BENGALURU CITY UNIVERSITY

CHOICE BASED CREDIT SYSTEM

(Semester Scheme with Multiple Entry and Exit Options for

Under Graduate Course)

Syllabus for B.Voc (IT)
(V & VI Semester)

2023-24 onwards

BANGALORE CITY UNIVERSITY

PROCEEDINGS OF THE MEETING OF BOARD OF STUDIES HELD IN COMPUTER SCIENCE (UG AND PG), BANGALORE UNIVERSITY HELD ON 09-09-2023 THROUGH ONLINE MODE AT 11:30 AM

### The following members were present:

1. Dr. Guru D.S. Department of Computer Science , Mysore Univeristy
2. Dr. Susesha , Department of Computer Science , Mysore Univeristy
3. Dr. Prabhakar C.J , Kuvempu University, Shimogga
4. Dr. Chandrakanth Naikodi,Department of Computer Science ,Davanagere University
5. Dr. Prathibha V Kalburgi ,Ramaiah College of Arts Science, and Commerce Bangalore
6. Mrs. Amalorpavam ,Sambram Academi of Management Studies ,Bangalore
7. Smt. Nagarathnamma S.M,Maharani Cluster Univeristy, Bangalore
8. Dr. B.L Muralidhara, Department of Computer Science, Bangalore University - Chairperson

The Following Members did not attend the meeting:

1. Dr. Bhagyawana S Mudigowda ,Maharani Cluster University, Bangalore

The Chairperson presented the syllabus of the V and VI semester BCA (NEP), B.Sc. Computer Science and BVoC (Computer Science) to the Committee. The Committee discussed the syllabus in detail and approved the same.

The Chairperson thanked all members for their active participation.
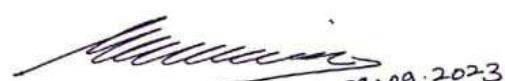
(Dr. B.L Muralidhara) 09.09.2023
Chairman, BoS – Computer Science

MEMBERS OF THE BoS IN COMPUTER SCIENCE

1	Dr. Muralidhara B L Professor Department of Computer Science Bangalore University	CHAIRPERSON
2	Dr. Guru D.S Professor PG Department of Computer Science Mysore Univeristy	Member
3	Dr. Susesha Professor, PG Department of Computer Science Mysore Univeristy	Member
4	Dr. Prabhakar C.J Professor Kuvempu University, Shimogga	Member
5	Dr. Chandrakanth Naikodi Associate Professor Department of Computer Science Davanagere University	Member
6	Dr. Prathibha V Kalburgi Ramaiah College of Arts Science, and Commerce Bangalore	Member
7	Mrs. Amalorpavam Sambram Academi of Management Studies Bangalore	Member
8	Dr. Bhagyawana S Mudigowda Associate Professor Maharani Cluster University, Bangalore	Member
9	Smt. Nagarathnamma S.M Associate Professor Maharani Cluster Univeristy, Bangalore	Member

Semester	Course Code	TitleofthePaper	Credits	Languages,SkillEnhancement (SEC), andAbility EnhancementCourses (AECC)	Credits	TotalCredits
I	BVOC-C1T	DiscreteStructure	3	OE1:OpenElective	3	25
	BVOC-C2T	ProblemsolvingTechniques	3	LanguageL1	3	
	BVOC-C3T	DataStructure	3	LanguageL2	3	
	BVOC-C4L	ProblemsolvingLab	1	SEC I : Office Automation & Advance Excel	2	
	BVOC-C5L	DataStructure Lab	2	Physical Education	1	
				Health&Wellness	1	
II	BVOC-C6T	ComputerArchitecture	3	OE2:OpenElective	3	25
	BVOC-C7T	Object Oriented ProgrammingusingJava	3	LanguageL1	3	
	BVOC-C8T	DatabaseManagement System	3	LanguageL2	3	
	BVOC-C9L	JavaLab	1	Environmentalstudies	2	
	BVOC-C10L	DatabaseManagementSystem Lab	2	Physical Education	1	
				NCC/NSS/CL/R&R	1	
III	BVOC-C11T	OperatingSystems	3	OE3:OpenElective	3	25
	BVOC-C12T	Computer Networks	3	LanguageL1	3	
	BVOC-C13T	PythonProgramming	3	LanguageL2	3	
	BVOC-C14L	ComputerNetworksLab	1	SEC II : Unix Programming	2	
	BVOC-C15L	PythonProgrammingLab	2	Physical Education	1	
				NCC/NSS/CL/R&R	1	
IV	BVOC-C16T	Software Engineering	3	OE4:OpenElective	3	25
	BVOC-C17T	DesignandAnalysisofAlgorithm	3	LanguageL1	3	
	BVOC-C18T	InternetTechnologies	3	LanguageL2	3	
	BVOC-C19L	Design and Analysis of AlgorithmLab	1	The ConstitutionofIndia	2	
	BVOC-C20L	InternetTechnologiesLab	2	Physical Education	1	
				NCC/NSS/CL/R&R	1	

Semester	Course Code	Title of the Paper	Credits	Languages, Skill Enhancement (SEC), and Ability Enhancement Courses (AECC)	Credits	Total Credits
V	BVOC-C21T	Artificial Intelligence	4	BVOC-V1 Vocation Course I : Quantitative Techniques	3	23
	BVOC-C22T	Data Analytics	4	BVOC-E1 Elective I: a. Soft Skill & Personality Development. b. E-Commerce	3	
	BVOC-C23T	Web Programming	4	SEC III : Cyber Crime, CyberLaw, and Intellectual Property Right	3	
	BVOC-C24L	Data Analytics Lab	1			
	BVOC-C25L	Web Programming Lab	1			
VI	BVOC-C26P	Project Work	4	CA-V2 Vocation Course II : Enterprise Resource Planning	3	23
	BVOC-C27T	Machine Learning	4	CA-E2 Elective II: a. Data Science b. Software Testing	3	
	BVOC-C28T	Mobile Application Development	4	Internship	2	
	BVOC-C29L	Machine Learning Lab	2			
	BVOC-C30L	Mobile Application Development Lab	1			

BVOC-C21T:ARTIFICIALINTELLIGENCE

TotalTeachingHours:60   No.ofHours/Week:04

CourseOutcomes:

CO1.Understandthevariouscharacteristicsofproblemsolvingagentsandapplyproblemsolving
throughsearchforAIapplications.

