SCHEMEOFEXAMINATION & SYLLABUS

of

Bachelor of Computer Applications (BCA)

UNDER

Faculty of Information Technology

w.e.f.Session 2022-23

Bachelor of Computer Applications
(W.e.f. 2022 – 2023)

Semester-I					
Subject Code	**Subject Name**	**Credit**	**Internal**	**External**	**Total**
BCA101	Mathematics- I	3	30	70	100
BCA102	FundamentalsofInformation Technology	3	30	70	100
BCA103	ProgrammingforProblemSolvingUsing 'C++'	3	30	70	100
-	**(Choose AnyOne)104A/104B**	2	15	35	50
BCA104A	EnvironmentalStudies				
BCA104B	NCC				
BCA105	DigitalElectronics	3	30	70	100
BCA106P	FundamentalsofInformationTechnology Lab	1	20	30	50
BCA107P	ProgrammingforProblemSolvingUsing 'C++' Lab	1	20	30	50
Total		**16**	**175**	**375**	**550**

Semester–II					
Subject Code	**SubjectName**	**Credit**	**Internal**	**External**	**Total**
BCA201	StatisticalMethods	3	30	70	100
BCA202	DataStructuresUsingC++	3	30	70	100
BCA203	DatabaseManagement Systems(DBMS)	3	30	70	100
BCA204	FinancialAccounting	3	30	70	100
-	**(ChooseAnyOne)205A/205B**	2	15	35	50
BCA205A	English				
BCA205B	NCC				
BCA206P	DataStructuresUsingC++Lab	1	20	30	50
BCA207P	DatabaseManagementSystem(DBMS)Lab	1	20	30	50
Total		**16**	**175**	**375**	**550**

*Student hastoundergo forInternship Assessmentcompletionof2ndSemesterwhichistobe evaluated in 3rd Semester

Semester-III					
Subject Code	**SubjectName**	**Credit**	**Internal**	**External**	**Total**
BCA301	ProgramminginJava	3	30	70	100
BCA302	WebDevelopmentwithPHP	3	30	70	100
BCA303	DesignandAnalysisofAlgorithm	4	30	70	100
BCA304	OperatingSystem	4	30	70	100
BCA305	EntrepreneurshipDevelopment	3	30	70	100
-	**Elective-I**	3	30	70	100
BCA306A	EmbeddedSystems				
BCA306B	NaturalLanguage Processing				
BCA306C	EnterpriseResourcePlanning				
BCA307P	ProgramminginJavaLab	1	20	30	50
BCA308P	WebDevelopmentwithPHP	1	20	30	50
BCA309P	MiniProject/Internship Assessment	2	20	30	50
Total		**24**	**240**	**510**	**750**

Semester-IV					
Subject Code	**SubjectName**	**Credit**	**Internal**	**External**	**Total**
BCA401	ComputerGraphics&Multimedia Application	3	30	70	100
BCA402	SoftwareEngineeringandTesting	3	30	70	100
BCA403	DataMiningand Warehousing	4	30	70	100
BCA404	OptimizationTechniques	3	30	70	100
BCA405	ComputerNetwork	4	30	70	100
-	**Elective-II**	3	30	70	100
BCA406A	GreenComputing				
BCA406B	ImageProcessing				
BCA406C	BigDataAnalytics				
BCA407P	PythonProgrammingLab	1	20	30	50
BCA408P	ComputerGraphics&Multimedia Application Lab	1	20	30	50
BCA409P	SoftwareEngineeringandTesting Lab	1	20	30	50
Total		**23**	**240**	**510**	**750**

*Student hastoundergo forInternship Assessmentcompletionof4th Semesterwhichisto be evaluated in 5th Semester

Semester–V					
Subject Code	**SubjectName**	**Credit**	**Internal**	**External**	**Total**
BCA501	MobileApplication Development	3	30	70	100
BCA502	LinuxServer Administration	3	30	70	100
BCA503	Cloud Computing	4	30	70	100
-	**Elective-III**	3	30	70	100
BCA504A	ArtificialIntelligence and MachineLearning				
BCA504B	AdvanceNeuralNetwork& DeepLearning				
BCA504C	InternetOfThings				
-	**Elective-IV**	3	30	70	100
BCA505A	DigitalMarketingandBusiness Analytics				
BCA505B	EthicalHacking				
BCA505C	IT Security				
-	**Practical(504A,504B,504C)**	1	20	30	50
BCA506P(A)	ArtificialIntelligence and MachineLearning				
BCA506P(B)	AdvanceNeuralNetwork& DeepLearning				
BCA506P(C)	InternetOfThings				
BCA507P	MobileApplication DevelopmentLab	1	20	30	50
BCA508P	LinuxServer Administration Lab	1	20	30	50
BCA509P	InternshipAssessment	2	20	30	50
Total		**21**	**230**	**470**	**700**

Semester-VI					
CourseCode	**TitleofPaper**	**Credit**	**Internal**	**External**	**Total**
BCA601P	Internship/MajorProject	18	150	200	350
BCA602P	Seminar	2	50	100	150
Total		**20**	**200**	**300**	**500**

Total Credit-120

TotalMarks-3800

SEMESTER–I

Mathematics–I

(BCA101)

Course Objectives:

- TounderstandconceptsandoperationsinSetTheoryandRelations.
- TounderstandconceptsandoperationsinMatricesand Determinant.
- TounderstandfundamentalsofReasoning.
- ToprovidefoundationsofProbabilitytheory&Logic.
- ToprovidefoundationsofStatisticsrelatedtodataanalysis.

Course Outcomes:

- Studentwill beabletoperform Mathematical OperationslikeSetoperations,Matrix operations
- Student will be able to perform Statistical operations like mean, mode, and median on given datasets.
- UnderstandandpracticeMathematicalrelationsandfunctions&probabilitytheory.
- UnderstandandpracticeDeterminant,Matrices&Logic.

UNIT– I

Sets and elements: power set, universal set, union and intersection of sets, difference of sets, complement of a set, ordered pairs, Cartesian product of sets, number of elements in the Cartesian product of two finite sets. Equality of sets, transitivity of set inclusion, universal set,complement of a Set, Subsets Proper and Improper Subsets, Union of Sets, properties of Union. operation, intersectionofsets, disjoint sets, propertiesofintersectionoperation, relative complement of a set, De Morgan'sLaws, Distributive Laws of Union and Intersection. Definition of Relation: Pictorial Diagrams, Co-domain and Range of a relation.

UNIT-II

Function as a special kind of relation from one set to another. Pictorial representation of a function, domain, co-domain & range of a function. Real valued function of the real variable, domain and range ofthese functions, constant, identity, polynomial, rational, modulus, signum and greatest integer functions with their graphs. Sum, difference, product and quotients of functions. Typesofrelations: reflexive, symmetric,transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function. Binary operations. Fundamental principle of counting. Factorial n. (n!), permutations and combinations.

UNIT-III

Determinant: Determinant of 3rd order, Cramer's rule, consistency of equations Matrices:types of matrices, algebra of matrices, linear homogeneous equations, linear nonhomogeneous equations.

UNIT-IV

Mathematical reasoning: mathematically acceptable statements. connecting words/ phrases – consolidating the understanding of "if and only if (necessary and sufficient) condition", "implies", "and/or", "implied by", "and", "or", "there exists" and their use through variety ofexamples relatedto reallife and mathematics. Definitionofstatistics, raw data, classification

of data, average, scatter, range, relationshipbetween mean, median, mode, dispersion, mean deviation, standard deviation, variance.

UNIT-V

Meaning of probability, random experiment an outcome, sample space, sample point, types of sample space, types of events, and probability of an event, total and conditional probability, probability distribution of a random variable, repeated independent (Bernoulli) trials and binomial distribution.

References:

1. BasicsofMathematicsByR.D Sharma.
2. StatisticsandSolutionByV.K.Kapoor.
3. www.e-booksdirectory.com/mathematics
4. www.origoeducation.com/go-maths

FundamentalsofInformationTechnology

(BCA102)

Course Objectives:

- Toknowcomputerevolutionwithfeaturesofeachgeneration.
- IdentifyvariousdevicesusedinComputer systemwithspecificuseofeach.
- Toknowtheplaceofcomputerinourdaytodaylife,itscharacteristics,itsusage, Limitations and benefits etc.
- Toknowtypesofsoftwareandlanguageswithspecificuseofeach.
- TounderstandComputerNetworkandManagementInformationSystembasics.
- TofamiliarizestudentwithOfficeAutomationandComponentofOfficeAutomation.
- To make them comfortable to evaluate, select and use Office Software appropriate tospecific task.
- Tomake themworkonOpenSoftware forOfficeAutomation.
- Todevelopexpertise inWordProcessing,Spreadsheet,andPresentationSkills.

Course Outcomes:

- DescribeComputerSystemevolution,Characteristicsand Types.
- SelectNeedbaseSystemHardwareand Software.
- DescribetheOS,TypesofOS,BatchFileandfeatures.
- DescribetheUse, Process,TypesandTopologies ofComputerCommunication.
- OutlineOfficeSuitcomponentswithspecificapplication.ListOpenOfficeSoftware.
- ApplyWordProcessingToolsincludingDocumentFormatting,UsingGraphics, Working with Macro and Mail Merge.
- Apply Spread Sheet Tools including Worksheet formatting, Using Functions, Graphics and Charts.
- CreateeffectivePresentationUsingAnimationandTransition.

UNIT-I

Introduction to Computers: Introduction, Characteristics of Computers, Block diagram of computer. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages). Data Organization, Drives, Files, Directories. Types of Memory (Primary And Secondary) RAM, ROM, PROM, EPROM. SecondaryStorage Devices (FD, CD, HD, Pen drive)I/O Devices (Scanners, Plotters, LCD, Plasma Display) Number Systems Introduction to Binary, Octal, Hexadecimal system Conversion.

UNIT-II

Operating System and Services in O.S. Dos – History, Files and Directories, Internal and External Commands, Batch Files, Types of O.S.Windows Operating Environment Features of MS – Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush etc.Use of communication and IT, Communication Process, Communication types- Simplex, HalfDuplex, Full Duplex, Communication Protocols, Communication Channels - Twisted, Coaxial, Fiber Optic, Serialand Parallel Communication,

Modem - Working and characteristics, Types of network Connections - Dialup, Leased Lines, ISDN, DSL, RF, Broad band, Types of Network - LAN, WAN, MAN, Internet, VPN etc., TopologiesofLAN -Ring, Bus,Star,Meshand Treetopologies, ComponentsofLAN -Media, NIC, NOS, Bridges, HUB, Routers, Repeater and Gateways.

UNIT-III

Introduction to Office Automation Suit, Elements of Office Suit & Area of Use. WordProcessing, Spreadsheet, Presentation Graphics, Database. Introduction ofvarious Office Suites Open Office, Libre Office, WPS Office, Microsoft Office. Word Basics UsingMSOffice : Starting Word Processor, The parts of a Word Processor Window, Menus & Commands, Toolbars & Buttons, Shortcut Menus, Creating a New Document, Different Page Views and Layouts, Applying various Text Enhancements, Formatting Text and Documents:Auto Format, Text Attributes, Paragraph and Page Formatting, Line Spacing, Margins, Borders and Shading, Tabs and Indents, Text Editing using various features, Bullets, Numbering, Working withStyles, Printing &variousprint options, SpellCheck ,Working with Headersand Footers,Tables: Creating a Simple Table, Creating a Table using the Table Menu, Entering and Editing Text in a Table, Selecting in Table, Adding Rows, Changing Row Heights, Deleting Rows, Inserting Columns, Deleting Columns, Changing Column Width.

UNIT– IV

Spreadsheet Basics: Overview ofSpreadsheet, Features, Creating a New Worksheet, Selecting Cells, Entering and Editing Text, Entering and Editing Numbers, Entering and Editing Formulas, Referencing Cells, Moving Cells, Copying Cells, Sorting Cell Data, Inserting Rows,Columns, Inserting Cells, Deleting Partsofa Worksheet, Clearing Parts ofa Worksheet. Formatting: Page Setup, Changing Column Widths and Row Heights, Auto Format, Changing Font Sizes and Attributes, Using Border Buttons and Commands, Changing Colors andShading, Hiding Rows and Columns.Function in Spreadsheet, Functions by category: Date and Time functions, Statistical functions, Text functions. Spreadsheet Charts: Chart parts and Terminology, Instant Charts with the Chart Wizard, Creation of different types of Charts, Printing Charts, Deleting Charts, L:inking in Spreadsheet. Spreadsheet Graphics: Creating and Placing Graphic Objects, Resizing Graphics, Drawing Lines and Shapes.

UNIT-V

Creating Presentations: Using Blank Presentation Option, Using Design Template , Adding Slides, Deleting a Slide, Importing Images from Outside, Transition and Build Effects,Deleting a Slide, Numbering a Slide, Saving Presentation, Closing Presentation, Printing Presentation.

