofDebuggingTool,UsingRProgrammingDebugging Facilities.[CO3] Simulation:GeneratingRandomNumbers,SettingtheRandomNumberSeed,SimulatingaLinear Model, Random Sampling.[CO5]	10

TextBooks:

1. TheARTofRProgramming,NormanMatloff,NoStarchPress.
2. RProgrammingforData Science,RogerD.Peng,LeanPublishing.
3. RProgrammingforBeginners,S.Rakshit,TMH.

ReferenceBooks:

- 1.DataAnalyticsusingR, SeemaAcharya,TMH.

CourseCode:BVDW403-21

CourseName:DataStructures

Program: B.VocWeb& DataAnalytics	L: 3 T: 1 P:0
Branch: ComputerApplications	Credits: 4
Semester: 4 th	Contacthours: 44hours
Theory/Practical: Theory	Percentageofnumerical/design problems:--
Internalmax.marks: 40	Durationofendsemesterexam (ESE): 3hrs
Externalmax.marks: 60	Electivestatus: Core
Totalmarks: 100	

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Prerequisite: -NA-

Corequisite: -NA-

Additional material required in ESE: -NA-

CourseOutcomes: Students will be able to

CO#	Courseoutcomes
CO1	Apply appropriate constructs of Programming language, coding standards for application development
CO2	Select appropriate data structures for problem solving and programming
CO3	Illustrate the outcome of various operations on data structures.
CO4	Identify appropriate searching and/or sorting techniques for wider range of problems and data types.
CO5	Differentiate between various types of data structures

DetailedContents	Contacthours
Unit-I Introduction to Data Structures: Algorithms and Flowcharts, Complexity of Algorithm, Introduction and Definition of Data Structure, pointer, declaration and use of pointer, pointer arithmetic and dynamic allocation using pointer, structures/classes with pointers, Various types of Data Structure, operations on data structure. Arrays: Introduction to Arrays, insertion and deletion in One Dimensional Array and Two Dimensional Array.[CO1]	10
Unit-II Linked Lists Introduction, Representation of Linked Lists, Singly Linked List, Doubly Linked List, Circular Linked List, And Circular Doubly Linked List, Operations of Linked Lists.[CO2,5]	8
Unit-III Stacks and Queue Introduction to Stack, Definition, Stack Implementation, Operations of Stack, Introduction to Queue, Definition, Queue Implementation, Operations of Queue.[CO2,3,5]	14
Unit-IV Searching and Sorting: Searching, Types of Searching like linear and binary search, Sorting, Types of sorting like quick sort, bubble sort, merge sort, selection sort. [CO4]	12

TextBooks

1. Brijesh Bakariya. Data Structures and Algorithms Implementation through C, BPB Publications.
2. Kruse R.L. Data Structures and Program Design in C; PHI

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3. AhoAlfredV.,HopperofJohnE.,UllmanJeffreyD.,“DataStructuresandAlgorithms”,AddisonWesley

Referencebooks

1. Horowitz&Sawhaney:FundamentalsofDataStructures,GalgotiaPublishers.
2. YashwantKanetkar,UnderstandingPointersinC,BPBPublishations.
3. Horowitz,S.Sahni,and S. Rajasekaran,ComputerAlgorithms,Galgotia Pub.Pvt.Ltd.,1998.

Course Code: BVDW 404-

21CourseName:DigitalMarketing

Program: B.VocWeb& DataAnalytics	L: 3 T:1 P: 0
Branch: ComputerApplications	Credits:4
Semester: 4 th	Contacthours:44hours
Theory/Practical: Theory	Percentageofnumerical/designproblems:--
Internalmax.marks: 40	Durationofendsemesterexam (ESE):3hrs
Externalmax.marks: 60	Electivestatus: Elective
Totalmarks: 100	

Prerequisite: -NA-

Corequisite:-NA-

Additional material required in ESE: -NA-

CourseOutcomes:

CO#	Courseoutcomes
CO1	Highlightthekeyelements ofadigital marketingstrategy.
CO2	Choosetherightplatform fordigitalmarketing
CO3	Identifythemajordigitalmarketingchannels.
CO4	Designcontentfordigital marketing.
CO5	Developdigitalmarketingstrategyandplan.

DetailedContents	Contacthours
Unit-I IntroductiontoDigitalMarketing Difference between Traditional Marketing and Digital Marketing, Benefits ofusing Digital Media, Inbound andOutboundMarketing, Online marketingPOEM: (Paid, Owned, and Earned Media), Components of Online Marketing(Email, Forum, Social network, Banner, Blog), Impact of Online Marketing,Basics of Affiliate Marketing, Viral Marketing, Influencer Marketing, ReferralMarketing.[CO1] EmailMarketing: Emailnewsletters,Digests,DedicatedEmails,LeadNurturing, Sponsorship Emails and Transactional Emails, Drawbacks of EmailMarketing[CO1] Social Media Marketing (SMM): Different types of Social Media MarketinglikeFacebook, LinkedIn,Twitter, Video,Instagrametc.[CO1]	11
Unit-II SearchEngineOptimisation(SEO)	11

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About SEO, Need of an SEO friendly website, Importance of Internet and Search Engines; Role of Keywords in SEO.[CO2] On-Page Optimization (Onsite): Basics of Website Designing/Development; HTML Basics for SEO; Onsite Optimization Basics; Website Structure and Navigation Menu Optimization; SEO Content Writing. Keywords Research and Analysis (eg. SWOT analysis of website, finding appropriate keywords). OffPage Optimization: Introduction; Local marketing of websites depending on locations; Promoting Subsequent pages of the website. Introduction to organic SEO vs non-organic SEO; Social Media Optimization Techniques and PageRank Technology.[CO2]	
Unit-III Website Planning & Creation Content Marketing Strategy: Goals and concepts, Strategic building blocks, Content creation & channel distribution, Tools of the trade, Advantages and challenges. Keywords Research and Analysis: Introduction to Keyword Research; Business Analysis; Types of Keywords; Keywords Analysis Tools.[CO3] Web Presence: Online presence and driving more traffic for a website, Search result visibility in search engines for chosen keyword and phrases, Using e-mail marketing to drive traffic for a website, Posting social media content for lead generation, Tools to create and manage content, Use of Blogging as content strategy.[CO3] Creating content: Writing and posting content on the web and in social networks, blog and video; Create, manage and implement a content marketing strategy; Monitoring and recording results to improve content marketing campaigns; Successful content marketing strategies and case studies.[CO4]	12
Unit-IV Online Advertising, Mobile Marketing and Web analytics Introduction to Online Advertising and its advantages, Paid versus Organic, Pay Per Click (PPC) Model. Basic concepts Cost per Click (CPC), CPM, CTR, CR etc. About Mobile Marketing, Objectives of Mobile Advertising, Creating a Mobile Marketing Strategy, Introduction to SMS Marketing. About Web Analytics, Types of Web Analytics (On-site, Off-site), Importance of Web Analytics [CO5]	10

Text Books:

1. Puneet Singh Bhatia, Fundamental of Digital Marketing First Edition, Publication Pearson.
2. Vandana Ahuja, Digital Marketing 1st Edition, Publication Oxford
3. Shivani Karwal, "Digital Marketing Handbook: A Guide to search Engine Optimization, Pay Per Click Marketing, Email Marketing and Content Marketing", CreateSpace Independent Publishing Platform, 1st edition.