CO2.AppreciatetheconceptsofknowledgerepresentationusingPropositionallogicandPredicatecalculusa
ndapplythemforinference/reasoning.

CO
3.ObtaininsightsaboutPlanningandhandlinguncertaintythroughprobabilisticreasoningandf
uzzysystems.

CO
4.UnderstandbasicsofcomputervisionandNaturalLanguageProcessingandunderstandtheirr
elevanceinAIapplications.

CO5.Obtaininsightsaboutmachinelearning,neuralnetworks,deeplearningnetworksandtheirsignific
ance.

UNIT I: [15 Hours]

Introduction to Al: What is AI? Intelligent Agents: Agents and environment, the concept
ofRationality, the nature of the environment, the structure of agents; Problem-solving:
Problem-solving agents; Uninformed search strategies: DFS, BFS; Informed Search: Best
First Search,A* search, AO* search, Means End Analysis. Adversarial Search & Games:
Two-playerzero-sumgames,MinimaxSearch,Alpha-Betapruning.

UNIT-II   [15Hours]

Knowledge-based Agents, The Wumpus world as an example world, Logic,
Propositionallogic, First-order predicate logic, Propositional versus first-order inference,
Unification
andlifting,Forwardchaining,Backwardchaining,Resolution,Truthmaintenancesystems.Knowle
dge in Learning, What is learning? Types of Learning,: Rote Learning, Learning byTaking
Advice, Learning in Problem Solving, Learning from Examples, Winston's
LearningProgram,DecisionTrees.

UNIT-III   [15 Hours]

IntroductiontoPlanning:BlocksWorldproblem,Strips;HandlingUncertainties:Non-
monotonicreasoning,Probabilisticreasoning,Fuzzylogic;Robotics:FundamentalsofRobotics,Ro
botKinematics;ComputerVision:Introductiontoimageprocessingandclassification,objectdetecti
on.

UNIT-IV   [15Hours]

NaturalLanguageProcessing:Introduction,SyntacticProcessing,SemanticAnalysis,Discoursean
dPragmaticProcessing;ExpertSystems:Architectureandroleofexpertsystems, two case studies
of   Expert   Systems;   Introduction   to   Machine   learning:
Supervisedlearning,unsupervisedlearning,reinforcementlearning;NeuralNetworks:Introductio
n,basicsofANN,DeepLearningwithbasicsofCNN,RNN,LSTMandtheirapplications.

TextBook/References

1. Russell, S. and Norvig, P., "Artificial Intelligence-A Modern Approach", 3rd edition, Prentice Hall
2. Nilsson Nils J, "Artificial Intelligence: A new Synthesis, Morgan Kaufmann Publishers Inc. San Francisco, CA, ISBN: 978-1-55-860467-4.
3. Dan W Patterson, "Introduction to Artificial Intelligence & Expert Systems", PHI

BVOC-C22T:DATAANALYTICS

TotalTeachingHours:60   No.ofHours/Week:04

CourseDescription:
Almosteverycompanyandorganizationcollectdataabouttheiroperationstobetterunderstand how to make internal improvements, the collection of large quantities of data todiscoverbehaviorpatternsandbetterunderstand theirinternal processes.Data analyticsprovide strong foundation for the learners to understand the underlying core concepts andemergingtechnologiesindataanalytics.

Learningoutcomes:
- Explore thefundamentalconceptsofdata analytics
- Recognizeandconductstatisticalinferencetosolveengineeringproblems.
- Appreciate thescience ofstatisticsand thescopeofitspotentialapplications
- Summarizeandpresentdatainmeaningfulways
- Selecttheappropriatestatisticalanalysisdependingontheresearchquestionathand
- Form testable hypotheses that can be evaluated using common statistical

analysesEffectivelyandclearlycommunicateresults fromanalyses performedtoothers

UNIT:1IntroductiontoDataAnalytics   [15hours]

Evolution of Data Analytics, Data Analytics Overview, Types of Data Analytics - DescriptiveAnalytics-DiagnosticAnalytics-PredictiveAnalytics-PrescriptiveAnalytics,ImportanceandBenefits of Data Analytics. Different Applications of Analytics in Business, Text AnalyticsandWebAnalytics,SkillsforBusinessAnalytics.

UNIT:2ProbabilityandStatisticalMethods   [15hours]

Sample Space, Types of Events, Measures of probability, conditional probability, Bayes'theorem,Randomvariable,ProbabilityDistributions-Binomial,PoissonandNormal,SamplingDistributions,EstimationandHypothesisTesting-t-test,Analysisofvariance(ANOVA)andChi-squaretest,CorrelationAnalysis-SimpleCorrelationcoefficient,Interpretation, Scatter plot. Linear Regression-Simple and Multiple, Polynomial Regression,Logistic Regression- with one variable and with multiple variables, Logistic Regression vs.LinearRegression.

UNIT:3DataVisualization   [15hours]

Introduction to data visualization, Visualization foundations, Introduction to Power BI, PowerBI–AdvantagesandScalableOptions,PowerBIArchitectureandDataAccess,VisualizationTechniques for Spatial Data, Geospatial Data, Time-Oriented Data, Multivariate Data, Trees,Graphs, andNetworks,TextandDocumentVisualization,PowerQuery&MLanguage.

UNIT:4CaseStudy [15hours]

Importance and types of case studies: case study of Amazon, Twitter, Netflix, Uber, COVID-19: for understanding business scenarios and how they applied the analytics to improve theirdecisionmaking,costreduction,logistics planningandotherbenefits.

TextBooks:
1. Kumar,U.D.:BusinessAnalytics–TheScienceofData–DrivenDecisionMaking,Wiley.
2. DrAnilMaheshwari,DataAnalyticsMadeAccessible,Publisher:Amazon.comServices LLC.
3. Johnson,R.A.,Miller,I.andFreund,.:ProbabilityandStatisticsforEngineers,Pearson.