Reference:

- PradeepKSinha, PritiSinha, ComputerFundmentals, SixthEdn. BPBPublications
- S.K.Basandra,"ComputersToday", Galgotia Publications.
- AlexisLeon&MathewsLeon,"FundamentalsofInformationtechnology",Vikas Publishing House, New Delhi.
- V.Rajaraman,NeeharikaAdabala,ComputerFundamentals,PHI
- MicrosoftOfficeStebyStepBethMelton,MarkDodge,Publishedwiththeauthorization of Microsoft Corporation by: O'Reilly Media.
- Office2013Bible:TheComprehensiveTutorialResourcePaperback–byLisaA. Bucki (Author), John Walkenbach (Author), Michael Alexander.

- LearningMicrosoftOffice2013byRameshBangia,Khanna Publishers
- www.openoffice.org/documentation/manuals/.../0100GS3-GettingStartedOOo3.pdf
- Open Office for Dummies (https://whc.es/OpenOffice%20org%20For%20Dummies.pdf)
- https://www.libreoffice.org/get-help/documentation/Libre Office 5.1 Writer, Calc, Math Formula Book- Vol 1 by Lalitmali

ProgrammingforProblemSolvingUsing'CandC++'

(BCA103)

Course Objectives:

- Have Understanding of Programming Language Standards, Problem Solving Techniques, IDE and Compilers for C and C++.
- TohaveindepthknowledgeofWriting, CompilingandRunning Programs.
- To understand and Practice Programming Construct: Variable, Operators, Control Structures, Loop, Functions with C and C++.
- To understand and Practice basics of arrays, pointers, preprocessor, Structure andUnion
- To learn difference in procedural and Object oriented programming language with understanding of OOPs features and Practice beginner level of Pointers, Preprocessor, Programming

Course Outcomes:

- ListandDemonstrateBasicTerminologyUsedinComputerProgrammingWrite,Compile and Debug Programs in C and C++ Language.
- UnderstandandApplyVariable,Conditional Statements,Loops,FunctionsinCand C++.
- PracticePointers,Structure,UnionandClassinProgramming.
- Explain and Differentiate the Process of Problem Solving Using Proceduraland Object Oriented Programming Language.
- UnderstandandPracticeObjectOrientedProgrammingConceptsinC++

UNIT-I

IdeaofAlgorithm: RepresentationofAlgorithm, Flowchart, Pseudo codewithexamples, From algorithms to programs, source code. Introduction to C Language, Language Standards, Features of Procedural Language specific to C, Structure of C and C++ Program, Introduction toCompilers, Creating, CompilingandExecutingCandC++Programs, IDEFeaturesofTurbo Compiler. Keywords, Identifiers, Variables, Constants, ScopeandLifeofVariables, Localand Global Variable, Data Types, Expressions. Operators - Arithmetic, Logical, Relational, Conditional and Bit Wise Operators, Precedence and Associativity of Operators, Type Conversion.LibraryFunction,CharacterInput/Output-getch(),getchar().getche(),putchar( ). Formatted Input/Output-printf( ) and scanf( ), Mathematical & Character Functions in C and C++.

UNIT-II

Control Structures: Declaration Statement, Conditional Statement - if Statement, if-else Statement, Nesting of if Statement, else if Ladder, The?: Operator, switch Statement. Iteration Statements - For Loop, While Loop, Do-While Loop. Jump Statements: break, continue, goto,exit( ). Arrays - Concept of Single and Multi-Dimensional Arrays, ArrayDeclaration and Initialization. Strings: Declaration, Initialization, String Functions Using C and C++.

UNIT-III

The Need ofFunctions, User Defined and Library Function, Prototype ofFunctions, Prototype of main( ) Function, Calling of Functions, Function Arguments, Argument Passing: Call By Value and Call By Reference, Return Values. Nesting of Function, Recursion, Array asFunction Argument, Command Line Arguments, Basics of Pointers, Pointers Operators, Pointer Arithmetic, Pointers and Function, Pointer and Strings. Preprocessor and its Advantages.

UNIT-IV

Storage Class Specifier- Auto, Extern, Static, Register. Defining Structure, Declaration of Structure Variable, Type def, Accessing StructureMembers, Member AccessOperator, Nested Structures, Array of Structure, Structure Assignment, Structure as Function Argument, Function that Return Structure, Union. Pointer to Structure, Pointers within Structure, Introduction to Static and Dynamic Memory Allocation, The Process of Dynamic Memory Allocation, DMA Functions : malloc( ), calloc( ), free( ), realloc( ), sizeof( ) Operator. C++Classes and Object.

UNIT-V

Constructor and its Types, ArrayofObjects, Object as Argument, Reference Variable, Default Argument, Destructor Function, Object Oriented Programming Concepts. Polymorphism (Operator Overloading, Function Overloading) . Inheritance and its Types. Access Specifier, Virtual Functions, Abstract Base Classes and Pure Virtual Function. Virtual Base Classes.

References:

- Kerninghan&Ritchie“TheCProgrammingLanguage”,PHI
- Schildt“C:theCompleteReference”,4thEdTMH.
- KanetkarY.“LetUsC”,BPB.
- KanetkarY.:“PointersinC”,BPB
- Gottfried:“ProblemSolvinginC”,SchaumSeries
- Balagurusami“Programming inANSIC”,7thedMcGrawHillEducation.
- HerbertzShield, "C++TheCompleteReference "TMHPublicationISBN0-07-463880- 7
- R.Subburaj,'ObjectOrientedProgrammingWithC++VikasPublishingHouse,New Delhi.Isbn 81-259-1450-1
- E.BalgurUswamy,"C++"TMHPublicationISBNO-07-462038-X
- M.Kumar'ProgrammingInC++"TMHPublications
- R.Lafore,'Object OrientedProgramming C++"
- Ashok.N.Kamthane,"ObjectOrientedProgrammingWithANSi&TurboC++",Pearson Education Publication,ISBN-8j-7808-772-3

EnvironmentalStudies

(BCA104A)

Unit1:IntroductiontoEnvironmentalStudies (6 Lecture)

- Multidisciplinarynatureofenvironmentalstudies;
- Scopeandimportance;Conceptofsustainabilityandsustainabledevelopment.

Ecosystems

- Whatisanecosystem?Structure andfunctionofecosystem;Energyflowinanecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems :
    a) Forestecosystem
    b) Grasslandecosystem
    c) Desertecosystem
    d) Aquaticecosystems(ponds,streams,lakes,rivers,oceans,estuaries)

Unit2:NaturalResources:RenewableandNon---renewableResources (6 Lecture)

- Landresourcesandlandusechange;Landdegradation,soilerosionand desertification.
- Deforestation:Causesandimpactsduetomining,dambuildingonenvironment,forests, biodiversity and tribal populations.
- Water:Useandover---exploitationofsurfaceandgroundwater,floods,droughts,conflicts over water (international & inter---state).
- Energyresources:Renewableandnonrenewableenergysources,useofalternateenergy sources, growing energy needs, case studies.

Unit3:BiodiversityandConservation (5 Lecture)

- Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- Indiaasamega---biodiversitynation;EndangeredandendemicspeciesofIndia
- Threats to biodiversity : Habitat loss, poaching of wildlife, man---wildlife conflicts, biological invasions; Conservation of biodiversity : In---situ and Ex---situ conservation of biodiversity.
- Ecosystemandbiodiversityservices:Ecological,economic,social,ethical,aestheticand Informational value.

Unit4:EnvironmentalPollution (9 Lecture)

- Environmentalpollution:types, causes, effectsandcontrols;Air,water,soilandnoisepollution
- Nuclearhazardsandhumanhealthrisks
- Solidwastemanagement:Controlmeasuresofurbanandindustrialwaste.
- Pollutioncasestudies.

EnvironmentalPolicies&Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Naturereserves,tribalpopulationsandrights,andhumanwildlifeconflictsinIndiancontext.

Unit5:HumanCommunitiesandtheEnvironment (4 Lecture)

- Humanpopulationgrowth:Impactsonenvironment,humanhealthandwelfare.
- Resettlementandrehabilitationofprojectaffectedpersons;casestudies.
- Disastermanagement:floods,earthquake,cyclonesandlandslides.
- Environmentalmovements:Chipko,Silentvalley,BishnoisofRajasthan.
- Environmentalethics:RoleofIndianandotherreligionsandculturesinenvironmental conservation.
- Environmentalcommunicationandpublicawareness,casestudies(e.g.,CNGvehiclesin Delhi).

SuggestedReadings:

1. Carson,R.2002. *SilentSpring*.HoughtonMifflinHarcourt.
2. Gadgil, M.,&Guha,R.1993.*ThisFissuredLand:AnEcologicalHistoryofIndia*. Univ. of California Press.
3. Gleeson,B.andLow,N. (eds.)1999.*GlobalEthicsandEnvironment*,London, Routledge.
4. Gleick, P.H.1993.*WaterinCrisis*.PacificInstitutefor StudiesinDev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, MarthaJ., GaryK. Meffe, andCarlRonaldCarroll.*Principlesof ConservationBiology*. Sunderland: Sinauer Associates, 2006.
6. Grumbine,R.Edward,andPandit,M.K.2013.ThreatsfromIndia'sHimalayadams.*Science,* 339:36---37.
7. McCully,P.1996. *Riversnomore:theenvironmentaleffectsofdams*(pp.29---64).ZedBooks.
8. McNeill, JohnR. 2000.SomethingNewUnder theSun:AnEnvironmentalHistoryofthe Twentieth Century.
9. Odum,E.P.,Odum,H.T.&Andrews,J.1971.*FundamentalsofEcology*.Philadelphia: Saunders.
10. Pepper,I.L.,Gerba,C.P.&Brusseau,M.L.2011.EnvironmentalandPollutionScience. Academic Press.
11. Rao,M.N. &Datta,A.K. 1987.*WasteWaterTreatment.* OxfordandIBHPublishingCo. Pvt. Ltd.
12. Raven, P.H.,Hassenzahl, D.M.&Berg, L.R.2012.*Environment*. 8thedition. JohnWiley&Sons.
13. Rosencranz, A., Divan, S., &Noble, M. L.2001. *Environmentallawandpolicyin India*. *Tripathi 1992*.
14. Sengupta,R.2003.*Ecologyandeconomics*:Anapproachtosustainabledevelopment. OUP.
15. Singh, J.S.,Singh, S.P.andGupta,S.R.2014. *Ecology,EnvironmentalScienceand Conservation.* S. Chand Publishing, New Delhi.

16. Sodhi, N.S.,Gibson, L.&Raven, P.H. (eds). 2013. *ConservationBiology*:*Voicesfromthe Tropics*. John Wiley & Sons.

17. Thapar,V.1998.*Land oftheTiger*:*ANaturalHistoryof theIndian Subcontinent.*
18. Warren,C. E. 1971.*BiologyandWaterPollutionControl*.WBSaunders.
19. Wilson,E.O.2006.*TheCreation:Anappealtosavelifeonearth*.NewYork:Norton.

20. WorldCommissiononEnvironmentandDevelopment. 1987.*OurCommonFuture*.Oxford University Press.

(BCA105)

DigitalElectronics

COURSEOBJECTIVE:

1. Understandingthedisciplinesofanalogganddigitalelectroniclogiccircuits.
2. VariousNumbersystemandBooleanalgebrathendesignand implementationof combinational circuits.
3. DesignandimplementationofSequentialcircuits,Hardwaredescription language.

COURSEOUTCOME:

1. Understandtheconceptsofvariouscomponentstodesignstableanalog circuits.
2. Representnumbersandperformarithmeticoperations.
3. MinimizetheBooleanexpressionusingBooleanalgebraanddesignitusinglogicgates.
4. Analyzeanddesigncombinationalcircuit.
5. Designanddevelopsequentialcircuits.
6. TranslaterealworldproblemsintodigitallogicformulationsusingVHDL.

UNIT-I

Boolean Algebra : Basics Laws of Boolean Algebra, Logic Gates, Simplifications of Boolean equations using K-maps, Code Conversion, (Binary, Octal, Hexadecimal), Overview of Gray codes and Excess – 3 codes.

UNIT-II

Arithmetic Circuits Adder, Subtractor, Parallel binary adder/Subtractor, binary multiplier and divider. Combinational Circuits Multiplexers, De-Multiplexers, decoders, encoders, Design of code converters.

UNIT-III

Flip-flops -S-R, D, J-K, T, Clocked Flip -flop, Race around condition, Master slave Flip-Flop, Realisation of one flip-flop using other flip-flop.
Shift Registers, Serial-in-serial-out, serial-in-parallel-out, parallel-in-serial-out and parallel-in-parallel-out,Bi-directional shift register.

UNIT-IV

Counters- Ripple counter, Synchronous Counter, Modulo Counters, Ring Counter, Twisted Ring Counter. Memory Devices - RAM, ROM, PAL & PLA

Text Books:

1. MorisMano,"DigitalLogicandComputerDesign",PHIPublications,2002
2. R.P.Jain,"ModernDigitalElectronics",TMH,3rdEdition, 2003.