Reference Books:

1. Ian Dodson, The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted and Measurable Online Campaigns, Publication Wiley India Pvt Ltd.

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- Philip Kotler, Hermawan Kartajaya, Iwan Setiawan, Marketing 4.0: Moving from Traditional to Digital, Publication Wiley India Pvt Ltd.
- Venakataramana Rolla, "Digital Marketing Practice guide for SMB: SEO, SEM and SMM", CreateSpace Independent Publishing Platform, First edition.
- Engel, E., Spencer, S., Stricchiola, J., & Fishkin, R. (2012). The art of SEO. "O'Reilly Media, Inc."

EBooks/Online learning material:

- www.sakshat.ac.in
- <https://swayam.gov.in>
- <https://www.edx.org/course/online-marketing-strategies-curtin-x-mkt5x>
- <https://www.emarketinginstitute.org/free-courses/eMarketingInstitute>

Course Code: BVDW 405-21

Course Name: Data Analytics using R Laboratory

Program: B.Voc Web & Data Analytics	L: 0 T: 0 P: 4
Branch: Computer Applications	Credits: 2
Semester: 4 th	Contact hours: 4 hours per week
Theory/Practical: Practical	Percentage of numerical/design problems: --
Internal max. marks: 60	Duration of End Semester Exam (ESE): 3 hrs
External max. marks: 40	Elective Status: Elective
Total marks: 100	

Prerequisite: - Logics of basic programming terminologies.

Corequisite: - Simulation study.

Additional material required in ESE: - Record the *Simulation Results* on practical file.

Course Outcomes: Students will be able to

CO#	Course Outcomes
CO1	Write programs for arrays and matrices.
CO2	Execute data frames and lists.
CO3	Differentiate between arrays from vectors.
CO4	Implement factors in R
CO5	Execute minor projects using R.

Instructions: All programs are to be developed in R Programming Language.

1.	Design a program to take input from the user (name and age) and display the values through R Programming.
2.	Write a program to get the details of the objects in memory using R Programming.
3.	Create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91 using R Programming.
4.	Create a vector which contains 10 random integer values between -50 and +50 using R Programming.
5.	Demonstrate through a program to display the details of the objects in memory.
6.	Write an R program to get the first 10 Fibonacci numbers.
7.	Show all prime numbers up to a given number using R Programming.
8.	Design an R program to find the factors of a given number.
9.	Write an R program to find the maximum and the minimum value of a given vector.

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10.	Write a program to get the unique elements of a given string and unique numbers of vector.
11.	Convert a given matrix to a 1 dimensional array through R programming.
12.	Write an R program to create an array of two 3x3 matrices each with 3 rows and 3 columns from the given two vectors.
13.	Create a 3 dimensional array of 24 elements using dim() function.
14.	Write an R program to create an array using four given columns, three given rows and two given tables, also display the contents of the array.
15.	To convert a given matrix to 1 dimensional array design an R program.
16.	Write an R program to concatenate two given factors into a single factor.
17.	Write an R program to create a 3 dimensional array of 24 elements using the dim() function.
18.	Construct an R program to create an array of two 3x3 matrices each with 3 rows and 3 columns from the given two vectors. Print the second row of the second matrix of the array and the element in the 3rd row and 3rd column of the 1st matrix.
19.	Write an R program to create a data frame from four given vectors.
20.	Write a program to get the structure of a given data frame.
21.	Design an R program to get the statistical summary and nature of the data of a given data frame.
22.	Write an R program to extract a specific column from a data frame using column name.
23.	Design an R program to create a data frame from four given vectors.
24.	Demonstrate an R program to get the structure of a given data frame.
25.	Write an R program to get the statistical summary and nature of the data of a given data frame.
26.	Design an R program to extract a specific column from a data frame using column name.
27.	Demonstrate an R program to create a data frame from four given vectors.
28.	Write an R program to create a matrix taking a given vector of numbers as input. Display the matrix.
29.	Construct an R program to create a matrix taking a given vector of numbers as input and define the column and row names. Display the matrix.
30.	Write an R program to access the element at 3 rd column and 2 nd row, only the 3 rd row and only the 4 th column of a given matrix.
31.	Develop an R program to create a vector of a specified type and length. Create a vector of numeric, complex, logical and character types of length 6.
32.	Write an R program to add two vectors of integer type and length.
33.	Design an R program to append a value to a given empty vector
34.	Write an R program to multiply two vectors of integer type and length.
35.	Design an R program to create a list containing strings, numbers, vectors and logical values.
36.	Write an R program to list containing a vector, a matrix and a list and give names to the elements in the list.
37.	Demonstrate an R program to find the levels of a factor of a given vector.
38.	Write an R program to change the first level of a factor with another level of a given factor.
39.	Design an R program to create an ordered factor from data consisting of the names of months.
40.	Construct graphical output & display the results of any five tasks using a simulator.

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TextBooks:

1. TheARTofRProgramming, NormanMatloff, NoStarchPress.
2. RProgrammingforDataScience, Roger D.Peng, LeanPublishing.
3. RProgrammingforBeginners, S.Rakshit, TMH.

ReferenceBooks:

- 1.DataAnalyticsusingR, SeemaAcharya, TMH.

CourseCode:BVDW 406-21

CourseName:DataStructuresLaboratory

Program: B.VocWeb& DataAnalytics	L: 0 T: 0 P:4
Branch: ComputerApplications	Credits: 2
Semester: 4 th	Contacthours: 4hoursperweek
Theory/Practical: Practical	Percentageofnumerical/design problems:--
Internalmax.marks: 60	Durationofendsemesterexam (ESE): 3hrs
Externalmax.marks: 40	Electivestatus: Core
Totalmarks: 100	

Prerequisite: -NA-

Corequisite:-NA-

Additional material required in ESE: - NA-

CourseOutcomes: Student will beableto

CO#	Courseoutcomes
CO1	ImplementDynamicmemoryallocation.
CO2	CreatedifferentdatastructuresinC/ C++
CO3	Implementvariousoperationsofalldatastructures
CO4	Illustratetheoutcomeofvariousoperationswiththehelpofexamples.
CO5	Writeprogramstoimplementvarious types ofsearchingandsortingalgorithms

Instructions:ProgramsmaybedevelopedinC/C++/Python/Javalanguage.