ReferenceBooks:
1. Gert, H.N., Thorlund, L. and Thorlund, J :Business Analytics for Managers – TakingBusiness IntelligenceBeyondReporting,Wiley.
2. Data Analytics: Principles, Tools, and Practices: A Complete Guide for AdvancedData Analytics Using the LatestTrends, Tools, and Technologies by Dr. GauravAroraa(Author),ChitraLele (Author),
3. Dr.MunishJindal(Author)
4. Howto Find aJob inDataAnalyticsauthorMichaelDillon

BVOC-C23T:WEBPROGRAMMING

TotalTeachingHours:60   NoofHours/Week:04

CourseObjective
CO1: UnderstandthebasicsofWebProgrammingconcepts
CO2: To builddynamicwebpageswithvalidationusingJavaScriptobjectsandbyapplyingdifferenteve nt-handlingmechanisms.
CO3: AnalyzevariousPHPlibraryfunctionsthatmanipulatefilesanddirectories.
CO4: TodevelopmoderninteractivewebapplicationsusingPHPandXML

 UNIT –1 [15Hours]

Fundamentals ofWeb:Internet–WorldWideWeb-WebBrowsers-WebServers–URLs–MIME– InternetSecurity - TheWeb Programmers Toolbox.**JavaScriptandHTMLDocuments**: The JavaScript execution environment - The Document Object Model - Elementaccess in JavaScript - Events and event handling -Handling events from the Body elements,Button elements, Text box and Password elements - The DOM 2 event model - The navigatorobject-DOMtreetraversalandmodification.

 UNIT– II [15Hours]

Dynamic Documents with JavaScript: Introduction to dynamic documents - Positioningelements - Moving elements - Element visibility - Changing colours and fonts - Dynamiccontent - Stacking elements -Locating the mouse cursor - Reacting to a mouse click - Slowmovement of elements - Dragging and dropping elements.**XML**: Introduction – Syntax -Document structure - Document Type definitions - Namespaces - XML schemas -

Displayingraw XML documents - Displaying XML documents with CSS - XSLT style sheets - XMLProcessors -Webservices.

UNIT– III   [15 Hours]

Introduction to PHP: The Structure of PHP-Using Comments -Basic Syntax -VariablesOperators - VariableAssignment-Multiple-LineCommands-VariableTyping-ConstantsPredefined Constants -The Difference Between the echo and print Commands -FunctionsVariable Scope, Expressions and Control Flow in **PHP**: Operators -Operator Precedence -Associativity Relational Operators - **Conditionals**: The if Statement -The else Statement -The elseif Statement -The switch Statement - The ? Operator - **Looping**: while Loops - do...whileLoops forLoops-BreakingOutofa Loop-ThecontinueStatement.

UNIT– IV   [15Hours]

 PHP Functions and Objects: PHP Functions - Defining a Function - Returning a ValueReturning an Array - Do Not Pass Arguments by Reference - Returning Global Variables.**PHPArrays**:NumericallyIndexedArrays-AssociativeArrays-
AssignmentUsingthearrayKeyword - Theforeach...as Loop -Multidimensional Arrays - Using Array Functions-Dateand Time Functions. **File Handling:** Checking Whether a File Exists - Creating a File -Reading from Files - Copying Files - Moving a File - Deleting a File - Updating Files -Locking Files for - Multiple Accesses Reading an Entire File - Uploading Files. ExceptionHandling,Cookiesandconnectingtodatabase

TEXTBOOK
1. RobertWSebesta,"ProgrammingtheWorldWideWeb",4thEdition,PearsonEducation,2008.
2. LearningPHP,MySQL&JavaScriptWithjQuery,CSS&HTML5byRobinNixon,PublishedbyO'Reilly2015.

ReferenceBooks
1. M.Deitel,P.J.Deitel,A.B.Goldberg,"Internet&WorldWideWebHowtoprogram",3rdEdition,PearsonEducation/PHI, 2004.
2. Chris Bates,"Web Programming Building Internet Applications",3rd Edition,WileyIndia,2006.
3. XueBaietal,"TheWebWarrior GuidetoWebProgramming",Thomson,2003.
4. PHPABeginner'sGuidebyVikramVaswani,byTheMcGraw-Hill,2009

BVOC-C24L:DataAnalyticsLab

Part-A:Spreadsheet(Excel)

Datapreprocessing,interpretationandanalyticalfunctions

*Note:*Download the sample data file from the open sources (Kaggle.com, etc.,) to apply &practiceallthesefunctions.

1. CONDITIONAL FORMATTING, IF, COUNTIF, SUMIF, AVERAGE,CONCAT

2. INDEX,MATCH,UNIQUE,IFS,COUNTIFS,SUMIFS,AVERAGEIFS

3. VLOOKUP,HLOOKUP,XLOOKUP,COUNT,COUNTA

4. LEFT,MID,RIGHT,LEN,SUBSTITUTE,SEARCH,ISNUMBER

5. TODAY,NOW,YEAR,MONTH,NETWORKDAYS,EOMONTH

5. OFFSET,CHOOSE,LET,MAX,SORT,SORTBY,RANK

6. FILTER,FRQUENCY,SEQUENCE,RANDARRAY,IFERROR

7. PIVOT TABLES, WHAT-IF ANALYSIS, DATA VALIDATION,SUBTOTALSWITHRANGES

8. DevelopaninteractivedashboardfortheFinancialSampleExcelworkbook(https://learn.microsoft.com/en-us/power-bi/create-reports/sample-financial-download)orSample-SuperstoreExceldata

Part-B:DataAnalysisusingPython

*Note:*Downloadthesampledatafilefromtheopensources(Kaggle.com,etc.,)orfromprescribedstudymaterials toapply&practiceallthesemethods usingPython.