ReferencesBooks:

1. R.L.Tokheim,“DigitalElectronics,PrinciplesandApplications”,TataMcGraw Hill, 1999.
2. W.Gothman,“Digitalelectronics”,PHI.
3. S.Salivahanan&S.Arivyhgan.“Digitalcircuitsanddesign”,Vikas Publication, 2001
4. MalvinoLeach,"DigitalPrinciplesandApplication",TMH,1999.

FundamentalsofInformationTechnologyandOfficeAutomationLab

(BCA106P)

PracticalwillbebasedonPaper Fundamentals ofInformationTechnologyandOffice Automation Lab: Covers UNIT-III, UNIT-IV, and UNIT-V, of Syllabus.

ProgrammingforProblemSolvingUsing'CandC++'Lab

(BCA107P)

1. WriteaProgram inC tocalculateSimpleInterestwhen thevalues of Principal,Rate and Time are given.
2. Write a Programin C++ to calculate Temperaturein Centigrade whentemperature is in Fahrenheit.
3. WriteaPrograminCto determinewhetheraninput YearisLeap Yearornot.
4. WriteaprogramtocalculatetheFactorialofanumberinputfromKeyboardusing Recursive method.
5. WriteaPrograminC++ toshowhowtopassanArrayto auserdefinedfunction.
6. WriteaPrograminCto swaptwonumbersusing Call byValueand Call byAddress.
7. Write a Program in C to read Name, Roll No, and Percentage of five Students and display them using Array of Structures.
8. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by the user. Assign grades according to the following criteria :
    a. GradeA:Percentage>=80
    b. GradeB:Percentage>=70and<80
    c. GradeC:Percentage>=60and<70
    d. GradeD:Percentage>=40and<60
    e. GradeE: Percentage<40
9. WriteaPrograminC++todisplaythefirstntermsofFibonacciseries.
10. Writea PrograminCtocalculatethe sumoftwo compatiblematrices.
11. WriteaPrograminC++tocalculatetheproductoftwocompatiblematrices.
12. Write a C program to pass an entire array to a user-defined function and multiply each element by 3 inside the function and print the elements of the array in main().
13. Writea Cprogramtoshow usageofpointertostructureusingarrowoperators
14. Write a C programtoshow usageofpointertofunction
15. Raising a number n to a power p is the same as multiplying n by itself p times. Write a function called power ( ) that takes a double value for n and an int value for p, and returns the result as double value. Use a default argument of 2 for p, so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values from the user to test this function.
16. Create a class Employee with basic information of Employees as data members and member function to get these information and display employee information.

SEMESTER–II

StatisticalMethods

(BCA201)

Course Objectives: To understand the role of statistic and probability in the spatial data analysis and design

Course Outcomes:

at the end ofthe coursethe student will able to learnto Understand/(Solve the problems using) the advanced statistical approaches, Identify the statistical methods for solving geospatial problems, applythe advanced statistical methods forimage processing and to use geo-statistics for studying spatially varying phenomena

UNIT-I

Basic Statistics:Sources of Data, Organization of Data, The Histogram, Measures of central tendency, Mean Deviation, Standard Deviation, Correlation, Coefficient of correlation, Rank correlation, Regression.

UNIT-II

Probability:equally likely, mutually exclusive events, definitions of probability, additions & multiplication theorems of probability and problems based on them. Bayesian approach, distributions; Poisson, normal, Erlang, Gamma and Weibull probability distributions

UNIT-III

Multivariate Data:Random Vectors and Matrices, sample estimate of centroid, standard deviation, SSCP, dispersion, variance, covariance, correlation matrices.

UNIT-IV

Multivariate Regression Models, Multiple linear Regression:Multiple parameter estimation by method of least squares, tests of significance use of dummy variables, problems associatedwith multi collinearity, heteroscedasticity.

UNIT-V

Geo-statistics-Pattern Analysis, Measures of Arrangements & dispersion, Auto Correlation, Semi-veriogram, Kriging;

TEXTBOOKS:

- Gupta,S.C.andKapoor,V.K.,"Fundamentalsof MathematicsStatistics",Sultan Chand and Sons, 2001.
- Johnson,R.J.,"MillerandFreund'sProbabilityandStatisticsforEngineers"6th Edition, Prentice Hall of India, 2002.

REFERENCES:

- JayL.Devore,"ProbabilityandstatisticsforEngineeringandtheSciences", Thomson and Duxbbury, 2002.

- Sarma,D.D.“GeostatisticswithApplicationsinEarthSciences”,CapitalPublishing Company, 2002.
- CooleyW.WandLohnesP.R.-MultivariateDataAnalysis,JohnWileyandSons,1971.

DataStructuresUsing C++

(BCA202)

CourseObjectives:

- TolearnSeveraldatastructureconceptslikestack, queue,linkedlist,treesand graphs
- Tolearnthe Applications ofdatastructures.
- ToimprovetheProblemsolvingqualityusingdatastructuretechniques

Course Outcomes:

- Understandtheconceptandusageof data types,dynamicmemorymanagementand data structures.
- Implementstackandqueuesalgorithms
- Implementlinkedlistdatastructures
- Implementgraphsdata structures
- Implementtreeandsortingindatastructures
- Choosetheappropriatedatastructurestosolvecomplexreallifeproblems

UNITI-INTRODUCTIONTODATASTRUCTURES

Definition – types of data structure-abstract data type-array as an abstract data type representation of array- sparse matrices- asymptotic notation.

UNITII-STACKSANDQUEUES

Stacks- queue- mazing problem- evaluation of expression- postfix notation- infix to post fix- multiple stack and queue.

UNITIII-LINKED LIST

Singly linked list- representation of linked singly list- operations on singly linked list, doubly linked list- representation of doubly linked list- operations on doubly linked listdifferentiate singly and doubly linked list- circularly singly and doubly linked list

UNITIV -TREES

Tree Terminology- representation of tree- binary tree- binary tree traversaloperations on tree- applications- Sorting: selection sort- bubble sort- quick sort

UNITV-GRAPHS

Definition- representation of a graph- operations- breadth first search- depth first search- minimum cost spanning trees- kruskal's algorithm and prim's algorithmshortest path and transitive closure- single source- floyds algorithm- all pair dijikstra's algorithm.

TEXT BOOK

- EllisHorowitz,Sahni,DineshMehta(1999),"FundamentalsofDataStructuresin C++", Golgotha publication, New Delhi.

REFERENCE

- WeissMarkAllen(2006),"DataStructureandalgorithmanalysis",Pearson Education.

DataStructuresUsingC++Lab

(BCA206P)

PracticalListonDataStructuresUsingC++

1. ProgramtomaintainaLinked List.
2. Programtoaddanew nodetothe ascendingorderLinkedList.
3. Programto maintainaDoublyLinked List.
4. ProgramtoimplementStack asanArray.
5. ProgramtoimplementStackasaLinkedList.
6. ProgramtoconvertanA.E.fromInfixformtopostfixform.
7. ProgramtoevaluateanExpressionentered inPostfix form.
8. ProgramtoImplementNon-RecursivefunctionforFactorialofa Number.
9. ProgramtoImplementRecursivefunctionfor Factorialofa Number.
10. Programto implementaQueueasanArray.
11. ProgramtoimplementaQueueasaLinkedList.
12. ProgramtoimplementaCircular QueueasanArray.
13. ProgramtoimplementaCircular QueueasaLinkedList.
14. ProgramtoimplementaDequeusinganArray.
15. ProgramtoimplementLinear SearchinanunsortedArray.
16. ProgramtoimplementBinarySearchina sortedArray.
17. ProgramtoimplementSelectionSort.
18. Programtoimplement InsertionSort(Theprogramshouldreportthenumberof Comparisons).
19. ProgramtoimplementBubbleSort.
20. ProgramtoimplementQuickSort.

DatabaseManagementSystem

(BCA203)

Course Objectives:

- TounderstandneedofDBMS.
- Tounderstandconceptualand physicaldesignofadatabase.
- TounderstandRDBMSandtodesignRelationaldatabase.
- Toknowbasicdatabasebackupandrecoverymechanism.
- Toknowadvances inDBMS.

Course Outcomes:

- UnderstandData,Databasesystemanditsarchitecture.
- ApplyERmodelingandRelationalDatabasedesignusingNormalization.
- Applyconcepts ofdatabasestorageandquerying.
- UnderstandConcurrency,RecoveryandSecuritymechanisminDBMS.
- UnderstandCurrent advancesinDBMS.

UNIT-I

IntroductionTo DatabaseSystem: Data - DatabaseApplications - EvolutionofDB &DBMS - Need for data management, Introduction and applications of DBMS, File systems versus Databasesystems,DataModels,DBMS Architecture,DataIndependence,DataModelingusing Entity-Relationship Model, Enhanced ER Modeling.

UNIT-II

Relational Database Concept and Design: Introduction to relational database, Structure of Relational Database, Relational model terminology domains, Attributes, Tuples, Relations, relational DB schema. Relational algebra: Basic operations selection and projection, Set Theoretic operations Union, Intersection, set difference and division, Join operations: Inner, Outer, Left outer, Right outer and full outer join. Relational Database design, Functional Dependency, definition, trivial and nontrivial FD, Normalization 1Nf, 2NF, 3NF, Decomposition using FD dependency preservation, BCNF, Multi valued dependency, 4NF, Join dependency and 5NF.

UNIT-III

Database storage and querying -Basic Concepts of Indexing and Hashing Query Processing, Measures Of Query Cost, Query Processing for Select, Sort Join Operations, Basics of Query Optimization, Transformation of Relational Expression Estimating Statistics of Expression, Choice of Evaluation Plan.

UNIT-IV

Concurrency, Recovery and Security -Concurrency Control: Definition of concurrency, lost update, dirty read and incorrect summary problems due to concurrency. Concurrency Control Techniques:OverviewofLocking,2PL,Timestampordering,multi-versioning,validation

Recovery concepts, Shadow paging, Log Based Recovery, Elementary concepts of Database security: system failure, Backup and Recovery Techniques, authorization and authentication.

UNIT-V

Introduction to Current Trends – Centralized and Client Server Architectures, Distributed Databases, Object Oriented Database, Spatial & Temporal Databases, Data Mining & Warehousing, DataVisualization, Mobile Databases, OODB&XMLDatabases, Multimedia& Web Databases.

References:

- Abraham Silberschatz, Henry Korth, S. Sudarshan, "Database Systems Concepts", 7th Edition, McGraw Hill .
- RajeshNarang"DatabasemanagementSystem"PHI.
- RamakrishnanandGherke,"DatabaseManagementSystems",TMH.
- R. ElmarsiandSBNavathe,"FundamentalsofDatabaseSystems",Pearson,5th Ed.
- SinghS.K.,"DatabaseSystemConcepts,designandapplication",PearsonEducation
- BipinDesai,"AnIntroductiontodatabaseSystems",GalgotiaPublications

FinancialAccounting

(BCA204)

Course Objectives:

This course revisits and strengthens fundamental accounting principles and processes, culminating inthe preparationofthe financialstatementsofa sole proprietorship business. The course also focuses on accounting for special transactions such as consignment and joint ventures.

Course Outcome:

1. UponUnderstandandapplyfundamentalaccountingconcepts,principlesand conventions.
2. Record basic accounting transactions and prepare annual financial statements for a sole proprietorship business.
3. RecordaccountingtransactionsforBillsofExchange,ConsignmentAccount,Joint Venture Account, Final Account.

UNIT-I

Overview - Meaning and Nature of Financial Accounting, Scope of Financial Accounting, Financial Accounting & Management Accounting, Accounting concepts & convention, accounting standards in India.

UNIT-II

Basics of accounting – Capital & Revenue items, Application of Computer in Accounting Double Entry System, Introduction to Journal, Ledger and Procedure for Recording and Posting, Introduction to Trail Balance, Preparation of Final Account, Profit & Loss Account and related concepts, Balance Sheet and related concept.

UNIT-III

Financial statement analysis: Ratio analysis, Funds flow analysis, concepts, uses, Preparationof funds flow statement, simple problem, Cash flow analysis, Concepts, uses, preparation of cash flow statement, simple problem, Break – even analysis.

UNIT-IV

Definition nature and Objective of Financial Management, Long Term Sources of Finance, Introductory idea about capitalization, Capital Structure, Concept of Cost of Capital, introduction, importance, explicit & implicit cost, Measurement ofcost ofcapital, costofdebt.

UNIT-V

Concept & Components of working Capital. Factors Influencing the Composition of working Capital, Objectives of working Capital Management – Liquidity Vs. Profitability and working capitalpolicies. Theoryofworking capital: Nature and concepts, CashManagement, Inventory Management and Receivables Management.