Listofassignments:

1	Writeaprogramtoimplement pointers.
2	Writeaprogramto implementdynamicmemory allocationusingpointers.
3	Writeaprogramtocreateselfreferentialstructureusingpointers.
4	Programtoinsert,delete andtraversean elementfromanarray
5	Programtomergeonedimensionalarrays
6	Programforimplementingselectionsort.
7	Programforimplementinginsertion sort.
8	Programforimplementing bubblesort.
9	Programforimplementingmergesort.
10	ProgramforimplementingQueueusingarray.
11	Programtocreatelinked list
12	Programtoinsertand deleteinlinkedlist
13	Programtosearchin linkedlist.
14	Writeaprogramtoimplementlinearsearch.
15	Writeaprogramtoimplementbinarysearch.
16	Writeaprogram to find thesum of two 2-D arrays.
17	Writeaprogramto multiply2 2-Darrays.

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18	Writeaprogramto printthe diagonalelements of the2-Darray.
19	Writeaprogramtoimplementpushoperationin stack.
20	Writeaprogramtoimplementpopoperationusing stack.

ReferenceBooks:

1. BrijeshBakariya.DataStructuresandAlgorithmsImplementationthroughC,BPBPublishations.
2. AhoAlfredV.,HopperoftJohnE.,UllmanJeffreyD.,“DataStructuresandAlgorithms”,AddisonWesley
3. Horowitz&Sawhaney:FundamentalsofDataStructures,GalgotiaPublishers.

FifthS emester

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CourseCode:BVDW 501-21

CourseName:Probability andStatistics

Program: B.VocWeb&DataAnalytics	L: 3 T: 0 P:0
Branch: ComputerApplications	Credits:3
Semester: 5 th	Contacthours:3hours
Internalmax.marks: 40	Theory/Practical: Theory
Externalmax.marks: 60	Durationofendsemesterexam (ESE): 3hrs
Totalmarks: 100	Electivestatus: Core

Prerequisite:Studentsmusthavethebasic knowledgeofmathematicterms.

Corequisite:NA

AdditionalmaterialrequiredinESE:Minimumtwoexerciseseachconceptwillberecordedinthefileand the filewill besubmitted in End Semester Examinations.

CourseOutcomes:After studyingthis course,students willbeable to:

CO#	CourseOutcomes
CO1	Understandthescience ofstudying&analyzingnumbers
CO2	Defineprobability
CO3	Describevariousstatisticalformulas.
CO4	Computevariousstatisticalmeasures.

DetailedContents	Contacthours
UnitI Define probability, Random experiment, outcome, trial and event, Exhaustiveevents, favourable events, Independent events, sample space, definition ofprobability, addition theorem of probability, conditional probability,independentevents,Mutuallyandpairwiseindependentevents,multiplicationtheoremofprobabilityforindependentevents,Baye'stheorem.	8 hours
UnitII RandomVariable(Univariate):RandomVariable,Distributionfunction,discrete random variable, Probability mass function, Distribution function ofdiscrete random variable, Continuous random variable, Probability densityfunction.Distributionfunctionofcontinuousrandomvariable.Twodimensionalprobabilitymassfunction,Marginalprobabilityfunction,conditionalprobabilityfunction,Two dimensional distributionfunction,marginaldistributionfunction ,Jointdensityfunction,marginaldensity function.	8 hours
UnitIII Definestatistics,MeasuresofCentraltendency:IntroductiontoCentralTendency,PurposeandFunctionsofAverage,CharacteristicsofaGoodAverage, Types of Averages, Meaning of Arithmetic Mean, Calculation ofArithmeticMean,MeritandDemeritsofArithmeticMean,Meaningof Median,CalculationofMedian,MeritandDemeritsofMedian,Meaningof	8 hours

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Mode, Calculation of Mode, Merit and Demerits of Mode, Harmonic Mean-Properties-Merit and Demerits.	
Unit IV Measures of Dispersion: Meaning of Dispersion, Objectives of Dispersion, Properties of a good Measure of Dispersion, Methods of Measuring Dispersion, Range Introduction, Calculation of Range, Merit and Demerits of Range, Mean Deviation, Calculation of Mean Deviation, Merit and Demerits of Mean Deviation, Standard Deviation Meaning, Calculation of Standard Deviation, Merit and Demerits of Standard Deviation, Coefficient of Variation, Calculation of Coefficient Variance, Merit and Demerits of Coefficient of Variation.	9 hours

Text Books:

1. Statistics and Data Analysis, A. Abebe, J. Daniels, J. W. McKean, December 2000.
2. Statistics, Tmt. S. Ezhilarasi Thiru, 2005, Government of Tamil Nadu.
3. Introduction to Statistics, David M. Lane.
4. Weiss, N. A., Introductory Statistics. Addison Wesley, 1999.
5. Clarke, G. M. & Cooke, D., A Basic course in Statistics. Arnold, 1998.

Reference Books:

1. Banfield J. (1999), Rweb: Web-based Statistical Analysis, Journal of Statistical Software.
2. Bhattacharya, G. K. and Johnson, R. A. (1997), Statistical Concepts and Methods, New York, John Wiley & Sons.

E-Books/Online learning material

1. http://onlinestatbook.com/Online_Statistics_Education.pdf
2. <https://textbookcorp.tn.gov.in/Books/12/Std12-Stat-EM.pdf>
3. <https://3lihandam69.files.wordpress.com/2015/10/introductorystatistics.pdf>

Course Code: BVDW502-21

Course Name: Computer Networks

Program: B.Voc Web & Data Analytics	L: 3 T: 0 P: 0
Branch: Computer Applications	Credits: 3
Semester: 5 th	Contact hours: 33
Theory/Laboratory: Theory	Elective status: Core
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO#	Course outcomes
CO1	Familiar with the different Network Models.
CO2	Understand different protocols working at Medium Access Sub-layer.
CO3	Learn the concept of network routing through algorithms.
CO4	Learn and understand Internet protocols and network security.