1. Probability

a. Calculatingthesimpleprobabilities

b. ApplicationsofProbabilitydistributionstoreallifeproblems

2. Testofsignificance

a. T-Test:onesample,twoindependentsamplesandpaired

b. ANOVA&Chi-Square Test

3. CorrelationandRegressionanalysis

a. Scattereddiagram, calculatingofcorrelationcoefficient

b. Linearregression:fitting,testingmodeladequacyandprediction(simpleandmultiple)

c. Fittingoflogisticregression

Part-C:PowerBI

1.   Introduction to Power BI- Get Started with Power BI - Sign up for Power BI - Overview: Power BI data sources - Connect to a SaaS solution - Upload a local CSVfile- Connect toExceldatathatcanberefreshed-CreateaReport withVisualizations

2.   Using visualizations - Create a new report - Create and arrange visualizations - Format a visualization - Use text, map, and gauge visualizations and save a report - Useaslicerto filtervisualizations-Sort,copy,andpaste visualizations

3.   Modify and Print a Report - Rename and delete report pages - Add a filter to apageorreportSetvisualizationinteractions-Send areportto PowerPoint

4.   Create a Dashboard - Create and manage dashboards - Pin a report tile to adashboard - Pin a live report page to a dashboard - Pin a tile from another dashboard -PinanExcelelementtoadashboard-Addatiletoadashboard

BVOC-C25L:WEB PROGRAMMINGLAB

1. Create a form with the elements of Textboxes, Radiobuttons,Checkboxes,andsoon.WriteJavaScriptcodetovalidatetheformatinemail,andmobilenumberin 10 characters, If a textbox has been left empty, popup an alert indicating whenemail,mobilenumberandtextboxhasbeenleftempty.

2. Develop an HTML Form, which accepts any Mathematical expression. WriteJavaScriptcodetoEvaluatethe expressionandDisplaytheresult.

3. Create a page with dynamic effects. Write the code to include layers and basicanimation.

4. Write a JavaScript code to find the sum of N natural Numbers. (Use user-definedfunction)

5. WriteaJavaScriptcodeblockusingarraysandgeneratethecurrentdateinwords,thisshouldincludetheday,monthandyear.

6. CreateaformforStudentinformation.WriteJavaScriptcodetofindTotal,Average,ResultandGrade.

7. CreateaformforEmployeeinformation.WriteJavaScriptcodetofindDA,HRA,PF, TAX,Gross pay,DeductionandNetpay.

8. Write a programinPHPtochangebackgroundcolorbasedondayofthe weekusing ifelseifstatementsandusingarrays.

9. WriteasimpleprograminPHPfori)generatingPrimenumberii)generateFibonacciseries.

10. WriteaPHPprogramtoremove duplicatesfromasorted list

11. WriteaPHP Script toprint thefollowing patternontheScreen:

```
*****
****
***
**
*
```

12. WriteasimpleprograminPHPforSearching ofdatabydifferentcriteria

13. WriteafunctioninPHPtogeneratecaptcha code

14. WriteaProgramtostore andread imagefromDatabase.

15. WriteaprograminPHPtoread and write fileusingformcontrol.

16. WriteaprograminPHP toadd,updateanddeleteusingstudentdatabase.

17. WriteaprograminPHP toValidateInput

18. WriteaprograminPHPfor settingandretrievingacookie

19. Write aPHPprogramto Createasimple webpage ofacollege.

20. WriteaprograminPHPforexceptionhandlingfori)dividebyzeroii)checkin
gdateformat.

BVOC-V1:QUANTITATIVETECHNIQUES

TotalTeachingHours:48   No.ofHours/Week:03

UNIT –I   [12Hours]
Numbers Property – Simplification – Divisibility – HCF and LCM – Decimal Fractions –
SquarerootsandCubeRoots–Logarithms–Antilogarithms-Surdsandindices-Permutation   and
Combination – Probability – Odd man out series - Number series - letterseries –codes–
Relationships–classification.

UNIT– II   [12Hours]
Time and work – Problems on Ages – Calendar – Clock – Pipes and Cistern – Time
andDistance – Problems of Train – Boats and Streams. Area – Volume and surface Areas –
Heights and Distances –Data Interpretation: Tabulation – Bar Graphs – Pie Charts –
LineGraphs. Data Interpretation - Sources, acquisition and interpretation of data;
Quantitative andqualitativedata;Graphicalrepresentation andmappingofdata.

UNIT– III   [12Hours]
Simple Interest– Compound Interest– Stocks and Shares – True Discount– Banker'sdiscount.
Averages – Percentage – Profit and Loss - Ratio and Proposition – Partnership –Allegation
and   mixture – Chain   rule.   Understanding   the   structure   of   arguments;
Evaluatinganddistinguishingdeductiveandinductivereasoning;Verbalanalogies:Wordanalogy
Applied   analogy; Verbal   classification;   Reasoning   Logical   Diagrams: Simple
diagrammaticrelationship,multidiagrammaticrelationship;Venndiagram;AnalyticalReasoning
.

UNIT– IV   [12Hours]
Teaching:Nature,objectives,characteristicsandbasicrequirements;Learner'scharacteristics;
Factors affecting teaching; Methods of teaching; Teaching aids; Evaluationsystems.
Research Aptitude: Meaning, characteristics and types; Steps of research; Methodsof
research; Research Ethics; Paper, article, workshop, seminar, conference and
symposium;Thesis writing: its characteristics and format. Reading Comprehension: A
passage to be setwith questions to be answered. Communication: Nature, characteristics,
types, barriers andeffectiveclassroomcommunication.

Reference
1. R.S.Aggarwal, QuantitativeAptitude, S.Chand&Company, NewDelhi, 2012
2. GovindPrasadSinghandRakeshKumar,TextBookofQuickestMathematics(forallCo
   mpetitiveExaminations),KiranPrakashan,2012.
3.R.S.Aggarwal, ObjectiveArithmetic,S.Chand&Company, NewDelhi, 2005.

4.Dr.Lal,Jain,Dr.K.C.Vashistha,"U.G.C.-
NET/JRF/SETTeaching&ResearchAptitude",UpkarPrakashan,2010.

5."UGCNET/SLET:Teaching&ResearchAptitude", BrightPublications,2010.

BVOC-E1:SOFT SKILL AND PERSONALITY DEELOPEMENT

TotalTeachingHours:48   No.ofHours/Week:03

UNIT-I   [12Hours]

Self-concept:whatisattitude?Theprocessofattitudeformation.Youarethechiefarchitectureofyourself.Self-managementtechniques.

UNIT-II   [12Hours]

Believe   in   yourself:Self-imageandself-esteem,buildingself-confidence,Environmentwemixwith,howtobuildself-image,Meaninganddefinitionofpersonality.   Personal planning and success attitude: prioritizing, creating the master plan, active positive visualization and positive attitude, how to build a success attitude, Spot analysis.