ReferentialBooks:

- Maheshwari&Maheshwari,"AnIntroductiontoAccountancy",8thEdition,VikasPublishing House, 2003
- GuptaR.L.,GuptaV.K.,"Principles&PracticeofAccountancy",SultanChand& Sons, 1999.
- Khan&Jain,"FinancialAccounting"
- MaheshwariS.N., "PrinciplesofManagement Accounting", 11thEdition, SultanChand & Sons, 2001.
- ShuklaandGrewal,"AdvancedAccounts",14thEdition,SultanChand &Sons.

English

(BCA205A)

CourseObjective

The purpose of this course is to introduce students to the theory, fundamentals and tools of communication and to develop in them vital communication skills which should be integral to personal, social and professional interactions. One of the critical links among human beingsand an important thread that binds society together is the ability to share thoughts, emotionsand ideas throughvarious means ofcommunication: bothverbaland non-verbal. Inthe context of rapid globalization and increasing recognition of social and cultural pluralities, the significance of clear and effective communication has substantially enhanced.

CONTENTS

UnitI:Introduction: 06

Theory of Communication, Types and modes of Communication, Mediums and channels of communication, barriers to communication, English as a Global language, the Lingua Franca, Social influences on English

UnitII:LanguageofCommunication: 08

Verbal and Non-verbal (Spoken and Written) Personal, Social and Business Barriers and Strategies Intra-personal, Inter-personal and Group communication, Varieties of English, Language, Accent, Dialect, Colloquialism, Historical influences on English

Unit III:SpeakingSkills: 06

Monologue Dialogue Group Discussion Effective Communication/ Mis- Communication Interview Public Speech, Regional influences on English, Convergence and divergence, Linguistic Imperialism,

UnitIV:ReadingandUnderstanding- 06

Close Reading, Reading analysis of a text - Audience and purpose, Content and theme, Tone and Mood, stylistic devices, structure Comprehension- Analysis and Interpretation Translation(from Indian language to English and vice-versa) Literary/Knowledge Texts

UnitV:WritingSkills 06

Documenting Report Writing Making notes Letter writing, Writing tabloids, diary entry, open letters, essays, newsletter and magazine articles, skits, short stories, impersonating characters

Courseoutcome:

It will enhance Language of communication, various speaking skills such as personal communication, social interactions and communication in professional situations such as interviews,groupdiscussionsandofficeenvironments,importantreadingskillsaswellas

writing skills such as report writing, notetaking etc. While, to an extent, the art of communication is natural to all living beings, intoday's world of complexities, it has also acquired someelementsofscience. It is hoped that after studying thiscourse, studentswill find a difference in their personal and professional interactions.

RecommendedReadings:

1. FluencyinEnglish- PartII,OxfordUniversityPress,2006.

2. BusinessEnglish,Pearson,2008.

3. Language,LiteratureandCreativity,OrientBlackswan,2013.

4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, DrRanjanaKaul, DrBrati Biswas

Practical
DatabaseManagementSystem(DBMS)
(BCA207P)

1. Draw anERdiagramtoUniversityDatabase.
2. DrawanERdiagramtoLibrarymanagementSystem.
3. CreateaLibrarymanagementSchema/databaseandsearchanomaliesinit.
4. Assumeavideo librarymaintainsadatabaseofmoviesrentedout.Without any normalization, all information is stored in one table as shown below.
    a. NormalizethefollowingSchemawithgivenConstraints.
    b. books(accessionno,isbn,title,author,publisher)
    c. users(userid,name,deptid,deptname)
    d. accessionno->isbn
    e. isbn->title
    f. isbn->publisher
    g. isbn->title
    h. userid->name,
    i. userid->deptid
    j. deptid ->department

5. Compare3NFand BCNFwithappropriate example.
6. GiveexerciseonDDLandDML.
7. Createadatabasenamed “school.mdb”andperformthe followingtasksusingMS Access or My SQL
8. Createatablenamed“studentinfo”havingfollowingtable structure.

FieldName	DataType	Structure
Class	Number	
Section	Text	
RollNo.	Number	
Name	Text	40CharactersLong
Status	LookUpWizard	TwoValue:SeniorandJunior
Photo	OLE Object	Photosof Student
DOB	Date/Time	DateofBirthOfstudents
Remarks	Memo	

9. Fillatleast5records.

   Prepare a query to display all records and Name should be in ascending order. Prepareaquerynamed “senior”todisplayrecordsincluding fieldsname,class,sec, rollno, status, photo and value of “status” field must be senior.
   Prepareaformofabovequery“senior”. Preparereport ofallthe fieldsofabove table.
10. Createadatabasenamed“library.mdb”andperformthefollowing tasks:
11. Createatablenamed“Book”havingfollowingstructure:

FieldName	DataType
Bookid	Text
BName	Text
WName	Text
PYear	Date/Time
PName	Text
Price	Currency

Addatleast5records.

SEMESTER–III

ProgramminginJava

(BCA301)

Course Objectives:

- UnderstandtheusageofJavaSDKenvironmentandapplytocreate,debugandrun simple java programs.
- Understandandapplythebasicconceptofjavaprogrammingsuchascharacterset, variables, data types, conditional and iterative execution, methods, etc.
- Understandand implement theObject-OrientedProgramming(OOPs) concepts injava, through defining classes, invoking methods, using class libraries, etc.
- Learnthecreationand the usageofarraysandthreadsinjava.
- Learnanddemonstratejava applets.

Course Outcomes

- Explaintheobjectorientedconceptsandapplythemfor solving realproblems.
- Demonstrate and apply the various features Java SDK to develop, run and debug javaprograms.
- Applyjavatechnologytodevelopthesmallapplications, utilities,andwebapplications.
- Apply events management and layout managers using awt, swing, jdbc and servlet for developing the software for various problems.

UNIT-I

C++ vs java, java and internet and WWW, java support systems, java environment, java program structure, tokens, statements, java virtual machine, constants & variables, data types, type casting, operators, expressions & its evaluation, decision making and branching, loops,jumps in loops, labeled loops.

UNIT-II

Defining a class, adding variables and methods, creating objects, accessing class members, constructors,methodoverloading,static members,nestingofmethods, inheritance:extending a class, overriding methods, final variables and method~, final classes, finalizes methods,abstract methods and classes, visibility control.

UNIT-III

Arrays, one dimensional & two dimensional, strings, vectors, wrapper classes, defining interfaces, extending interfaces, implementing interfaces, accessing interface variables, system packages, using systempackages, naming conventions, creating packages, accessing apackage, using package, adding a class to a package, hiding classes.

UNIT-IV

Threads, creating threads, extending the threads class, stopping and blocking a thread, lifecycle of a thread, using thread methods, thread exceptions, thread priority, synchronization, implementing the unable interface.

UNIT-V

Applets, local and remote applets, applets VS applications, writing applets, applets life cycle, creating an executable applet, designing a web page, applet tag, adding applet to HTML file, running the applet, passing parameters to applets, aligning the display, HTML tags & applets, getting input from the user interface.

References:

- E.Balagurusamy,"ProgrammingwithJava,aPrimer",TMH,ISBN-13:978-0-07-061713-1, ISBN-10: 0-07-061713-9.
- PatrickNaughtonandHerbertSchildt,"Java:theCompleteReference",TMHPublication, ISBN 0-07-463769-X.
- Yashavantkanetkar,"LetusJava",BPBPublications.
- CayHorstmann,"BigJava",WileyPublication
- PeterNorton,"JavaProgramming",TechmediaPublications.
- JosephWeber,"UsingJava1.2",PHI,ISBN-81-203-1558-8.

PracticalListonProgramminginJAVA

(BCA307P)

1. Writeaprogramto findthelargestofnnaturalnumbers.
2. Writeaprogramto findwhether agivennumberisprimeornot.
3. Writeamenudrivenprogramforfollowing:
    a. ComputeFactorialofanumber
    b. Checkwhether agiven numberisoddoreven.
    c. Checkwhether agivenstringisPalindromeornot.
4. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
5. Write a program to create an array of 10 integers. Accept values from the user in that array.Input another number fromthe user and find out how many numbers are equalto thenumber passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average ofthe prices and find out all the prices that are higher than the calculated average.
7. Write a program in java to input N numbers in an array and print out the Armstrongnumbers from the set.
8. Writejavaprogramfor thefollowingmatrixoperations:
    a. Additionoftwomatrices
    b. Multiplicationoftwomatrices
    c. Inputtheelementsofmatricesfromuser.
9. Writeajavaprogramthatcomputestheareaofacircle,rectangleandatriangle usingfunction overloading.
10. WriteaJavafortheimplementationofMultipleinheritanceusinginterfacesto calculatethe area of a rectangle and triangle.
11. Writeajavaprogramtocreateaframewindowinan Applet.Displayyourname, addressand qualification in the frame window.
12. Writeajavaprogramtodrawalinebetweentwocoordinatesinawindow.
13. Writeajavaprogramtodisplaythefollowinggraphics inanappletwindow.
    a. Rectangles
    b. Circles
    c. Ellipses
    d. Arcs
    e. Polygons
14. Writeaprogramforthefollowingstringoperations:
    a. Comparetwo strings
    b. Concatenatetwostrings
    c. Computelengthofa string
15. Create a class called Fraction that can be used to represent the ratio of two integers. Includeappropriate constructors and methods. If the denominator becomes zero, throw and handlean exception.
16. Writeaprogramto DisplayFibonacciseries.

WebDevelopmentwithPHP

(BCA302)

CourseObjective:

This course is aimed to provide a fundamental understanding of dynamic web site creation. PHP is the language used for development of most common web sites. Syllabus includes basic and advancedfeatures of PHP which includes detailed introduction of PHP and MYSQL, Arrays, Loops andvariables etc. It also gives an overview open source framework like JOOMLA, ZEND etc.

Course Outcomes:

- DevelopprogramsusingHTMLandPHP.
- DevelopPHPProgramusingCharacterset,variables,datatypes,conditionalanditerative statements, functions etc.
- Develop WebPages using built-in functions related to string manipulation, mathematical, date and time etc.
- Develop Webpagesusing Arrays,Webforms,files,anddatabaseswithPHP

UNIT-IIntroductiontoHTML

HTML INTRODUCTION: History of HTML – HTML Document – Anchor Tags – Hyper Links-Sample HTML Documents.HEAD AND BODY SECTIONS: Header Section – Title – Prologue–Links–Comment–Heading–HorizontalRule–Paragraph–ImagesandPictures
- Ordered and Unordered List.TABLES: Table Creation – ColSpan, RowSpan – Cell Spacing, Cell Padding – Nested Tables. FRAMES: Frameset Definition – Frame Definition – Nested Frames.FORMS: Action Attribute – Method Attribute – Drop Down List – Sample Forms.

UNIT-IIIntroductiontoOpenSourceandPHPprogramming

Introduction to Open Sources Technologies, Introduction to PHP, installation and configuration, Advantages and Disadvantages of PHP, Client Side Scripting, Server Side Scripting, Variables, data types, various types of function, creating your own function, Strings in PHP, String Functions.Operator, Loops, Array, Exception and Error Handling Operators, Conditions, Loops, Using for each, Creating and Using Arrays, Multidimensional Array, Associative array. Error Handling in PHP, Errors and Exceptions, Exception class, try/catch block, throwing an exception, defining your own Exception subclass.

UNIT-III

Classes, File system, Passing Information between pages Object oriented programming with PHP, Working with Date time, code re-use, require (), include(), and the include path; Understanding PHP file permissions, File reading and writing functions, File systemfunctions, File uploads, Sending mail & use of email server. HTTP, GET arguments, POST arguments, Using Session in PHP, cookies, The setcookie() function, Deleting Cookies and Reading Cookies.

UNIT-IV Working with Database

HTML Tables and Database tables, Databasemanipulation(Select, Insert, Update, Delete), validatingUserInputusingJavascript.MYSQL,IntroducingMySQL;databasedesignconcepts;

the Structured Query, Language (SQL); communicating with a MySQL backend via the PHP, MySQL API Building Database Applications.

UNIT-VWorking with Frameworks

WorkingwithMambo,WorkingwithJoomla,Workingwithframework.UseofJoomla inrapid development of website.Developing of simple website using joomla.