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Detailedcontents	Contact hours
Unit1 : Data Communications Concepts: Digital and analog transmissions- Modem,parallel and serial, synchronous and asynchronous, Modes of communication:Simplex, half duplex, full duplex, Concept of multiplexing, De-multiplexing.Typesof Networks: LAN, MAN, WAN NetworkTopologies:Bus,Star, Ring,Mesh, Tree,Hybrid CommunicationChannels:Wiredtransmissions:Telephonelines,leasedlines,switchline,coaxialcables-baseband,broadband,optical fibertransmission.	9
Unit2 : TransmissionMedia:GuidedMedia(TwistedPairCable,CoaxialCable,FiberOptics Cable), Unguided Media (Radio Waves, Microwaves, Infrared)CommunicationDevices(Switches,Hub, Routers, gatewayetc) IntroductiontoSwitching:CircuitSwitchNetworks,DatagramSwitchNetworksNetworkModels.	8
Unit3 : IntroductiontoOSIModel–PhysicalLayer,Data LinkLayer,NetworkLayer,TransportLayer, SessionLayer, Presentation Layer TCP/IP (Layer Architecture) Data Link Layer, Internet Layer, Transport Layer,ApplicationLayer	8
Unit4 : MAC sub layer: 802.4Token Bus, IEEE 802.5 Token RingConceptofInternetworking.	8

TextBooks:

1. ComputerNetworks,Tanenbaum,Andrew,FifthEdition,PHI.
2. DataCommunicationandNetworking,BehrouzA.Forouzan,FourthEdition.
3. ComputerToday,S.K.Basandra, FirstEdition,Galgotia.

ReferenceBooks:

1. DataCommunicationSystem,Black,Ulysse,ThirdEdition,PHI.
2. DataandComputerCommunications,Stalling,NinthEdition,PHI.

CourseCode:BVDW503-21

CourseName: Programming withPHP

Program: B.Voc Web & DataAnalytics	L: 3 T: 0 P:0
Branch: ComputerApplications	Credits:3
Semester: 5 th	Contacthours:33hours
Theory/Practical: Theory	Percentageofnumerical/designproblems:80%
Internalmax.marks: 40	Durationofendsemesterexam (ESE): 3hrs
Externalmax.marks: 60	Electivestatus:Core
Totalmarks: 100	

Prerequisite: Students must havebasicknowledgeof any texteditor likenotepad++and Editplus etc.
Corequisite: StudentsmustknowthebackgroundofHTML,Front-End,Back-End&conceptofStructureQueryLanguage.

Additionalmaterialrequiredin ESE:

- Demonstration of the website of college/ specific department/specific cells etc. will be presentedbythe students during thefinal practical.

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- Developed Website/s must be made online by the student/s.
- Printout of the Main Page of the website must be arranged on Practical file during daily lab work and must be submitted in the final examinations.

Course Outcomes: After studying this course, students will be able to:

CO#	Course Outcomes
CO1	Outline the importance and benefit of PHP
CO2	Compare Client Side Script & Server Side Script.
CO3	Explain the use of control structures, data types used in PHP.
CO4	Implement database connectivity.
CO5	Develop Dynamic Website that can interact with different kinds of Database Languages.

Detailed contents	Contact hours
Unit-I Introduction to PHP Evolution of PHP & its comparison Interface to External systems, Hardware and Software requirements, PHP Scripting, Basic PHP Development, Working of PHP scripts, Basic PHP syntax, PHP datatypes. [CO1] Displaying type information: Testing for a specific datatype, Changing type with Set type, Operators, Variable manipulation, Dynamic variables and Variable scope. [CO1]	8
Unit-II Control Statements if() and elseif() condition Statement, The switch statement, Using the ? Operator, Using the while() Loop, The do while statement, Using the for() Loop. [CO3] Functions Function definition, Creation, Returning values, Library Functions, User-defined functions, Dynamic function, default arguments, Passing arguments to a function by value. [CO3] String Manipulation Formatting String for Presentation, Formatting String for Storage, Joining and Splitting String, Comparing String Array Anatomy of an Array, Creating index based and Associative array, Looping array using each() and foreach() loop. [CO2]	9
Unit-III Forms Working with Forms, Superglobal variables, Superglobal array, Importing user input, Accessing user input, Combine HTML and PHP code, Using hidden fields, Redirecting the user.	9

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WorkingwithFileandDirectories Understanding file & directory, Opening and closing a file, Coping,renaminganddeletingafile,Workingwithdirectories,FileUploading&Downloading. Generating Images with PHP: Basics computer Graphics,CreatingImage.	
Unit-IV DatabaseConnectivity withMySql Introduction to RDBMS, Connection with MySql Database, Performingbasic database operation (DML) (Insert, Delete, Update, Select).[CO4][CO5]	7

TextBooks:

1. [PHP:TheCompleteReference, “StevenHolzner”,TataMcGrawHill.](#)
2. [ProgrammingPHP,“KevinTetro”, O'Reilly.](#)
3. [RobinNixon,LearningPHP,MySQL,andJavaScript,Shroff/O'Reilly.](#)

E-Books/Onlinelearningmaterial:

1. https://www.tutorialspoint.com/php/php_tutorial.pdf
2. <https://www.w3schools.com/php/>
3. <https://education.fsu.edu/wp-content/uploads/2015/04/Learning-PHP-MySQL-JavaScript-and-CSS-2nd-Edition-1.pdf>

CourseCode:BVDW 504-21

CourseName:LinuxOperatingSystem

Program: B.Voc Web & DataAnalytics	L: 3 T: 0 P: 0
Branch: ComputerApplications	Credits: 3
Semester: 5 th	Contacthours: 3hours
Theory/Practical: Theory	Percentageofnumerical/designproblems: 60%
Internalmax.marks: 40	Durationofendsemesterexam (ESE): 3hrs
Externalmax.marks: 60	Electivestatus: Core
Totalmarks: 100	

Prerequisite:OperatingSystem

Corequisite:-NA-

AdditionalmaterialrequiredinESE: -NA-

CourseOutcomes:Aftercompletingthiscourse,studentswillbeableto:

CO#	Courseoutcomes
CO1	Discusstheevolution ofOpenSourceoperatingsystems.
CO2	Prepareenvironmentfor workingonopensource operatingsystemlikeLinux.
CO3	Performresource managementinLinux
CO4	Writescripts inLinux.
CO5	Executeuserlevelprivileges

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Detailedcontents	Contacthours
Unit-I IntroductiontoLinux HistoryofLinux&Unix,OverviewofLinuxOperatingSystem,structureofLinux Operating system,Installation. [CO1] Desktops(TheXwindowSystem,GNOME,KDE),desktopoperations.Diff erenttypesofeditors,vieditoranditscommand.	7
Unit-II ShellsandUtilities RoleofshellsintheLinuxenvironment,DifferenttypesofshellsinLinuxOperatin gsystem,Shellconfiguration:Shellinitialization&configuration directories & file, Aliases, Filename expansion, StandardInput/Output&Redirection,Pipes,ManagingJobs.[CO3] Shell Scripting: Differenttypesof statementsin shellscript,variables in shell,assignvaluesto shellvariables,Default shell variablesvalue,RulesforNamingvariables,DisplaythevalueofshellvariablesG ettingUserwritingsimple shellscripts toaccept inputfromthe useranddisplayamessageonscreen,Shellscriptstoimplementvariouscontrolsta tements.[CO4]	9
Unit-III FilesSystems&LinuxSoftware LinuxFiles,Filestructure,commandsfor managingfiles&directorieswithothercommonlyusedcommands,SoftwareMa nagement,OfficeandDatabaseApplications,GraphicsToolsandMultimedia,In ternet&Networkservices,Web,FTP&javaClients. [CO3]	9
Unit-IV LinuxAdministration Managingusers,SuperuserControl,SystemRunlevels,ManagingFileSystems,[CO3] KernelAdministration: Linuxkernelources,rebuildingkernel,installingkerne l,Virtualization,backupmanagement.[CO5]	8