UNIT-III   [12Hours]

Self-motivation & communication: Levels of motivation, power of irresistible enthusiasm,etiquettes and manners in a group, public speaking, oral and written communication, Bodylanguage,Importanceoflisteningandresponding,tipsfortechnical writing.

UNIT-IV   [12Hours]

Leadership as a process: co-ordination while working in a team, leadership styles,leader &team player, Management of conflict, profiles of great and successful personalities, Role ofcareerplanninginpersonalitydevelopment, how topersonalinterviews andgroup discussions.

TextBooks:
1. Wallace : Personality Development 1st Edition, 2008 Cengage Learning India.
2. Kundu, C.l.- Personality development, Sterling Bangalore, 1989.

ReferenceBooks:
1. Listening and Responding – Sandra D.Collins-Cengage Learning India, 2008.
2. 1,001 ways to inspire your organization, your team and your self – David E. Rye- Jaico publishing house.

E-COMMERCE

TotalTeachingHours:48

UNIT1:   [12Hours]

Introduction to e-commerce and e-business: Traditional Business and E-Business. E-commercebusiness models, B2B, B2C, B2G, C2C, C2B and web auctions, virtual communities, portals, e-business revenue models. Web server hardware and software – software for web servers,Websiteandinternetutilityprograms,Webhostingchoices– electroniccommercesoftware.

UNIT2:   [12 Hours]

Security issues or Fundamentals of E-Commerce securities: Need for Security from users(Customer)perspectiveandCompany(Vendor)perspective-Securityrequirements-

Accesscontrol,Authentication,privacy/confidentiality,integrity,Auditing,Nonrepudiation. Types of security threats and attack, computer crime: Hacking, Cyber Theft, Unauthorized useatwork,Piracy,a)Softwarepiracy,b)PiracyofIntellectualProperty,c)ComputerVirusesand Worms,cyberterrorism.Securitytoolsandtechniques–
cryptography,andFirewalltechniques.EDI,Smart–Card.

UNIT3: [12 Hours]

Mobile Commerce/M-Commerce - Introduction – Infrastructure Of M–Commerce – Types OfMobile Commerce Services – Technologies Of Wireless Business – Benefits And Limitations,Support,MobileMarketing&Advertisement,Non–InternetApplications/servicesinM–Commerce–Wireless/Wired CommerceComparisons.

UNIT4: [12Hours]

Electronic Payment Systems: Overview of Electronic Payment Systems, Cyber-cash, SmartCards, Electronic Banking - types, Electronic Fund Transfers - Digital Token-based ElectronicPaymentSystems,E-cash,e-Cheque,PaymentSystemsoninternet-RiskofElectronicPaymentSystems.SecureElectronicTransactions(SET)Protocol

TextBooks:

1. Kalakota Ravi & A.B. Whinston: Frontiers of Electronic Commerce - Addision Wesley.
2. Watson R.T.: Electronic Commerce – the strategic perspective. The Dryden press.

ReferenceBooks:

1. Agarwala K.N and Deeksha Ararwala : Business on the Net – Whats and Hows of E- Commerc.
2. Agarwala K.N and Deeksha Ararwala : Business on the Net – Bridge to the online store- front,. Macmillan, New-Delhi.
3. Diwan, Prag and Sunil Sharma, Electronic Commerce – A manager guide to E-Business, Vanity Books International, Delhi.
4. Janal D.S : Online Marketing Hand Book. Van Nostrand Reinhold Network.

SECIII:CyberCrimes, CyberLawsand IntellectualPropertyRights

ProgramOutcomes
Attheendofthiscoursestudentwillbeableto:
- Understandcybercrimes,theirnature,legalremediesandastohowreportthecrimesthroughavailableplatformsandprocedures.
- RecognizevariousprivacyandsecurityconcernsonSocialmediaande-commerceplatforms.
- Usebasictoolsandtechnologiestoprotecttheirdevices.
- UnderstanddigitalenvironmentandIPRissues

Cybercrime&laws
- Identifytypesofcybercrimes
- PreparechecklistforreportingcybercrimeatCybercrimePoliceStation.
- Preparechecklistforreportingcyber-crimeonline.
- Identifyphishingemails
- Analyzecybercrime casesandidentifysectionapplicable(asperITAct)
- DiscussDataprotectionlawsinIndia

SocialMediaand E-commerceSecurity

- Basic checklist, privacy and security settings for popular social media platforms.
- Reporting and redressal mechanism for violations and misuse of social media platforms.
- Configure security settings in Mobile Wallets and UPIs.
- Prepare checklist for secure net banking

Digital Devices Security, Tools and Technologies for Cyber Security
- Setting, configuring and managing three password policy in the computer (BIOS, Administrator and Standard User).
- Setting and configuring two factor authentication in the Mobile phone.
- Security patch management and updates in Computers and Mobiles.
- Managing Application permissions in Mobile phone.
- Installation and configuration of computer Anti-virus.
- Wi-Fi security management in computer and mobile.

IPR
- IPR issues in Cyber Space
- Identify liabilities in case of infringement of copyrights/trademarks/patents using Cases
- Procedure for registration of patents, copyrights, trademarks and GI
- Recognize Geographical Indicators and their significance
- Traditional knowledge and IPR

- DiscussLandmarkjudgementsontrademarkanddomainnames issues

References

1. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes,Computer Forensics And Legal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81-265-21791,PublishDate2013
2. Dr.SuryaPrakashTripathi,RitendraGoyal,PraveenKumarShukla,KLSI."Introductiontoi nformationsecurity andcyberlaws".DreamtechPress.ISBN:9789351194736,2015
3. Duggal Pavan, Legal Framework on Electronic Commerce and Intellectual PropertyRightsinCyberspaceHardcover–2014

SIXTH SEMESTER

BVOC-C27T:MachineLearning

TotalTeachingHours:60   NoofHours/Week:04

CourseOutcome

1. Learnthebasicsofmachinelearning,understandingitsuses,challenges,andvariousapplications.
2. Buildpracticaldataskills,coveringdatacollection,analysis,visualization,andpreparation.
3. Becomeskilledinusingclassificationandregressionalgorithms,includingselecting,training,andevaluatingmodels.
4. Diveintoadvancedclusteringandspecializedapplications,usingmethodslikeK-Means,DBSCAN,andothers.