References/TextBooks:

- BeginningPHP,Apache,MySQLWebDevelopment
- MichaelK. Glass, YannLeScouarnec, ElizabethNaramore, GaryMailer, JeremyStolz, Jason Gerner
- PHP Manual.
- TheCompleteReferencePHP,byStevenHolzner,TAYAMcGraw-HillPublication
- BeginningPHPandMYSQL, byW. JasonGilmore, ApressPublication

PracticalListonWebDevelopmentwithPHP-Lab
(BCA308P)

1. Write theprocessofinstallationofwebserver.
2. Writeprogramstoprintalldetailsofyour phpserver.Use phpinfo().
3. Writeaprogramto givedemoofECHOand PRINTcommand.
4. Writeaprogramtoimplementthestringfunctions.
5. Writeaprogramto printFibonacciseriesuptogiven number.
6. Write a menu driven program to implement a calculator which performs only addition, subtraction, multiplication and division. The operation should happen based on user choice.
7. Writea programsorttennumberbyusingarray.
8. Writeaprogramto demonstratetheconcept ofassociative array.
9. Writeaprogramtodemonstratetheconceptofmultidimensionalarray.
10. Writea programto demonstratethe concept ofClasses&objects.
11. Create a login form with two text fields called “login” and “password”. When user enters “Kalinga”as a user name and “University” as a password it should be redirected to a Welcome.HTML page or toSorry.HTML in case of wrong username/password.
12. CreateadatabaseinMySqland connectthat databasefromPHP.
13. WriteaprogramtoUpdate,insertanddeletethevaluesoftableindatabase.
14. Create a form with a text box asking to enter your favorite city with a submit button when the user enters the city and clicks the submit button another php page should be opened displaying “Welcome to the city”.
15. Write a programto design login form in which find the greatest number amongst three numbers.
16. WAPforMarksheetgeneration

DesignandAnalysisofAlgorithm

(BCA303)

Course Objective:

The designing of algorithm isan important component of computer science. The objective of this course is to make students aware of various techniques used to evaluate the efficiency of a particular algorithm. Students eventually should learn to design efficient algorithm for a particular program.

Course Outcomes:

- Tolearnastrong foundationabout algorithms.
- Tolearndifferenttechniquesforwritingalgorithm.
- Toapplythetechniques forproducingalgorithmfordifferentproblems.

UNIT-I:Introduction

AlgorithmDesignparadigms - motivation, concept ofalgorithmic efficiency, runtime analysis ofalgorithms, Asymptotic Notations. Recurrences- substitution method,recursiontree method, master method

UNIT-II:Divideandconquer

Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Merge sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations. Greedy Method: Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution (Knapsack problem), Single source shortest paths, traveling salesman

UNIT-III:Dynamic programming

Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, chain Matrix multiplication, Traveling salesman Problem, longest Common sequence, knapsack problem

UNIT- IV: Graphsearchingand Traversal

Overview, Representation of graphs, strongly connected components, Traversal methods(depth first and breadth first search), Back tracking: Overview, 8-queen problem, andKnapsack problem, Brach and bound: LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem

UNIT-V:ComputationalComplexity

Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples.

References/TextBooks:

- E.Horowitz,S.Sahni,andS.Rajsekaran,"FunadmentalsofComputerAlgorithms," Galgotia Publication
- T.H.Cormen,Leiserson, RivestandStein,"IntroductionofComputeralgorithm,"

- SaraBasse,A.V.Gelder,“ComputerAlgorithms,”AddisonW
- J.EHopcroft,J.DUllman,“Designandanalysisofalgorithms”
- D. E.Knuth,“Theart ofComputerProgram

OperatingSystems

(BCA304)

Course Objectives:

- Tounderstandtheservicesprovidedbyoperatingsystem
- Tounderstandtheworkingandorganizationofprocessanditsschedulingand synchronization.
- Tounderstanddifferentapproachesofmemorymanagementtechniques.
- Tounderstand thestructureand organizationofthefilesystem.

Course Outcomes:

- Understand,identifyanddescribetheservicesprovidedbyoperating systems.
- Understand and solve problems involving processcontrol, mutualexclusion, synchronization and deadlock.
- Implement processor scheduling, synchronization and disk allocation algorithms for a given scenario.
- Understanddifferenttypesofoperatingsystem.

UNIT-I

Operating Systems - Definitions, functions, Types of operating system - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, components, Operating system Services, System Calls, programs, System structure.

UNIT –II

Process management - process concepts, process state & process control block, process scheduling, scheduling criteria, scheduling algorithms, multiple processor scheduling, realtime scheduling, threads.

UNIT–III

Critical section problem, semaphores, classical problem of synchronization,, deadlock characterizations, method for handling deadlocks, deadlock prevention, deadlock avoidance,deadlock detection, recovery from deadlock .

UNIT –IV

Memory management - logical versus physical address space, contiguous allocation, fixed partition, variable partition, swapping, paging, segmentation, virtual memory, demand paging, page replacement, page replacement algorithms

UNIT –V

Disk scheduling, disk management, swap space management, disk reliability, stable storage implementation. File concepts, directory structure, and protection.

References:

- OperatingsystemconceptsbySilberschatz,Galvin,Gagne,WileyStudentEdition
- Operatingsystemconcepts&design byMilanMilenkovic,TMH publication

EntrepreneurshipDevelopment

(BCA305)

COURSEOBJECTIVES:

- Todevelopandstrengthenentrepreneurialqualityandmotivationinstudents.
- Toprovideknowledgeandinformationaboutthesourceofhelp,incentivesand subsidies available from government to set up the project
- Toimpart informationabouttheprocess,procedureandrulesandregulationsforsetting up a new projects

COURSEOUTCOMES:

- Abilityto recognizeabusinessopportunitythatfitstheindividualstudent
- Demonstratetheunderstandingofhowtolaunchtheindividual'sentrepreneurialcareer
- Toinculcatethespiritofentrepreneurshipinstudentsandmakethemjobcreators instead of job seekers

UNIT-I

Entrepreneurship concept- Entrepreneurship as a Career –Entrepreneurial Personality - Characteristics of Successful, Entrepreneur –Knowledge and Skills of Entrepreneur. Problems faced by Women Entrepreneurs – Factors affecting Entrepreneurial Growth –Intrapreneur – Agripreneur.

UNIT-II

Business Environment -Role of Family and Society –Entrepreneurship Development Training and Other Support Organizational Services -Central and State Government Industrial Policies and Regulations.

UNIT-III

Sources of Product for Business -Prefeasibility Study -Criteria for Selection of Product - Ownership -Project Profile Preparation -Matching Entrepreneur with the Project - Feasibility Report Preparation and Evaluation Criteria.

UNIT-IV

Finance and Human Resource Mobilization Operations Planning -Market and Channel Selection -Growth Strategies -Product Launching–Incubation, Venture capital, AngelInvestors, Startups-Project Proposal-Project Management.

UNIT-V

Monitoring and Evaluation of Business -Preventing Sickness and Rehabilitation of Business Units-Effective Management of small Business.

TEXTBOOKS:

- Hisrich,Entrepreneurship,TataMcGrawHill,NewDelhi, 2001.

- S.S.Khanka,EntrepreneurialDevelopment,S.ChandandCompanyLimited,New Delhi, 2001.

REFERENCEBOOKS:

- MathewManimala,EntrepreneurshipTheoryattheCrossroads,Paradigms&Praxis, Biztrantra ,2ndEdition ,2005
- PrasannaChandra,Projects–Planning,Analysis,Selection,Implementationand Reviews, Tata McGraw-Hill, 1996.
- P.Saravanavel, EntrepreneurialDevelopment, EssPee kayPublishing House, Chennai-1997.
- AryaKumar.Entrepreneurship.Pearson.2012

Elective-I

EmbeddedSystems

(BCA306A)

Course Objectives:

- Introducestudentstothefeatures,applicationsofembedded systems
- Developanunderstanding ofthedesignchallengesofembeddedsystems
- Understandthebasicarchitectureof8051microcontroller
- Introducestudentsto Embedded C programming
- EnablestudentstodevelopbasicprogramsforembeddedsystemsusingEmbeddedC.

Course Outcomes:

- ExplainhardwareandsoftwaredesignrequirementsofEmbeddedSystems
- Discussthearchitectureof8051processor
- Describe8051ProcessorAddressingmodesandinstructionsets
- UseEmbeddedC forwritingbasicprogramsforembeddedsystems
- Examine the use ofvarious Embedded C programming constructs for writing programs for embedded systems.

UNIT-I

Fundamentals of Embedded Systems: Introduction, Features, Applications of Embedded Systems, Subsystems in an Embedded System.Design Considerations of Embedded Systems: Design Challenges, Common Design Metrics, Design Trade-offs and Performance Classification of Computer Architecture: Basic operation of a computer system, CPU Architecture, Microprocessor, Microcomputer.Introduction to Real Time Operating Systems.

UNIT-II

Microcontrollers: Evolution and Uses in Embedded Systems and its Advantages. Architecture of 8051 Microcontroller: Introduction, Block Diagram, Registers, Internal Memory, Counters, I/O Ports, Basic Concepts in Serial I/O.

8051 Processor Addressing modes and Instruction Set: Assembly language programming in 8051, Data Types, Addressing Modes,Arithmetic and Logical Operators Interfacing 8051 with external devices: LED's and SSD.

UNIT-III

Introductionto Embedded C, Difference between C&Embedded C, Programming style, Basic structure of the program. Keywords & Identifiers, Data type & its memory representation, Arrays and strings , Input and Output.

UNIT-IV

Types of Operators, Bitwise Operators Decision making with if statement, If….else statement, Switchstatement,andGOTOstatement,TheWhileandDo–Whilestatements,Forstatement

EmbeddedCProgramming:Functions:WhyFunctions,TypesofFunctions,AMulti functional program, Return values & their types.

UNIT-V

CaseStudy:UseofEmbeddedsystemsisdesigningvariouscommercialapplications/ appliances : Home Automation Systems, Washing machine etc.

Reference:

- K V K Prasad, "Embedded/Real Time Systmes : Concepts, Design and Programming", Dreamtech Press
- SteveFurber,"ARMSystem-on-chip Architecture",2e,AddisonWesley
- TammyNoergaard,"EmbeddedSystemArchitecture:AcomprehensiveGuidefor Engineers and Programmers", Newnes (Elsevier)
- ShibuKV, "IntroductiontoEmbeddedSystems", TataMcGrawHill
- Raj Kamal,"EmbeddedSystems:Architecture,ProgrammingandDesign",2e,Tata McGraw Hill
- K UmaRao,AndhePallavi,"The8051andMSP430Microcontrollers:Architecture, Programming and Applications, Wiley
- Bahadure,Chandrakar, "MicrocontrollersandEmbeddedSystemDesign",Wiley
- RajKamal,"EmbeddedSystems:Architecture,ProgrammingandDesign",TataMcGraw Hill.

NaturalLanguageProcessing

(BCA306B)

Course Objective:

- Understand natural language processing and to learn how to apply basic algorithms in this field.
- Getacquaintedwiththebasicconceptsandalgorithmicdescriptionofthemain language levels: morphology, syntax, semantics, and pragmatics.
- ImplementarulebasedsystemtotacklemorphologySyntaxofa Language
- Compareandcontrastuseofdifferentstatisticalapproachesfordifferenttypesof applications
- Designatagsettobeusedforstatistical processingkeepinganapplicationinmind, design a Statistical technique for a new application
- DesignaninnovativeapplicationusingNLPcomponents

Course Outcome:

- Understand the computational properties of natural languages and the commonly used algorithms for processing linguistic information.
- UnderstandtheinformationretrievaltechniquesusingNLP
- ApplymathematicaltechniquesthatarerequiredtodevelopNLP.
- AnalyzevariousNLP algorithmsandtextminingNLP applications.
- Design real worldNLPapplicationssuch asmachinetranslation,textcategorization, text summarization, information extraction by
- applyingNLPtechniques.

UNIT-I

Introduction: History of NLP, Generic NLP system, levels of NLP , Knowledge in language processing , Ambiguity in Natural language , stages in NLP, challenges of NLP ,Applications of NLP. Word Level Analysis: Morphology analysis –survey of English Morphology, Inflectional morphology & Derivational morphology, Lemmatization, Regular expression, finite automata, finite state transducers (FST) ,Morphological parsing with FST , Lexicon free FST Porter stemmer. N –Grams- N-gram language model.

UNIT-II

Syntax analysis: Part-Of-Speech tagging(POS)- Tag set for English (Penn Treebank) , Rule based POS tagging, Stochastic POS tagging, Issues –Multiple tags & words, Unknown words. Introduction to CFG, Sequence labeling: Hidden Markov Model (HMM), Maximum Entropy.

UNIT-III

Semantic Analysis: Lexical Semantics, Attachment for fragment of English- sentences, noun phrases, Verb phrases, prepositional phrases, Relations among lexemes & their senses – Homonymy, Polysemy, Synonymy, Hyponymy, Robust Word Sense Disambiguation (WSD),Dictionary based approach.

UNIT-IV

TextSummarization,TextClassification,Textsummarization-LEXRANK,Optimization based approaches for summarization , Summarization evaluation, Text classification.

UNIT-V

Sentiment AnalysisandOpinionMining,SentimentAnalysisintroduction,SentimentAnalysis - Affectivelexicons,Learning affectivelexicons,Computing with affectivelexicons,Aspect based sentiment analysis.