TextBooks:

1. Linux:Thecomplete referencebyRichardPetersen,PublishedbyTataMcGraw-HillPublication.
2. LinuxinaNutshell:ADesktopQuickReference,6thEditionbyStephenFiggins,ArnoldRobbins,EllenSi
ever&Robert LovePublished byO'Reilly Media.
3. LinuxAdministration:ABeginner'sGuidebySteveShah&WaleSoyinka,PublishedbyMcGraw-
HillEducation
4. UnixShellProgrammingbyYashavantP. Kanetkar,PublishedbyBPBPublishers.

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CourseCode:BVDW 505-21

CourseName:ProgrammingwithPHPLaboratory

Program: B.Voc Web & DataAnalytics	L: 0 T: 0 P: 2
Branch: ComputerApplications	Credits: 1
Semester: 5 th	Contacthours: 2hours perweek
Theory/Practical: Practical	Percentageofnumerical/designproblems: 100
Internalmax.marks: 30	Durationofendsemesterexam (ESE):
Externalmax.marks: 20	Electivestatus: Core
Totalmarks: 50	

Prerequisite:Studentsmusthavetheknowledgeofeditors likeNotepad++ andEdit plusetc.

Corequisite:StudentsmustknowthebackgroundofMarkupLanguage,Front-End,Back-End&conceptofStructureQuery Language.

Additionalmaterialrequiredin ESE:

- Demonstration of the website of college/ specific department/specific cells etc. will be presentedbythe students during the final practical.
- Developed Website/smustbemadeonlinebythe student/s.
- Printouts of the MainPage of the website mustbearrangedonPracticalfile during dailylab workandmust be submitted in thefinal examinations.

CourseOutcomes:After studyingthis course,students willbeable to:

CO#	Courseoutcomes
CO1	Writescripts forbasicweb pagedesigns
CO2	Designtheworkflowof webpagewiththehelpof variouscontrol statements
CO3	Differentiatebetweenclientsideandserversidescripting
CO4	Illustratetheconceptof staticanddynamicwebsites
CO5	Implementthedatabaseconcepts inPHP

Instructions:Instructorcanincrease/decreasethe experimentsaspertherequirement.

1.	Takevaluesfromtheuser andcomputesum,subtraction,multiplication,divisionand exponent ofvalue ofthevariables.
2.	Writeaprogramtofindareaof followingshapes:circle,rectangle,triangle,square,trapezoid and parallelogram.
3.	Computeandprintrootsofquadratic equation.
4.	Writeaprogram todeterminewhetheratriangleis isosceles ornot?
5.	Printmultiplication tableof anumberinputby the user.
6.	Calculatesumofnatural numbersfromonetonnumber.
7.	PrintFibonacci seriesupto numbers e.g.0 1123 581321.....n
8.	Writeaprogramto find thefactorial ofany number.
9.	Determineprimenumberswithin aspecificrange.
10.	Writeaprogram tocompute, theAverageandGradeof studentsmarks.
11.	Computeaddition,subtractionandmultiplicationofamatrix.
12.	Counttotalnumberofvowelsinaword“Develop&Empower Individuals”.

13.	Determinewhetherastring ispalindromeornot?
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14.	DisplaywordafterSortinginalphabeticalorder.
15.	Checkwhetheranumber isinagivenrangeusingfunctions.
16.	Write a program accepts a string and calculates number of upper case lettersandlower caseletters available in that string.
17.	Designaprogram toreverseastringwordbyword.
18.	Writeaprogram tocreatealoginform. Onsubmittingthe form,the usershouldnavigateto profilepage.
19.	Designfrontpageofa collegeordepartmentusing graphicsmethod.
20.	Writeaprogramto uploadand downloadfiles.

ReferenceBooks:

1. [PHP:TheCompleteReference,“StevenHolzner”,January1,2007.TataMcGraw-Hill Education.](#)
2. [ProgrammingPHP,“KevinTetroi”,O'Reilly.](#)
3. [PublishedbyWileyPublishing,Inc.10475CrosspointBoulevardIndianapolis,IN46256](#)

E-Books/Onlinelearningmaterial:

1. <http://cs.petrus.ru/~musen/php/2013/Books/Beginning%20PHP%205.3%20by%20Matt%20Doyl e.pdf>
2. <https://www.w3schools.com/php/>

CourseCode:BVDW 506-21

CourseName:LinuxOperatingSystemLaboratory

Program: B.VocWeb& DataAnalytics	L: 0 T: 0 P:4
Branch: ComputerApplications	Credits:2
Semester: 5 th	Contacthours: 4hours perweek
Theory/Practical: Practical	Percentageofnumerical/designproblems: 100
Internalmax.marks: 30	Durationofendsemesterexam (ESE):
Externalmax.marks: 20	Electivestatus: Core
Totalmarks: 50	

Prerequisite:Operatingsystem

Corequisite:-NA-

Additional material required in ESE: -NA-

CourseOutcomes:

CO#	Courseoutcomes
CO1	Preparetheenvironmentforinstallationanduseof Linuxoperatingsystem
CO2	WriteShell Scripts
CO3	ImplementCprogramsusinggcccompiler
CO4	Impelmentvirtualization
CO5	Executecommands relatedtograntinfandrevokinguserpriviledges.

Instructions:

1	InstallationofLinuxOS.
2	Writingadvancedshellprograms
3	Installationandmanagementofprinters
4	Usinggcccompilertowritecprograms

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5	Configuringmailserver
6	ConfiguringFTPserver
7	Connectingtointernet
8	Implementingdifferentcommandstomanagefile system
9	Implementationofvirtualization
10	Becomingsuperuser and implementingconfigurationcommands
11	Implementingcommandstomanageusers

- Instructorcanselctthe commands,utilitiesandservicestobemanagedontheirown.

ReferenceBooks:

1. Linux:ThecompletereferencebyRichardPetersen,PublishedbyTataMcGraw- HillPublication.
2. LinuxinaNutshell:ADesktopQuickReference,6thEditionbyStephenFiggins,ArnoldRobbins,EllenSiever&Robert Love Published byO'Reilly Media.
3. UnixShellProgrammingbyYashavantP. Kanetkar,PublishedbyBPBPublishers.