UNIT1: FundamentalsofMachineLearning   [12hours]

IntroductiontoMachineLearning:WhatisMachineLearning?WhyUseMachineLearning?   , Types of Machine Learning Systems, Main Challenges of Machine Learning,ApplicationsofMachineLearning.WhyPython,scikit-learn,EssentialLibrariesandTools.

UNIT2:Data Preparation   [12hours]

Working with Real Data, look at the Big Picture, Get the Data, Discover and Visualize theData to Gain Insights, Prepare the Data for Machine Learning Algorithms, Select and Train aModel.

UNIT3:Supervised Learning   [12hours]

Classification and Regression, Some Sample Datasets, k-Nearest Neighbours, Linear Models,NaiveBayes Classifiers,DecisionTrees.

UNIT4:UnsupervisedLearning   [12hours]

Clustering, K-Means, Limits of K-Means, using clustering for image segmentation, UsingClustering for Preprocessing, Using Clustering for Semi-Supervised Learning, DBSCAN,OtherClusteringAlgorithms.

Textbook:
1. Andreas.C.MüllerandS.Guido,"IntroductiontoMachineLearningwithPython,"O'Reilly, 2017(Unit-1)
2. Amanda.CasariandAlice.Zheng,"FeatureEngineeringforMachineLearning,"O'ReillyMedia,Inc.,2018,p.218.(Unit-2)
3. A.Géron,"Hands-onMachineLearningwithScikit-Learn,Keras,andTensorFlow,"O'ReillyMedia,Inc.,2022.
4. IanGoodfellow,Yoshua.Bengio,and Aaron.Courville,"DeepLearning,"MITPress,2016.(Unit-4)

ReferenceBooks

1. S.Rashkaand V.Mirdzhalili,"MachineLearningandDeepLearningwithPython,scikit-learn,andTensorFlow2," Packt,BirminghamandMumbai,2020.
2. S.Shalev-ShwartzandS.Ben-David,"UnderstandingMachineLearning:FromTheorytoAlgorithms,"CambridgeUniversityPress,2014.

OnlineMachineLearning Tutorial

1. Kaggle:
Kaggleoffersinteractivemachinelearningcoursesandcompetitions.URL:https://www.kaggle.com/learn

2. LinkedInLearning(formerlyLynda.com):
Offersawiderangeofcoursesonmachinelearningandartificial intelligence.
URL:https://www.linkedin.com/learning/machine-learning-with-python-foundations

3. Githubhttps://github.com/amueller/introduction_to_ml_with_python/blob/master/01-introduction.ipynb)

BVOC-C28T:MobileApplicationDevelopment

TotalTeachingHours:60 No.ofHours/Week:04

CourseObjective

This course examines the principles of mobile application design and covers the necessaryconcepts which are required to understand mobile based application and develop Androidbasedapplicationinparticular.Aftercompletingthecoursethestudentscanbuildvarieties ofreal-timeApps usingAndroid.

COURSE OUTCOMES:
CO1: Understand thebasicconceptsofMobileapplicationdevelopment
CO2: Designand developuserinterfacesfortheAndroid platforms
CO3: ApplyJavaprogrammingconceptstoAndroidapplicationdevelopmentandcreateanapplicationusingdatabase

UNIT –I [15Hours]
Introduction:BriefHistoryofmobiletechnologies,Differentmobiletechnologies
KeyMobileApplicationServices-IntroducingAndroid,TheAndroidApplicationComponents,
Exploring the Development Environment, -Obtaining the Required Tools-LaunchingYourFirstAndroidApplication-ExploringtheIDE-DebuggingYourApplication-PublishingYour Application
UsingActivities-FragmentsandIntentsinAndroid:Workingwithactivities,Using
Intents,Fragments,UsingtheIntentObjecttoInvokeBuilt–inApplication

UNIT–II [15Hours]

WorkingwiththeUserInterfaceUsingviews
UnderstandingtheComponentsofaScreen-AdaptingtoDisplayOrientation-
ManagingChangestoScreenOrientation-UtilizingtheActionBar-
CreatingtheUserInterfaceProgrammaticallyListeningforUINotification
UsingBasicViews-UsingPickerViews-UsingListViewstoDisplayLongLists-Understanding
Specialized Fragments - Using Image Views to Display Pictures -UsingMenus with Views
UsingWebView- Saving and Loading User Preferences-PersistingDatatoFiles-
CreatingandUsingDatabases.

UNIT– III [15Hours]

DesigningUserinterfaceDesigningbydeclaration,creatingtheopeningscreen,usingalternate
resources, implementing an about box, applying a theme, adding a menu,
addingsettings,debuggingwithlogmessages,debuggingwithdebugger

UNIT– IV [15Hours]

Creating Your Own Content Providers -Using the Content Provider, SMS Messaging -
SendingEmail-DisplayingMaps-GettingLocationData-Monitoringa Location
Putting SQL to work Introducing SQLite, In and Out of SQLite, Hello Database,
DataBinding,usingcontentprovider,implementingcontentprovider.
Reading/writing local data, Accessing the Internal File system, Accessing the SD
card.Preparing app for publishing, Deploying APK files, uploadingin Market ,
ConsumingWeb   ServicesUsingHTTP-ConsumingJSONServices-CreatingYourOwn
ServicesBindingActivitiestoServices-UnderstandingThreading

TextBooks:
1..Wei-MengLee,Beginningandroid4applicationDevelopment,JohnWiley&sons,Inc,2012.
2.JeromeDiMarzio,"BeginningAndroidProgrammingwithAndroidStudio",4thEdition

ReferenceBooks:
1.Grant Allen,BeginningAndroid4,Apress,2012.
2.PradeepKothari,"Android ApplicationDevelopment(WithKitkatSupport)",BlackBook2014

WebReference
https://developer.android.com/guidehttps://flutt
er.dev/http://ai2.appinventor.mit.edu
https://aws.amazon.com/mobile/mobile-application-
developmenthttps://www.tutorialspoint.com/android/android_advanced_tutorial.pdf

BVOC-C29L:MachineLearningLab

Outcome:

1. AchieveproficiencyinsettingupPython,installingvitallibraries,andconfiguringessentialtools.
2. Demonstratecompetenceindatamanipulation,datasetloading,andthecreationofinsightful visualizations.
3. Exhibittheabilitytopreprocessdata,addressmissingvalues,performcategoricalencoding,andimplementfundamentalmachinelearningalgorithms.
4. Developanunderstandingofclusteringtechniques,createclustervisualizations,andinterpretdecisiontreesplits.