Reference:

- Dan Jurafsky and James Martin. "Speech and Language Processing: AnIntroduction to Natural Language Processing, Computational Linguistics and Speech Recognition", Prentice Hall, Second Edition, 2009.
- StevenBird,EwanKlein, NaturalLanguageProcessingwithPython,O'Reilly
- Christopher D.Manning and HinrichSchutze, — Foundations of Statistical Natural Language Processing —, MIT Press, 1999.
- Siddiqui and Tiwary U.S., Natural Language Processing and Information Retrieval, Oxford University Press (2008).
- Daniel M Bikel and ImedZitouni — Multilingual natural language processing applications‖ Pearson, 2013
- Alexander Clark (Editor), Chris Fox (Editor), Shalom Lappin (Editor) — The Handbook of Computational Linguistics and Natural Language Processing — ISBN: 978-1-118-
- BrianNeilLevine,AnIntroductiontoRProgramming
- Niel J le Roux, SugnetLubbe, A step by step tutorial : An introduction into R application and programming

EnterpriseResourcePlanning

(BCA306C)

Course Objective:

This course examines the evolution of enterprise resource planning (ERP) systems - from internally focused client/server systems to externally focused e-business. This class studies the types ofissues that managers willneed to consider in implementing cross-functionalintegrated ERP systems. The objective of this course is to make students aware of the potential and limitations of ERP systems. This objective will be reached through hands-on experience, case studies, lectures, guest speakers and a group project. The course would equip students with the basics of E-Commerce, technologies involved with it and various issues associated with.

UNIT-I: IntroductionERP

An Overview, Enterprise-An Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, On-line Analytical Processing (OLAP), Supply Chain Management, Management Information systems (MIS), Decisionsupport system(DSS), ExecutiveInformationsystems(EIS).ERP – AManufacturing Perspective Materials Requirement Planning (MRP), Bill of Material (Bom), Distribution RequirementsPlanning(DRP), JIT &Kanban, CAD/CAM, Product DataManagement (PDM), Benefits of PDM, MTO, MTS, ATO, ETO, CTO.

UNIT-II:ERPImplementation

To be or not to be, ERP Implementation Lifecycle, Implementation Methodology, Not all Packages are Created Equal!, ERP Implementation-The Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring, After ERP Implementation.

UNIT-III: TheBusinessUNIT -s

Business UNIT - s in an ERP Package, Finance, Manufacturing (Production), Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution

UNIT-IV:TheERPMarket

ERP Market Place, SAP AG, PeopleSoft, Baan Company, JD Edwards World Solutions Company, Oracle Corporation, QAD, System Software Associates, Inc. (SSA) ERP-Present and FutureTurbo Charge theERPSystem, Enterprise IntegrationApplications(EIA),ERP and E-Commerce, ERP and Internet, Future Directions in ERP, Appendices"

UNIT-V:BenefitsofERP

Time Reduction, Resource Utilization, Performance, Customer Satisfaction, Flexibility, Quality, Accuracy.

Text&References:

- S.Sadagopan,“EnterpriseResourcePlanning”,TataMcGrawHill2000

- Bajaj,KamleshK.andNag,Debjani,E-Commerce:TheCuttingEdgeofBusiness, TataMcGraw-Hill Publishing Company
- AlexisLeon,“EnterpriseResourcePlanning”,TataMcGrawHill2001

MiniProject/InternshipAssessment

(BCA309P)

SEMESTER–IV

ComputerGraphics&MultimediaApplication

(BCA401)

Course Objective:

The objective of the course is to provide the understanding of the fundamental graphical operations and the implementation on computer, the mathematics behind computer graphics, including the use of spline curves and surfaces. It gives the glimpse of recent advances in computer graphics, user interface issues that make the computer easy, for the novice to use.

UNIT-I:IntroductiontoGraphicsandGraphicsHardwareSystem

Application ofcomputer graphics, Video Display Devices, Raster Scan Display, RandomScan Display, Input Devices, Graphic Software and graphics standards, Numerical based on Raster and Random scan display, Frame buffer, Display processor.

UNIT- II:OutputPrimitivesandClippingoperations

Algorithms for drawing 2D Primitives lines (DDA and Bresenham„s line algorithm), circles (Bresenham„s and midpoint circle algorithm), Antialiasing and filtering techniques. Line clipping (cohen-sutherland algorithm), Curve clipping algorithm, and polygon clipping with Sutherland Hodgemanalgorithm, Area fillalgorithms for variousgraphicsprimitives: Scanline fill algorithm, boundary fill algorithm, flood fill algorithm, Polygon representation, various method of Polygon Inside test: Even-Odd method, winding number method, Character generation techniques.

UNIT-III:2D&3DGeometric transformation

2D Transformation: Basic transformat ion, Translation, Rotation, Rotation relative to an arbitrary point, scaling, Matrix Representations and Homogeneous coordinates, window to viewport transformation. 3D Concepts: Parallel projection and Perspective projection, 3D Transformations, composite 3D transformation, co-ordinate transformation, Inverse transformation

UNIT- IV:objectmodelingandVisibleSurfacedetection

fractal geometry methods, fractal dimensions, Geometric construction of deterministic self-similar fractals, Iterated function system to generate fractals. Bezier curves and Beziersurfaces, Bspline curves and surfaces, Visible surface detection method: Basic illumination, diffuse reflection, specular reflection, shadows. Ray tracing method, Depth-buffer method, A- buffer method, Depth-sorting method (painter„s algorithm), Binary search partition method, Scan line method.

UNIT-V:Introductionto multimedia

Design of animation sequences, Computer Animation languages, Elementary filtering techniques and elementary Image Processing techniques, graphics library functions used in animation design.

Text/ReferencesBooks:

- Foleyet.al., “ComputerGraphicsPrinciples&practice”, 2nded.AWL, 2000.
- D.HearnandP.Baker,“ComputerGraphics”,PrenticeHall,1986.

- R. Plastock and G. Kalley, “Theory and Problems of Computer Graphics”, Schaum‟s Series, McGraw Hill, 1986
- R.H. Bartels, J.C. Beatty and B.A. Barsky, “An Introduction to Splines for use in Computer Graphics and Geometric Modeling”, Morgan Kaufmann Publishers Inc., 1987.
- C.E. Leiserson, T.H. Cormen and R.L. Rivest, “Introduction to Algorithms”, McGraw-Hill Book Company, 1990.
- W. Newman and R. Sproul, “Principles of Interactive Computer Graphics, McGraw-Hill, 1973.
- F.P. Preparata and M.I. Shamos, “Computational Geometry: An Introduction”, Springer-Verlag New York Inc., 1985.
- D. Rogersand J. Adams, “MathematicalElements for Computer Graphics”, MacGraw-Hill International Edition, 1989
- David F. Rogers, “Procedural Elements for Computer Graphics”, McGraw Hill Book Company, 1985.
- Alan Watt and Mark Watt, “Advanced Animation and Rendering Techniques”, Addison-Wesley, 1992

SOFTWAREENGINEERINGANDTESTING

(BCA402)

Course Objectives:

- Understand, learn and apply the theoretical and practical knowledge of software development such as software development paradigms, process, models, tools and techniques.
- Understand and learn the process of software requirements identification, analysis, review, and learn recording requirements in the standard format of the SRS document.
- Understand the varioustypesand levelsofsoftwaretesting and basic approachesoftest case designing.

Course Outcomes:

- ToclassifythevariousSoftwareProcessModels
- TounderstandtheSoftwareTesting Concepts.
- ToimplementtheSoftwareQualityand ControlConcepts
- ToDesigntheTestcasesandtogetfamiliarityover AutomatedTestingtools

UNITI-THEPRODUCTANDTHEPROCESS

The Evolving Role of Software– Software Characteristics– Software Applications– Software:A Crisis on the Horizon?- Software Myths- Software Engineering: A Layered Technology–The Software Process– Software Process Models– The Linear Sequential Model– The Prototyping Model- The RAD Model- Evolutionary Software Process Models- Component- Based Development.

UNITII- SYSTEMENGINEERINGANDANALYSISCONCEPTS

Computer-Based Systems– The System Engineering Hierarchy – Business Process Engineering: An Overview– Product Engineering: An Overview– Requirements Engineering– System Modeling– Requirement Analysis- Requirements Elicitation for Software- Software Prototyping- Specification- Specification Review.

UNITIIIPRINCIPLESOFTESTING

PRINCIPLES OF TESTING: Introduction - Phases of software – Quality assurance andQuality control - Testing verification and validation - TECHNIQUES: White box - statictesting - structural testing - challenges in white box testing - Black box testing.

UNITIV- TYPESOF TESTING

TYPES OF TESTING: Integration testing - Top-Down Integration – Bottomup integration-Bi-Directional Integration - System - Integration – SYSTEM ACCEPTANCE TESTING: Functional versus Non Functional Testing - Functional System Testing - Non Functional Testing Acceptance Testing.

UNITV-PERFORMANCE TESTING

PERFORMANCE TESTING: Introduction - Factors of governing - performance testing - Methodologyforperformancetesting-Toolsforperformancetesting-Processfor

performanceTesting–REGRESSIONTESTING:Introduction-Typesregressiontesting- Best pratice in regression testing.

TEXT/REFERENCESBOOKS

- RogerS.Pressman,(2001),“SoftwareEngineering“,Fifthedition,McGraw-HillHigher Education - A Division of The McGraw-Hill Companies.
- SrinivasanDesikanandGopalasamyRamesh,"SoftwareTestingforPrinciplesand Practices", Person Education,.
- WilliamE.Perry(2006),“EffectiveMethodsofSoftwareTesting”,3rd Ed,Wiley
- India.
- RenuRajani,PradeepOak(2007),“SoftwareTesting”,TMH.

DATAMININGANDWAREHOUSING

(BCA403)

Course Objective:

- Explainthe conceptofdataminingand data warehouse.
- ExplaintheconceptofKDD,OLAPtechniques,andNNwithgenetic algorithms.
- Explaintheconceptofdatawarehousearchitecture,anddatabaseschema.
- Explain the Hardware and operational design of data warehouse, planning and testing the data warehouse.

Course Outcomes:

- Toknowthebasicconcepts ofdatamining
- To classify&clusterthe data
- Touseassociationruleson data.
- Tointroducetheconceptofdatawarehousing
- Torecoverdata incase ofdataloss

UNITI-DATA MINING

Introduction- information and production factor- data mining Vs querytools - data mining and marketing -self learning computer system-computer learning-data learning, data mining and data warehouse.

UNITII-KNOWLEDGEDISCOVERYPROCESS

Data selection- cleaning-enrichment-coding preliminary analysis of data set using traditional query tools-visualization techniques-OLAP tools-decision trees association rules-Neural networks genetic algorithms-KDD(Knowledge discover in databases) environment.

UNITIII-DATAWAREHOUSE –ARCHITECTURE

System process-process architecture, - design – database schema- partitioning strategy-aggregations - data marting-meta data-system and data warehouse process managers.

UNITIV -HARDWAREANDOPERATIONAL DESIGN

Hardware and operational design of data warehouse - hardware arch-physical layoutsecurity-backup and receiver-service level agreement-operating the data warehouse.

UNITV-PLANNING, TUNINGAND TESTING

Capacity planning- tuning the data warehouse- testing the data warehouses-data warehouse features.

TEXT/REFERENCESBOOKS

- PieterAdriaans,Dolf,Zantinge(1996),"Datamining",AddisonWesley"(UnitI&II)
- SamAnahory,DennisMurray"DataWarehousinginrealworld"(1997),Addison Wesley.(Unit III, IV & V)
- MarkHall,IanWittenandEibeFrank(2011),"DataMining:PracticalMachine Learning Tools and Techniques", Third edition, Morgan Kaufmann Publisher.

OptimizationTechniques

(BCA404)

COURSEOBJECTIVES:

- EnumeratethefundamentalknowledgeofLinearProgrammingandDynamic Programming problems.
- Learnclassicaloptimization techniquesand numerical methodsofoptimization.
- Knowthebasicsofdifferentevolutionaryalgorithms.
- ExplainInteger programming techniquesand applydifferent optimizationtechniquesto solve various models arising from engineering areas.

COURSEOUTCOMES:

- Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems.
- Useclassicaloptimizationtechniquesandnumericalmethodsofoptimization.
- Describethebasicsofdifferentevolutionaryalgorithms.
- EnumeratefundamentalsofIntegerprogrammingtechniqueandapplydifferent techniques to solve various optimization problems arising from engineering areas.

UNIT-I

LINER PROGRAMMING (L.P): Revised Simplex Method, Duel simplex Method, Sensitivity Analysis.

DYNAMICPROGRAMMING(D.P):Multistagedecisionprocesses.Conceptsofsuboptimization, Recursive Relation-calculusmethod, tabular method, LP as a case of D.P.

UNIT-II

CLASSICAL OPTIMIZATION TECHNIQUES: Single variable optimization without constraints, Multi variable optimization without constraints, multivariable optimization with constraints – method of Lagrange multipliers, Kuhn-Tucker conditions.

NUMERICALMETHODSFOROPTIMIZATION:NelderMead'sSimplexsearchmethod, Gradient of a function, Steepest descent method, Newton's method.

UNIT-III

MODERNMETHODSOFOPTIMIZATION:GENETICALGORITHM(GA):Differences and similarities between conventional and evolutionaryalgorithms, working principle, Genetic Operators- reproduction, crossover, mutation.