CourseCode: **BVDW507-21**

CourseName:**ComputerNetworks Laboratory**

Program:B.VocWeb&DataAnalytics	L: 0 T: 0 P:2
Branch:ComputerApplications	Credits: 1
Semester:5 th	Percentageofnumerical/designproblems:-
Theory/Laboratory: Laboratory	Durationofend semester exam(ESE):-
Internalmax.marks: 30	Externalmax.marks: 20
Totalmarks: 50	Status(Elective/Core): Core

CourseOutcomes:

CO#	Courseoutcomes
CO1	Toexecute andevaluate networkadministrationcommandsanddemonstratetheiruseindifferent network scenarios.
CO2	Todemonstratetheinstallationandconfigurationofnetworksimulator.
CO3	Demonstrateandmeasuredifferentnetworkscenariosandtheirperformancebehavior.

Task1:	PreparingComputerNetworkCableusing ConnectorsandNetworkingtools
Task2:	LAN& WANConnectivity usingHub, Switchand Router
Task3:	InstallationofWindows andServer
Task4:	SharingPeripheralDevices.
Task5:	ConfigurationofNetworkConnectivity

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Task6:	TroubleshootingofComputerHardwareandNetwork
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RecommendedHardware:

Simple Network Components, Networking Components like Switch, Router, Hub, NIC, PC/Laptop, Router, Connectivity Networklab

TextBooks:

1. ComputerNetworks, Tanenbaum, Andrew, FifthEdition, PHI.
2. DataCommunicationandNetworking, Behrouz A. Forouzan, FourthEdition.
3. ComputerToday, S.K. Basandra, FirstEdition, Galgotia.

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CourseCode:BVDW601-21

CourseName:Advanced Web Technologies

Program: B. Voc. (Data &Web Analytics)	L: 3 T: 0 P: 0
Branch: ComputerApplications	Credits: 3
Semester: 6 th	Contacthours: 33hours
Theory/Practical: Theory	Percentageofnumerical/designproblems: 80%
Internalmax.marks: 40	Durationofendsemesterexam (ESE): 3hrs
Externalmax.marks: 60	Electivestatus: SkillEnhancement
Total marks: 100	

Prerequisite:-basicWebProgramming Co

requisite: -NA-

AdditionalmaterialrequiredinESE:-NA-

Course Outcomes: Students will be able to:

CO#	Course outcomes
CO1	Learntorepresentweb dataandXMLdocumenthandling.
CO2	UnderstandAJAXandrelevance.
CO3	AbletolearnhowtoperformbasicCRUDdatabaseoperationsinaDynamicWebsite.
CO4	Learnaboutwebservices andtheir development.

Detailedcontents	Contact hours
<u>PartA</u> PHP: Server-side web scripting, Installing PHP, Adding PHP to HTML, Syntax and Variables, Passing information between pages, Strings, Arrays and Array Functions, Numbers, Basic PHP errors/ problems. Advanced PHPand MySQL: PHP/MySQLFunctions,Displaying queries intables,IntroductiontoPHPOOPsconcepts,BuildingFormsfromqueries, String and Regular Expressions, Sessions, Cookies and HTTP, Type and Type Conversions, E-Mail Introduction to Web Services: Use of Web Services, Types of Web Services, Introduction to Content Management System CMS (Types, Usages, Benefits).	22 Hours

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PartB	22 Hours
XML: Introduction to XML, XML Basics, XML Syntax and Editors, documents, Elements, Attributes. Creating XML documents. Ajax: Introduction and Use of Ajax in Website. jQuery : Introduction, jQuery UI: Date picker, auto complete, tooltip, accordion, retrieving page content, manipulating page content, working with events. Introduction to Bootstrap : Components of Bootstrap Introduction to Node.js: Node Package Manager (NPM), Node.js Webserver – Server and Clients.	
React: Introduction to ReactJS, Environment Setup, JSX, Components, State, Props, Validating Props, Component API, Component Life Cycle, Forms, Events	

TextBooks:

1. Steven Holzner, "PHP: The Complete Reference", TATA McGraw Hill, 2015.
2. Roger S Pressman, David Lowe, "Web Engineering: A Practitioner's Approach", TMH.
3. W. Jason Gilmore, "Beginning PHP and MySQL: From Novice to Professional", Apress.
4. "Learning PHP, MySQL, JavaScript, CSS and HTML5", Robin Nixon, O'Reilly publication
5. Web Technologies, Black Book, dreamtech Press
6. Alex Young, "Node.js in Action", 2ed, Bradley Meck

ReferenceBooks:

1. Jesus Caspagnetto, "Professional PHP Programming", Wrox Publication.
2. P.J. Deitel & H.M. Deitel, "Internet and World Wide Web How to program", Pearson
3. Harwani, "Developing Web Applications in PHP and AJAX", McGraw Hill
4. Ralph Moseley and M.T. Savaliya, "Developing Web Applications", Wiley-India
5. HTML5, Black Book, Dreamtech Press

Course Code: BVDW606-21

Course Name: Advanced Web Technology Laboratory

Program: B. Voc. (Data & Web Analytics)	L: 0 T: 0 P: 2
Branch: Computer Applications	Credits: 1
Semester: 6 th	Contact hours: 2 hours per week
Theory/Practical: Practical	Percentage of numerical/design problems: 100%
Internal max. marks: 30	Duration of End Semester Exam (ESE):
External max. marks: 20	Elective status: Skill Enhancement
Total marks: 50	

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Course Outcomes: After studying this course, students will be able to:

CO#	Course Outcomes
CO1	Understand the advanced concepts of website development.
CO2	Provide skills to design and develop dynamic websites.
CO3	Work independently for database programming for web applications
CO4	Understand concepts of jQuery methods, AJAX, Bootstrap and REACT
CO5	Connect website with a Database Server and perform basic CRUD operations.
CO6	Develop market-ready website, to be used by clients.

Instructions: Instructor can increase/decrease the experiments as per the requirement.

Assignments: All the Practical Assignments need to be carried on specific applications. (Example: Inventory Management System, Bus/Airline/Railway Reservation System, Student Management System etc.)