List ofPrograms

1. Installand setupPythonandessentiallibrarieslikeNumPyandpandas.
2. Introducescikit-learnasamachinelearninglibrary.
3. Installand setupscikit-learnandother necessarytools.
4. WriteaprogramtoLoadandexplorethedatasetof.CVSandexcelfilesusingpandas.
5. WriteaprogramtoVisualizethedatasettogaininsightsusingMatplotliborSeabornbyplottingscatterplots,barcharts.
6. Write a program toHandlemissingdata, encode categorical variables,andperformfeaturescaling.
7. Writeaprogramtoimplementak-NearestNeighbours(k-NN)classifierusingscikit-learnandTrainthe classifieronthedatasetandevaluateitsperformance.
8. WriteaprogramtoimplementalinearregressionmodelforregressiontasksandTrainthemodelonadatasetwithcontinuoustargetvariables.
9. Writeaprogramtoimplementadecisiontreeclassifierusingscikit-learnandvisualizethedecisiontreeandunderstandits splits.
10. WriteaprogramtoImplementK-MeansclusteringandVisualizeclusters.

DatasetsLink:

1. ClassificationProblem:https://archive.ics.uci.edu/dataset/53/iris
2. RegressionProblem:https://archive.ics.uci.edu/dataset/186/wine+quality
3. ClusteringProblem:https://archive.ics.uci.edu/dataset/352/online+retail

BVOC-C30L:MobileApplicationDevelopmentLab

1   Creating"Helloworld"Application.

2   Creatinganapplicationthatdisplaysmessagebasedonthescreenorientation.

3	CreateanapplicationtodevelopLoginwindowusingUI controls.
4	Create an application to implement new activity using explicit intent, implicit intentandcontentprovider.
5	Createanapplicationthatdisplayscustomdesigned OpeningScreen.
6	CreateanUIwithallviews.
8	CreatemenuinApplication
9	Read/writetheLocaldata.
10	Create/Read/Writedatawithdatabase(SQLite).
11	CreateanapplicationtosendSMSandreceiveSMS
12	Createanapplicationtosendane-mail.
13	DisplayMap basedontheCurrent/given location.
14	Create a sample application with login module(check user name and password) OnsuccessfulloginchangeTextview"LoginSuccessful".Onloginfailalert usingToast"loginfail"
15	LearntodeployAndroidapplications.

BVOC-V2:ENTERPRISE RESOURCE PLANNING

TotalTeaching Hours:48   No.ofHours/Week:03

CourseDescription:

To make student able to build an understanding of the fundamental concepts of ERP systems, their architecture, and working of different modules in ERP. Students will also able to develop and design the modules used in ERP systems, and can customize the existing modules of ERP systems.

CourseOutcome:

- To Demonstrate a good understanding of the basic issues in ERP systems.
- To Analyze the strategic options for ERP identification and adoption.
- To Design the ERP implementation strategies.
- To Understand the need of Business Systems and Processes through strategic analysis of ERP. systems

UNITI: [12Hours]

Entrepreneurship: IntroductiontoEntrepreneur,EntrepreneurshipandEnterprise, ImportanceandRelevanceoftheEntrepreneur,FactorsInfluencingEntrepreneurship, Pros and Cons of being an Entrepreneur, Women Entrepreneurs, ProblemsandPromotion,TypesofEntrepreneurs,CharacteristicsofaSuccessfulEntrepreneur, Competency Requirement for Entrepreneurs, Awareness of Self Competency anditsDevelopment.
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UNIT2:   [12Hours]

Small Scale Industries: Small Scale Industries/ Tiny Industries/Ancillary Industries/CottageIndustries,Definition,Meaning,ProductRange,CapitalInvestment,OwnershipPatterns,Importance and Role Played by SSI in the Development of the IndianEconomy, ProblemsFacedbySSI"sandtheStepsTakentoSolvetheProblems,PoliciesGoverningSSI"s.

UNIT3:   [12Hours]

PreparingtheBusinessPlan(BP): TypicalBPformat,FinancialAspectsoftheBP,Marketing Aspects of the BP, Human Resource Aspects of the BP, Technical Aspects of the BP,SocialAspectsoftheBP,PreparationofBP,andCommonPitfallstobeavoidedinPreparationofaBP.AnOver viewoftheStepsInvolvedinStartingaBusinessVenture,Location,ClearancesandPermitsRequired,Formalities,LicensingandRegistrationProcedures,AssessmentoftheMarketfortheProposedProject.

UNIT4:   [12Hours]

Implementation of the Project: Financial Assistance through SFC"s, SIDBI, Commercial Banks, KSIDC, KSSIC, IFCI, Non-Financial Assistance from DIC, SISI, EDI, SIDO,AWAKE, TCO, TECKSOK, KVIC, Financial Incentives for SSI"s, and Tax Concessions, Assistance for Obtaining Raw Material, Machinery, Land and Building and Technical Assistance, Industrial Estates, Role and Types.

TextBooks:

1. Mark. J. Dollinger, Entrepreneurship- strategy and resources, pearson edition, 4th edition 2008.

2. Robert D. Hisrich, Michael P. Peters & Dean A. Shepherd: Entrepreneurship, Tata McGraw Hill Publications, 2007

ReferenceBooks:

1. Dr. Sudhir Sharma, Balraj Singh & Sandeep Singhal: Entrepreneurship Development, Wisdom Publications, New Delhi, 2005.

2. Government of India: Report of the Committee on Development of Small and Medium Entrepreneurs, 1975.

3. Donald F. Kuratko & Richard M. Hodgetts: Entrepreneurship Theory Process and Practice, Sixth Edition, Thomson South Western Publications, 2004.

CA-E2-ElectiveII:DATA SCIENCE

TotalTeachingHours:48   NoofHours/Week:03

Course Description:

Focuses on principles and algorithms for data management and analysis at scale.