GENETIC PROGRAMMING (GP): Principles of genetic programming, terminal sets, functional sets, differences between GA&GP, Randompopulation generation. Fuzzy Systems: Fuzzy set Theory, Optimization of Fuzzy systems

UNIT-IV

INTEGERPROGRAMMING:GraphicalRepresentation,Gomory'sCuttingPlaneMethod, Balas' Algorithm for Zero–OneProgramming, Branch-and-Bound Method.

UNIT-V

APPLICATIONSOFOPTIMIZATIONINDESIGNANDMANUFACTURINGSYSTEMS: Formulation of model- optimization of path synthesis of a four-bar mechanism, minimizationof weight of a cantilever beam, general optimization model of a machining process,optimization of arc welding parameters, and general procedure in optimizingmachining operations sequence.

Text/ReferencesBooks:

- EngineeringOptimization(4thEdition) byS.S.Rao, NewAgeInternational,
- Optimizationfor EngineeringDesignby KalyanmoyDeb,PHIPublishers
- GeneticalgorithmsinSearch,Optimization,andMachinelearning–D.E.Goldberg, Addison-Wesley Publishers
- OperationsResearchbyHillarandLiberman, TMH Publishers
- Optimaldesign–JasbirArora,McGrawHill(International)Publishers

ComputerNetworks

(BCA405)

Course Objectives:

- Buildanunderstandingofthefundamentalconceptsofcomputernetworking.
- Familiarizethestudentwiththebasictaxonomyandterminologyofthecomputer networking.
- Preparingthestudentfor entryinadvancedcoursesofcomputernetworking.
- Togainknowledgeofvariousprotocolsfor networkdesignandmaintenance.

Course Outcomes:

- UnderstandandexplainDataCommunicationsSystemanditscomponents.
- UnderstandComputerNetworkbasicsandOSIandTCP/IPmodel.
- UnderstandNetworksswitching, error detectionanderrorcorrectiontechniques.
- Identifythedifferent typesofnetworkdevicesandtheirfunctions.
- Familiaritywiththevarious protocols ofcomputer networks.

UNIT-I

Basic concepts: network definition, components of data communication, distributedprocessing, topology, transmission mode, categories of networks. OSI and TCP/IP models: layers and their functions, comparison of models. Digital transmission: modems, modems, cable modems. Analog and digital signal; data-rate and limits; digital to digital line encoding schemes; parallel and serial transmission; modulation scheme, multiplexing techniques FDM, TDM, transmission media.

UNIT-II

Networks switching techniques and access mechanisms, circuit switching; packet switching, message switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber, data link layer functions and protocol, error detection and error correction techniques, data -link control framing and flow control, error recovery protocols- stop andwait ARQ, go-back-n ARQ; point to point protocol.

UNIT-III

Multiple access protocol and networks, ALOHA, SLOTTED ALOHA, CSMA/CD, protocols; Ethernet LANS, Token Ring, Token Bus, back-bone networks, network adapters cards, repeaters, hubs, switches, bridges, types of bridges, router and gateways.

UNIT-IV

Networks layer functions and protocols, routing: routing algorithms distance vector routing; shortest path routing, network layer protocol, IP protocol, internet control protocols, Unicasting, multicasting, broadcasting, ISDN: services, historical outline, PRI, BRI.

UNIT-V

Transport layer functions and protocols, overview of TCP and UDP, transport services error and flow control, connection establishment and release, three way handshake, overview of session layer and presentation layer,overview of application layer protocol overview of DNS

protocol,overviewof internet,WWW,HTTP,FTP,SNMP protocol.Internetservices,email services, www services, search service etc.

References:

- B.A.Forouzan:DataCommunicationsandNetworking,Fourthedition,THM,
- A.S.Tanenbaum:ComputerNetworks,FourtheditionPHI.
- AmesChewsCharlesPerkins,MatthewStrebe"NetworkingEssentials:Study Guide "MCSE BPB Publications.
- K.Basandra&S.Jaiswal"LocalAreaNetwork"Galgotia Publications
- WilliamStalling"DataandComputerCommunication"PearsonPrenticeHall
- PrakashCGupta"DataCommunicationandComputerNetwork"PHI

Elective-II

GreenComputing

(BCA406A)

Course Objective:

- ExplainwhyGreenITisimportant totheenterpriseoverall
- Createawarenessamongstakeholdersandpromotegreeninitiativesintheir environments leading to a green movement.
- Adoptspecialskillssuchasknowledgeaboutenergyefficiency,ethicalITassetsdisposal, carbon footprint estimation.
- Createeco-friendlyenvironment.
- Conductbasicequipment usageaudits
- Improveenergyefficiencyoftheirpersonalcomputingenvironmentaswellasthe enterprise-wide computing environment

Course Outcome:

- Acquireexpertiseforimprovingtheenergyefficiencyforlaptopsandpersonal computers by reducing the power consumption requirements
- Assessenterprise-wideandpersonalcomputingandcomputingenergyconsumption
- Recognizethenecessityfor long-termsustainabilityin IT
- FormulateplansforreducingITheatingandcooling requirements
- EvaluatetheregulatoryandgovernanceissuessurroundingIT
- Choosethebestsustainable hardware fortheir applications

UNIT-I

TrendsandReasonstoGoGreen:OverviewandIssues,ConsumptionIssues,Minimizing PowerUsage, Cooling.

Introduction to Green IT: GreenIT, Holistic Approach to GreeningIT, Greening byIT (can beused for case study also)

- UsingRFIDforEnvironmentalSustainability
- SmartGrids
- SmartBuildingsand Homes
- GreenSupplyChain andLogistics
- Enterprise-WideEnvironmentalSustainability

UNIT-II

GreenHardware:Introduction,LifeCycleofaDeviceorHardware,Reuse,Recycleand Dispose

GreenSoftware:Introduction,Energy-SavingSoftwareTechniques,SustainableSoftware Development

UNIT-III

Green Data Centers: Data Centre ITInfrastructure, Data Centre Facility Infrastructure: Implications for Energy, Efficiency, IT InfrastructureManagement, Green Data Centre MetricsGreen Data Storage: Introduction, Storage Media PowerCharacteristics, Energy Management Techniques for HardDisks, System-Level EnergyManagementGreen Networks and Communications: Introduction, Objectives of Green NetworkProtocols, Green Network Protocols andStandards

UNIT-IV

Enterprise GreenIT Strategy: Introduction, Approaching Green IT Strategies, Business Drivers of Green IT Strategy, Organizational Considerations in a Green ITStrategy, Steps in Developing a Green ITStrategy, Metrics and Measurements in GreenStrategies.

EnterpriseGreenIT Readiness:Background:ReadinessandCapability, Development oftheG-Readiness Framework, Measuring an Organization's G-Readiness.

UNIT-V

Managing Green IT: Introduction, Strategizing GreenInitiatives, Implementation of GreenIT, InformationAssurance, Communication and SocialMedia.

Green Cloud Computing and Environmental Sustainability: Cloud Computing and Energy Usage Model, Features of Clouds Enabling Green Computing, Towards Energy Efficiency of Cloud Computing, Green Cloud Architecture

The Future of Green IT: Green Computing and theFuture, Megatrends for GreenComputing, Tele-presenceInsteadofTravel, Tele-commutingInsteadofCommuting, DeepGreenApproach.

Reference:

- Green IT: Reduce Your Information System's Environmental Impact While Adding to the Bottom Line,TobyVelte, Anthony Velte, Robert Elsenpeter, 2008, McGraw Hill.
- HarnessingGreenIT,SanMurugesan, G.R.Gangadharan, 2013, WILEY.
- GreenComputing-ToolsandTechniquesforsavingenergy,moneyandresources,Bud E.Smith,2014,CRCPress.
- GREENITFORSUSTAINABLEBUSINESSPRACTICE, MarkG.O'Neill,AnISEB FoundationGuide.
- GreenComputingandGreenITBestPractices,JasonHarris
- The Green of IT – How Companies Can Make a Difference for the Environment, John Lamb, IBM Press (2009).
- GreenProject Management, Richard Maltzmanand David Shirley, CRC Press a Taylor and Francis Company (2010).
- FoundationsofGreenIT, MartyPoniatowski,PrenticeHall,2009

ImageProcessing

(BCA406B)

Course Objectives:

- StudythefundamentalconceptsofDigitalImageprocessingandtodiscuss mathematical transforms .
- StudyimageenhancementtechniquesandexploreDCTandDFT techniques
- Expose studentsto variousimage enhancement,restoration methodsand morphological operations.
- AnalyzeImageDataCompressionandmorphologicalOperation
- Explainvarious ApplicationsofImageProcessing

Course Outcomes

- Explainthefundamentalconceptsofadigitalimageprocessing System
- Applytechniques forenhancingdigitalimages
- ExaminetheuseofFouriertransformsforimageprocessinginthefrequencydomain
- ComparevariousImagecompressionstandardsandmorphologicalOperation
- IdentifyvariousApplicationsofImageProcessing

UNIT-I

Introduction to Image Processing Systems: Image representation, basic relationship between pixels, elements of DIP system, elements of visual perception-simple image formation model Vidicon and Digital Camera working principles Brightness, contrast, hue, saturation, mach band effect, Colour image fundamentals-RGB, CMY, HSImodels 2D sampling,quantization.

UNIT-II

Image Enhancement in the Spatial domain: Spatial domain methods: point processing-intensity transformations, histogram processing, image subtraction, image averaging Spatial filtering-smoothing filters, sharpening filters Frequency domain methods: low pass filtering, high pass filtering, homomorphic filter.

UNIT-III

Discrete Fourier Transform: Discrete Fourier Transform: Introduction, DFT and itsproperties, FFT algorithms ñ direct, divide and conquer approach, 2-D DFT &FFTImage Transforms : Introduction to Unitary Transform, DFT, Properties of 2-D DFT, FFT, IFFT, Walsh transform,Hadamard Transform, Discrete Cosine Transform, Discrete Wavelet Transform:Haar Transforms, KL Transform

UNIT-IV

Image Restoration and Image Segmentation: Image degradation, Classification of Image restoration Techniques, Image restoration Model, Image Blur, Noise Model : Exponential, Uniform, Salt and Pepper, Image Restoration Techniques : Inverse Filtering, Average Filtering,Median Filtering. The detection of discontinuities- Point, Line and Edge detections:

Prewit Filter, Sobel Filter, Fri-Chen Filter Hough Transform, Thresholding Region based segmentation Chain codes, Polygon approximation, Shape numbers.

UNIT-V

Image Data Compression and morphological Operation: Need for compression, redundancy, classification of image compression schemes,Huffman coding, arithmetic coding, dictionary based compression, transform Based compression, Image compression standards- JPEG &MPEG,vector quantization, wavelet based image compression.Morphological Operation: Introduction, Dilation, Erosion, Opening, Closing.

Applications of Image Processing: Case Study on Digital Watermarking, Biometric Authentication (Face, Finger Print, Signature Recognition), Vehicle Number Plate Detection and Recognition, Object Detection using Correlation Principle, Person Tracking using DWT, Handwritten and Printed Character Recognition, Contend Based Image Retrieval, Text Compression.

Reference:

- R.C.Gonzalez&R.E.Woods, Digital Image Processing, Pearson Education, 3rd edition, ISBN. 13:978-01316872882 S.
- Jayaraman Digital Image Processing TMH (McGraw Hill) publication, ISBN- 13:978-0-07- 0144798
- Gonzalez,Woods&Steven,DigitalImageProcessingusingMATLAB,Pearson Education, ISBN-13:978-0130085191
- WilliamK. Pratt, "DigitalImageProcessing", JohnWiley, NJ, 4thEdition,200
- Sid Ahmed M.A., "Image Processing Theory, Algorithm andArchitectures", McGraw-Hill, 1995.Umbaugh, "Computer Vision".
- AnilK.Jain,FundamentalsofDigitalImageProcessing,PrenticeHallofIndia,2ndEdition,2004.

BIGDATAANALYTICS

(BCA406C)

Course Objective:

Students will gain knowledge on analyzing Big Data. It serves as an introductory course for graduate students who are expecting to face Big Data storage, processing, analysis, visualization, and application issues on both workplaces and research environments.

UNIT- I:INTRODUCTIONTOBIGDATA

Introduction– distributed file system–Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce Big Data – Apache Hadoop & Hadoop EcoSystem, MovingData in and out of Hadoop – Understanding inputs and outputs ofMapReduce -, Data Serialization.

UNIT-II: HDFS, HIVEANDHIVEQL,HBASE

HDFS-Overview, Installation and Shell, Java API; Hive Architecture, Comparison with Traditional Database, HiveQLQuerying Data, Sorting And Aggregating, Map Reduce Scripts, Joins& Sub queries, HBase concepts, Advanced Usage, Schema Design,Advance Indexing, PIG, Zookeeper, how it helps in monitoring acluster, HBase uses Zookeeperand how to Build Applications withZookeeper.