Practice Programs with PHP	
1.	PHP Code to display today's date in dd-mm-yyyy format.
2.	PHP Code to check if number is prime or not.
3.	PHP Code to print first 10 Fibonacci Numbers.
4.	PHP Code to read data from txt file and display it in html table (the file contains info in format Name: Password: Email)
5.	PHP Script for login authentication. Design an HTML form which takes username and password from user and validate against stored username and password in file.
6.	PHP Script for storing and retrieving user information from MySQL table. • Design an HTML page which takes Name, Address, Email and Mobile No. From user (register.php) • Store this data in MySQL database/text file. • Next page display all user in html table using PHP (display.php)
7.	PHP Script for user authentication using PHP-MYSQL. Use session for storing username.
Implement the following with specific web applications	
8.	Create HTML page for chosen application that contains text box, submit/reset button. Write php program to display this information and also store into text file.
9.	Create XML documents for chosen application and validate using DTD and schema. Also render the content of XML document using XSL. Scenarios include • XML document must have attributes and elements so that they can be validated against DTD/Schema. • Check the data types of variables declared in XML document using Schema. • Display the details of data contained in XML document in a table using XSL.

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10.	Embed the JQuery features for the application chosen. Perform the Scenarios using JQUERY ready function • In login form, define username and password constraints and ensure that the credentials follow them. • In registration form, username must be of at least 6 characters. Password must be of at least 8 characters and follow password constraints. Password and confirm password fields must match with each other. E-mail id must be of the form "yourname@domain.com". Mobile number must be of 10 digits only and starting digit must be any number from 6-9 etc... • Use the get and post methods for server side communication.
11.	Modify the specific web application to use AJAX to show the result on the same page.
12.	Enhance functionality of the specific web applications using BOOTSTRAP
13.	Create a responsive Photo Gallery in BOOTSTRAP
14.	Suppose you have a list of Students having Student's Name, Roll Number, Marks in five subjects, Show this list in a responsive table in BOOTSTRAP
15.	Modify your answer for above question with PHP and MySQL database and Perform CRUD operations with AJAX
16.	Build a Password Strength Check App with JQuery. You can use AJAX for form validation and add an alert when the user enters a weak password.
17.	Build a Registration Form and Validate it with JQuery. Registration Form must have at least 10 elements.

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18.	DesignaSignIn,SignUpandForgotPasswordPagewithBOOTSTRAP.UsePHP andMYSQL to storeSignUp data in Database.
19.	CreateaStarRatingSystemin JQuery.
20.	Createasimple To-dolistApplicationwith REACT
21.	CreateaCalculatorwithREACT
22.	CreateaPhotoGallerywithREACT.Alsoimplementsearchoperation
23.	Howcan youcreateaPortfolio Appwith Node.js?
24.	CreateasimpleShoppingCartwithREACTandNode.js
25.	ModifyyourShippingCartwithJQuery,JSONandAJAX functionality.

ReferenceBooks:

1. RogerSPressman,DavidLowe,“WebEngineering:APractitioner'sApproach”,TMH.
2. StevenHolzner,“PHP:TheCompleteReference”, TATAMcGrawHill,2015.
3. W.JasonGilmore,“Beginning PHPandMySQL:FromNovicetoProfessional”, Apress.
4. LearningPHP,MySQL,JavaScript,CSSandHTML5,RobinNixon,O'Reillypublication

CO#	Course outcomes
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Program: B. Voc. (Data &Web Analytics)	L: 3 T: 1 P: 0
Branch: Computer Applications	Credits: 4
Semester: 6 th	Contact hours: 44 hours
Theory/Practical: Theory	Percentage of numerical/design problems: 20%
Internal max. marks: 40	Duration of end semester exam (ESE): 3hrs
External max. marks: 60	Elective status: Elective
Total marks: 100	

Course Code: BVDW602-21

Course Name: Business Intelligence

Prerequisite:

Co requisite: -NA-

Additional material required in ESE: -NA

Course Outcomes: After completing this course, students will be able to:

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CO1	Understand the fundamentals of business intelligence and link data mining with business intelligence
CO2	Apply various modeling techniques and business intelligence methods to various situations using data mining principles and techniques
CO3	Implement data analysis techniques to make better business decisions and demonstrate the impact of business reporting, information visualization, and dashboards

Detailed contents	Contact hours
Unit-I DECISION SUPPORT SYSTEMS AND BUSINESS INTELLIGENCE The Concept of Decision Support Systems – A Framework for Business Intelligence - Effective and timely decisions – A Work System View of Decision Support – The Major Tools and Techniques of Managerial Decision Support - 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	10
Unit-II BASICS OF DATA INTEGRATION ETL Concepts of data integration - need and advantages of using data integration - introduction to common data integration approaches - introduction to ETL - introduction to data quality, data profiling concepts and applications. Introduction to data and dimension modeling - multidimensional data model - ER Modeling vs. multi-dimensional modeling - concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema.	10
Unit-III Business intelligence applications & Classification: Marketing models: Relational marketing, Sales force management, Logistic and production models: Supply chain optimization, Optimization models for logistics planning, Revenue management systems. Data envelopment analysis: Efficiency measures, Efficient frontier, The CCR model, Identification of good operating practices. Classification: Classification: Classification problems, Evaluation of classification models, Bayesian methods, Logistic regression, Neural networks, Support vector machines.	12

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Unit-IV KNOWLEDGE MANAGEMENT AND KNOWLEDGE DELIVERY Introduction to Knowledge Management – Knowledge Management Activities – Approaches to Knowledge Management - Information Technology(IT) in Knowledge Management - 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	12
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Course Code: BVDW603-21
Course Name: Data Visualization

Program: B. Voc. (Data &Web Analytics)	L: 3 T: 1 P:
Branch: Computer Applications	Credits: 4
Semester: 6 th	Contacthours: 4hours per week
Theory/Practical: Theory	Percentage of numerical/design problems:--
Internal Max.marks: 40	Duration of end semester exam (ESE): 3hrs
External Max.marks: 60	Elective status: core
Total marks: 100	

Prerequisite: -NA

Co Requisite: -NA

Additional material required in ESE: -NA

Course Outcomes: Students will be able to:

CO#	Course Outcomes
CO1	Familiarize students with the basic and advanced techniques of information visualization and scientific visualization
CO2	To learn key techniques of the visualization process
CO3	A detailed view of visual perception, the visualized data and the actual visualization, interaction and distorting techniques

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Unit 1 Introduction of visual perception, visual representation of data, Gestalt principles, information overloads. Creating visual representations, visualization reference model, visual mapping, visual analytics, Design of visualization applications. [co1]
Unit 2 Classification of visualization systems, Interaction and visualization techniques misleading, Visualization of one, two and multi-dimensional data, text and text documents. [co2]
Unit 3 Visualization of volumetric data, vector fields, processes and simulations, Visualization of maps, geographic information, GIS systems, collaborative visualizations, Evaluating visualizations. [co2]
Unit 4 Recent trends in various perception techniques, various visualization techniques, data structures used in data visualization. TOOLS: Programming Statistical Data Visualization, Google Map API, Google Chart, Tableau - Heat Map Generation [co3]

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Suggested Books:

1. Jon Raasch, Graham Murray, Vadim Ogievetsky, Joseph Lowery, "JavaScript and jQuery for Data Analysis and Visualization", WROX
2. Ritchie S. King, Visual story telling with D3" Pearson
3. Ben Fry, "Visualizing data: Exploring and explaining data with the processing environment", O'Reilly, 2008.
4. A Julie Steele and Noah Iliinsky, Designing Data Visualizations: Representing Informational Relationships, O'Relly
5. Andy Kirk, Data Visualization: A Successful Design Process, PAKT
6. Scott Murray, Interactive Data Visualization for Web, O'Relly
7. Nathan Yau, "Data Points: Visualization that means something", Wiley, 2013.
8. Tamara Munzner, Visualization Analysis and Design, AK Peters Visualization Series, CRC Press, Nov. 2014

Course Code: BVDW605-21

Course Name: Data Visualization Laboratory

Program: B. Voc. (Data &Web Analytics)	L: 0 T: 0 P:4
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Branch: Computer Applications	Credits: 2
Semester: 6 th	Contacthours: 4hours per week
Theory/Practical: Practical	Percentage of numerical/design problems:--
Internalmax.marks: 60	Duration of end semester exam (ESE): 3hrs
Externalmax.marks: 40	Elective status: core
Total marks: 100	

Prerequisite: - Logics of basic programming terminologies

Co requisite: - Simulation Study.

Additional material required in ESE: -Record the Simulation Results on Practical File.

Course Outcomes: Students will be able to:

CO#	Course Outcomes
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CO1	Design effective data visualizations to communicate information to the viewer.
CO2	Identify appropriate data that can be used in order to create a visualization.
CO3	Organize data and visualizations in order to prepare them for reuse.

Instructions: All programs are to be developed in R Programming Language.

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1. Loading and Distinguishing Dependent and Independent parameters
2. Exploring Data Visualization tools
3. Drawing Charts
4. Drawing Graphs
5. Data mapping
6. Creating Scatter Plot maps
7. Using BNF Notations
8. Working with REGEX
9. Visualize Network Data
10. Understanding Data Visualization frameworks
11. Design applications to implement **Google Map API, Google Chart, Tableau - Heat Map Generation**

Reference Books:

1. E. Tufte, The Visual Display of Quantitative Information, Graphics Press. 2nd Edition, 2001
2. Alexandru C Telea, Data Visualization: Principles and Practice, 2nd Edition, 2014
3. Wang Kaining, Infographic & Data Visualizations, sew Edition. 2013
4. Andy Krik, Data Visualisation: A Handbook for Data Driven Design, 1st Edition, 2016

Course Code: BVDW604-21
Course Name: Web Analytics

Program: B. Voc. (Data &Web Analytics)	L: 3 T: 1 P: 0
Branch: Computer Applications	Credits: 4
Semester: 6 th	Contact hours: 44 hours
Theory/Practical: Theory	Percentage of numerical/design problems: 60%
Internal max. marks: 40	Duration of end semester exam (ESE): 3hrs
External max. marks: 60	Elective status:
Total marks: 100	

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Prerequisite:

Co requisite: -NA

Additional material required in ESE: -NA

Course Outcomes: After completing this course, students will be able to:

CO#	Course outcomes
CO1	Understand the concept and importance of Web analytics in an organization and the role of Web analytic in collecting, analyzing and reporting website traffic.
CO2	Identify key tools and diagnostics associated with Web analytics
CO3	Explore effective Web analytics strategies and implementation and Understand the importance of web analytic.

Detailed contents	Contact hours
Unit-I INTRODUCTION TO WEB ANALYTICS: Introduction to Web Analytics: Web Analytics Approach – A Model of Analysis – Context matters – Data Contradiction – Working of Web Analytics: Log file analysis – Page tagging – Metrics and Dimensions – Interacting with data in Google Analytics.	10
Unit-II LEARNING ABOUT USERS THROUGH WEB ANALYTICS: Goals: Introduction – Goals and Conversions – Conversion Rate – Goal reports in Google Analytics – Performance Indicators – Analysing Web Users: Learning about users – Traffic Analysis – Analysing user content – Click-Path analysis – Segmentation	10
Unit-III GOOGLE ANALYTICS: Different analytical tools - Key features and capabilities of Google analytics- How Google analytics works - Implementing Google analytics - Getting up and running with Google analytics -Navigating Google analytics – Using Google analytics reports - Google metrics - Using visitor data to drive website improvement- Focusing on key performance indicators Integrating Google analytics with third-Party applications	12

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Unit-IV OVERVIEW OF QUALITATIVE ANALYSIS: Lab Usability Testing Heuristic Evaluations- Site Visits- Surveys (Questionnaires) - Testing and Experimentation: A/B Testing and Multivariate Testing-Competitive Intelligence - Analysis Search Analytics: Performing Internal Site Search Analytics, Search Engine Optimization (SEO) and Pay per Click (PPC)- Website Optimization against KPIs- Content optimization- Funnel/Goal optimization - Text Analytics: Natural Language Processing (NLP)- Supervised Machine Learning (ML) Algorithms-API and Web data scarping using R and Python	12
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Text Books:

- 1 Beasley M, (2013), Practical web analytics for user experience: How analytics can help you understand your users. Newnes, 1st edition, Morgan Kaufmann.
- 2 Sponder M, (2013), Social media analytics: Effective tools for building, interpreting, and using metrics, 1st edition, McGraw Hill Professional.
- 3 Clifton B, (2012), Advanced Web Metrics with Google Analytics, 3rd edition, John Wiley & Sons.

Web resources:

- [1] <https://analytics.google.com/analytics/web/>
[2] <https://www.optimizely.com/optimization-glossary/web-analytics/>
[3]https://www.tutorialspoint.com/web_analytics/web_analytics_introduction.htm

Course Code: BVDW607-21

Course Name: Web Analytics Laboratory

Program: B. Voc. (Data &Web Analytics)	L: 0 T: 0 P: 4
Branch: Computer Applications	Credits: 2
Semester: 6 th	Contact hours: 2 hours per week
Theory/Practical: Practical	Percentage of numerical/design problems: 80%
Internal max. marks: 30	Duration of End Semester Exam (ESE): 3hrs
External max. marks: 20	Elective status:
Total marks: 50	

Detailed list of Tasks:

1. Working concept of web analytics.
2. Evaluation with Intermediate metrics, custom metrics, calculated metrics.

3. Collection of web data and other internet data with the help of web analytics.
4. Delivering reports based on collected data.
5. Implement the concept of web analytics ecosystem.
6. Creation of segmentation in web analytics.
7. Visualization, acquisition and conversions of web analytics data.
8. Performing site search analytics.
9. Analyse the web analytic reports and visualizations.
10. Performing visual web analytics.