CourseOutcomes:
- To demonstrate proficiency with statistical analysis of data.
- To develop the ability to build and assess data-based models.
- To execute statistical analyses with professional statistical software.
- To demonstrate skill in data management.
- To apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively.

UNIT-I   [12 Hours]

Fundamentals of Analytics and Statistics: various Data Science Disciplines: Data Science and Business Buzzwords, Difference between Analysis and Analytics, Continuing with BI, ML and AI, careers in Data Science: Finding the Job - What to Expect and What to Look for, descriptive & Inferential Statistics, hypothesis Testing.

UNIT- II   [12Hours]

Data Wrangling and Data Analysis: practical Implementation of Inferential and Descriptive Statistics, cleaning Data - Missing Values, Outliers, preparing Data for Modeling - Transformations, Derived Variables, visualization Methods and Applications. Feature Selection and Dimensionality Reduction, Feature Selection Techniques, Feature Selection vs Dimensionality Reduction.

UNIT– III   [12Hours]

Introduction to Machine Algorithms: Overview of Machine learning, overview of Statistical learning, supervised Versus Unsupervised Machine Learning, Regression Versus Classification Problems: Regression and Classification Models, simple Linear Regression, multiple Linear Regression, Naive Bayes, K-Nearest Neighbors.

UNIT-IV   [12Hours]

Tree Based Models : Basics of Decision tree, Bagging and Boosting, Random Forest, Gradient Boosting Machines. Unsupervised Learning: Overview of Clustering, K-means Clustering.

Textbooks:

1. Jiawei Han, Micheline Kamber, Data Mining Concepts and Techniques, Morgan Kaufmann, 3rd Edition, 2011..

ReferenceBooks:

1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Person Education, 2016.
2. K.P. Soman, Shyam Diwakar and V. Ajay, Insight into Data mining Theory and Practice, Prentice Hall of India, 2016.

3. G.K. Gupta, Introduction to Data Mining with Case Studies, Prentice Hall of India, 3rd Edition, 2014

B.VOC-E2:SOFTWARE TESTING

TotalTeachingHours:48   No.ofHours/Week:03

CourseOutcomes:
Thiscourse willenable students to
- Differentiatethevarioustestingtechniques
- DeriveTestCases for anygivenproblem.
- Classifytheproblemintosuitabletestingmodels.
- Applyawide-varietyoftestingtechniquesinaneffectiveandefficientmanner.
- Explainthe needforplanningandmonitoringaprocess

UNIT-I   [12Hours]

Introduction: Basic definitions, A testinglife cycle, Test Cases, Fundamental approachestoapplyTestCases,Levelsof
Testing,Examples:TheNextDatefunction,TriangleproblemandTheCommissionProblemand TheSATM(SimpleAutomaticTellerMachine)problem.Boundary
ValueTesting:GeneralizingBoundary
ValueAnalysis,LimitationsofBoundaryValueAnalysis,RobustnessTesting,Worst-CaseTesting,Special Value Testing, Test cases for the Triangle problem, Test cases for the NextDatefunction, Test cases for the Commission Problem, Random Testing and Guidelines forBoundaryValueTesting.

UNIT-II   [12Hours]

EquivalenceClassTesting:EquivalenceClasses,WeakNormalVsStrongNormalEquivalence Class Testing, Weak Robust Vs Strong Robust Equivalence Class Testing,Equivalence Class Test Cases for the Triangle Problem, Equivalence Class Test Cases forthe Next Date Function and Equivalence Class Test Cases for the Commission Problem,Guidelines for Equivalence Class Testing. Decision Table Based Testing: Decision tables,Testcasesforthetriangleproblem,TestcasesfortheNextDatefunction,Testcasesforthe commission problem, Guidelines and observations. Data flow Testing: Definition UseTesting,Example-TheCommissionProblem,Slice-BasedTesting,GuidelinesandObservations.

UNIT-III   [12Hours]

Levels of Testing: The SATM System, Structural and Behavioural Insights. IntegrationTesting: A Closer Look at the SATM System, Decomposition-Based Integration, Top-Down Vs Bottom-Up Integration,Sandwich Integration,Call Graph-Based Integration,Pair wise Integration, Neighborhood Integration, Path-Based Integration. System
Testing:Threads,Basicconceptsforrequirementsspecification,Findingthreads,Structuralstrat egies and functional strategies for thread testing, Interaction Testing: A Taxonomy ofInteractions,StaticInteractioninaSingleProcessor,StaticInteractioninMultipleProcessors, Dynamic Interaction in a Single Processor, Dynamic Interaction in MultipleProcessors,Client-ServerTesting.

UNIT-IV   [12Hours]

Object Oriented Testing: Issues in Object Oriented Testing, Implication of CompositionandEncapsulation,ImplicationsofInheritance,ImplicationsofPolymorphism,G UI-Testing,Object-OrientedIntegrationTesting.Exploratory   Testing:Thecontext-drivenschool,Exploringexploratory   testing,Exploringafamiliarexample,Exploratory andcontext-driventestingobservations.Model-BasedTesting:Testingbasedonmodels,Appropriate models, Use case-based testing, Commercial tool support for model-basedtesting. Test-Driven Development: Test-then-code   cycles,   Automated   test   execution, JavaandJUnitexample,Remainingquestions,Pros,cons,andopenquestionsofTDD,Retrospecti ve on MDD versus TDD, Software Testing Excellence: Craftsmanship, Bestpractice ofsoftwaretesting,Top10bestpracticesforsoftwaretestingexcellence.

TextBook
 1. PaulC. Jorgensen: SoftwareTesting,ACraftsman'sApproach,3rdEdition,2013.

ReferenceBooks

1. Mauro Pezze, Michal Young: Software Testing and Analysis – Process, Principles andTechniques,1stedition,JohnWiley&Sons,2011.
2. BrianMarrick:TheCraft ofSoftwareTesting,1stedition,Pearson,2012.
3. Srinivasan Desikan, Gopalaswamy Ramesh: Software testing Principles and Practices,1st   Edition,Pearson,2012.
4. AdityaP Mathur:FoundationsofSoftwareTesting,Pearson,2008.