UNIT- III:SPARK

Introduction to Data Analysis with Spark, Downloading Sparkand Getting Started, Programming with RDDs

UNIT-IV:NoSQL

What is it? Where It is Used Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL, NewSQL.

Text&References:

- Understanding Big Data: Analytics for EnterpriseClassHadoop and Streaming Data, by Chris Eaton, Paul Zikopoulos
- BigData,BigAnalytics:EmergingBusinessIntelligenceandAnalyticTrends,By Michael Minelli, Michele Chambers, AmbigaDhiraj
- Boris lublinsky, Kevin t. Smith, AlexeyYakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.
- BIGDataandAnalytics,SimaAcharya,SubhashiniChhellappan,Wiley

PythonProgrammingLab

(BCA407P)

Course Objectives:

- To Introduce Python Programming Language as Multipurpose Programming Language with Features and Applications.
- ToLearnInstalling PythonandIntroducing CrossMultiplatformUsageofPython.
- To Practice Basic Language Features of Python and Implement Oops Concepts Using Python.
- Learncorepythonstructuresand flowcontrol,Create and runpythonfunctions
- Explorethepythonlibraryfunctionsforvariouspurpose

Course Outcomes:

- InstallandusePythononVariousPlatform.
- UnderstandandExplainvarious featuresofPythonlanguage
- Designand Develop Pythonapplicationsfordataanalysisusing object-oriented concept
- BuildpackageandmodulesinPythonwithreusabilityandexceptionAspect
- WriteandexecuteSimpleprogramsforsortingandsearchinginPython.

UNIT-I

Introduction to python: python interpreter, using python as calculator, python shell,indentation. Atoms, identifiers and keywords, literals, strings, operators (arithmetic operator, relational operator, logical or Boolean operator, assignment, operator, ternary operator, bit wiseoperator, increment or decrement operator) Creating python programs: input and output statements, control statements(branching, looping,conditional statement, exit function, difference between break, continue and pass.), defining functions, default arguments, errorsand exceptions. Iteration and recursion: conditional execution, alternative execution, nested conditionals, the return statement.

UNIT-II

Recursion, stack diagrams for recursive functions, multiple assignment, the while statement, tables, two-dimensional tables. Strings and lists: string as a compound data type, length, traversaland the for loop, string slices, string comparison, a find function.

UNIT-III

Loopingandcounting,list values,accessingelements,list length,list membership,listsand for loops, list operations, list deletion. Cloning lists, nested lists Object oriented programming: introduction to classes, objects and methods, standard libraries.

UNIT-IV

Data structures: arrays, list, set, stacks and queues. Searching and sorting: linear and binary search, bubble, selection and insertion sorting.

References:

- T.Budd,ExploringPython,TMH,1stEd,2011
- How to think like a computer scientist: learning with Python / Allen Downey, JeffreyElkner, Chris Meyers. 1st Edition – Freely available online.
- http://docs.python.org/3/tutorial/index.html
- http://interactivepython.org/courselib/static/pythonds

ComputerGraphics&MultimediaApplicationLab

(BCA408P)

Practical will be based on Paper Computer Graphics & Multimedia Application: Covers Units of Syllabus.

SoftwareEngineeringandTestingLab

(BCA409P)

PracticalwillbebasedonPaperSoftwareEngineeringandTestingLab:CoversUnitsof Syllabus.

SEMESTER–V

MOBILEAPPLICATIONDEVELOPMENT

(BCA501)

Course Objectives:

- TointroduceAndroidplatformanditsarchitecture.
- To learnactivitycreationandAndroid UIdesigning.
- TobefamiliarizedwithIntent,BroadcastreceiversandInternetservices.
- ToworkwithSQLiteDatabaseandcontentproviders.
- Tointegratemultimedia,cameraandLocationbasedservices&RESTfullweb Services in Android Application.
- ToexplorepublishingprocessofAndroidApplication

Course Outcomes:

- DescribeAndroidplatform,Architectureandfeatures.
- DesignUserInterfaceanddevelopactivityforAndroidApp.
- UseIntent,BroadcastreceiversandInternetservicesinAndroidApp.
- DesignandimplementDatabase ApplicationandContentproviders.
- Usemultimedia,cameraandLocationbasedservicesinAndroid App.
- DiscussvariousstagesinAndroidApppublishing.

UNIT-I

Various mobile platforms, introduction to android, history and versions of android, android API, android architecture, android runtime, dalvik virtual machine, features of android, introduction and installation of eclipse and ADT plugin and/or introduction and installation ofandroid studio, requirements and installation of android SDK, SDK manager, emulator, avd, android virtualdevice manager, Google play account, installing android app fromgoogle play, APK file.

UNIT-II

Setting up Development Environment, Installing Packages using SDK Manager, Android Project Structure, Creating Hello Android App, Deploy it on USB-connected Android device, Setting up an Emulator, Android Tool Repository, Manifest File, DDMS, File Explorer,Installing and Running Android - Hello App, Activity Life Cycle and its methods, Logcat, Components of an Android App – Activity, Service, Broadcast Receiver, Content Provider

UNIT-III

Layout – Linear Layout, Relative Layout, Scroll View Layout, Table Layout, Frame Layout,UI Resources – Layout Resources, UI Elements, Views – Text view, Edit Text, Button, Check Box, Radio Button,ImageButton, Spinner, NavigatingbetweenActivities –Intent,Exchanging Data between Activities, Action Bar, Event Handling, Listeners, Notifying the User –Toast.

UNIT-IV

UsingThreads, ImageView, ExceptionHandling, Multimedia - Playing Audio usinganIntent, Playing Video using an Intent, Playing Audio using Media Player, Playing Video using Video View, Fragment, Fragment Life Cycle.

UNIT-V

SQLite database, creation of database and tables, CRUD operations – create, retrieve, update and delete operations, Cursor, list view,Introduction – REST fullweb Services, JSON, Google Play Services, location services, publishing apps.

References:

- MichaelBurton,DonnFelker,"AndroidApplicationDevelopmentforDummies", Dummies, ISBN : 9788126538775
- Pradeep Kothari, " Android Application Development (with Kitkat Support)", Kogent Learning Solutions Inc., Black Book, DreamTech Press, ISBN : 9789351194095
- W.FrankAbleson,RobiSen,Et.Al.,"AndroidinAction",Manning,ISBN: 9789350042915
- CharlieCollins,MichaelGalpin,Et.Al.,"AndroidinPractice",Manning,ISBN: 9789350042397
- AnubhavPradhan,AnilVDeshpande,"ComposingMobileApp,Learn|Explore| Apply using Android", Wiley, ISBN : 9788126546602
- JamesC.Sheusi,"AndroidApplicationDevelopmentForJavaProgrammers", Cengage Learning, 2013.
- Wallace Jackson, "Android Apps for Absolute Beginners", Apress, ISBN : 9788132211372
- http://www.developer.android.com

PRACTICALLISTONMOBILEAPPLICATION DEVELOPMENT

(BCA507P)

1. InstallingAndroidEnvironment.
2. Create “Hello World” application. That willdisplay“Hello World” inthe middle ofthe screen in the emulator. Also display “Hello World” in the middle of the screen in the Android Phone.
3. Createanapplicationwithloginmodule. (Checkusernameand password).
4. Createspinnerwithstringstakenfromresourcefolder(res>>value folder)andon changing the spinner value, Image will change.
5. Createamenuwith5optionsandselectedoptionshouldappearintextbox.
6. Createalistofallcourses inyour collegeandonselectingaparticular courseteacherin- charge of that course should appear at the bottom of the screen.
7. Createanapplicationwiththreeoptionbuttons, onselecting abuttoncolorofthescreen will change.
8. Createand Loginapplicationasabove.Onsuccessfullogin,pop upthemessage.
9. CreateanapplicationtoCreate,Insert,update,Deleteandretrieveoperationonthe database.
10. CreateaSimpleApplicationusingAndroidResources.
11. CreateaSimpleApplicationusingLayouts.
12. CreateaSimpleApplicationusingIntents.
13. CreateaSimpleApplicationusinguserinterfaces.
14. CreateaSimple Applicationforplaying Audioand Video files.

LinuxServerAdministration.

(BCA502)

CourseObjectives:

- UnderstandfundamentalconceptsofLinuxserveradministration,
- Willbe able toputthoseconceptstouse inreal-worldsituations.
- Understand howtoinstallandcustomizeLinux
- Manageusers,permissions,folders,andnativeapplications;
- ConfigureInternetandintranetservices(understandingandmanagingtheLinux TCP/IP networking stack and services);
- Creatingand maintainingprint,e-mail,FTP,andwebservers.

Course Outcomes:

- Writeshellprogramfor simpleproblem
- Use ofbasiccommandsofLinux.
- AnalyzetheneedforsecuritymeasuresforLinuxsever.
- ManaginguseraccountinLinux.
- Installand configureEmailSever,DNS,FTPetc.

UNIT– I

Linux introduction and file system - basic features, different flavors of Linux. Advantages,how Linux access files, storage files, Linux standard directories. Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons – cmp&comm, view files, disk related commands, checking disk free spaces.

UNIT–II

Understanding shells, Processes in Linux, connecting processes with pipes, Redirecting input output, manual help, Background processing, managing multiple processes, changing process priority with nice, scheduling of processes at command, cron commands, kill, ps, who, sleep, Printing commands, touch, file related commands - wc, cut, dd, etc. Mathematical commandsbc, expr. Creating and editing files with vi& vim editor. Simple filter commands – pr, head, tail, cut, paste, sort, uniq, tr. Filter using regular expressions – grep, egrep, and sed.

UNIT–III

Introduction to shell programming-develop some shell programs. System administration: common administrative tasks, configuration and log files, role of system administrator.Installing requirement, partitioning the hard drive for Linux, installing the Linux system, system startup and shut-down process.

UNIT–IV

Managing user accounts-adding & deleting users, changing permissions and ownerships, creating and managing groups, modifying group attributes, temporary disable user's accounts, creating and mounting file system, file security & permissions, becoming super user using su.Host name, disk partitions & sizes, users, kernel. Backup and restore files, installing and removingpackages.Starting& usingKDE&GNOMEgraphical interfaces.Basicnetworking

administration: setting up a LAN using LINUX, choosing peer to peer vs client/server model, setting up an Ethernet LAN, configuring host computers, checking Ethernet connecting, connecting to internet, common networking administrative tasks, configuring Ethernet, initializingEthernet interface, ifconfig, netstat andnetconfigcommands,TCP/IP network,DNS services.

UNIT-V

Installation,configuration&AdministrationoffollowingserversinLinux

- Mailserver
- DNS
- Remoteaccess
- FTPserver
- Apachewebserver
- VNCServer

References:

- Fedora9AndRedHatEnterpriseLinuxBibilebyChristopherNegus,WileyIndiaLtd.
- LinuxBible, 9ed, byChristopherNegus, WileyIndiaLtd
- Linux Administration, by Kogent Learning Solutions Inc., ISBN 13- 9789350044209, ISBN 10-935004420X, Wiley India
- Unix&ShellProgrammingbyForouzan,CengagePublications

PracticalListonLinuxServeradministration

(BCA508P)

1. Write a Shell script that displays list ofall the files in the current directoryto whichthe user has read, write and execute permissions?
2. WriteaShellscriptto listallofthedirectoryfilesinadirectory.
3. WriteaShellscriptto findfactorialofagiven integer?
4. Writeashellscripttochangedataformat.Showthetimetakeninexecutionofthis script.
5. Write a shell script to print files names in a directoryshowing date of creation & serial number of the file.
6. Writeashellscripttocountlines, wordsandcharactersinitsinput(donotusewc).
7. Writeashellscripttocomputegcdlcm&oftwonumbers.Usethebasicfunctionto findgcd& LCM of N numbers.
8. Writeashellscript tofindwhetheragivennumberisprime.
9. WriteshellscriptforShowingthecountofusers loggedin.
10. Runallthe command giveninsyllabususing allthe syntax incommandmode.

CLOUDCOMPUTING

(BCA503)

Course Objectives:

- Basicsofcloudcomputing.
- Keyconceptsofvirtualization.
- DifferentCloudComputingservices
- CloudImplementationand itstools
- KeycomponentsofAmazon WebServices
- CloudBackupand solutions

Course Outcomes:

- DefineCloudComputingandmemorizethedifferentCloudserviceanddeployment models
- Describeimportanceofvirtualizationalongwiththeirtechnologies.
- UseandExaminedifferent cloudcomputingservices
- AnalyzethecomponentsofGoogleCloud platform
- DescribethekeycomponentsofAmazonweb Service
- Design&develop backupstrategiesfor cloud databased on features.

Unit-I

Introduction to Computing Paradigms: High-Performance Computing, Parallel Computing,

UNIT– II

Cloud Computing Management: Cloud Application, Benefits and Drawbacks Applications on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure, Managing the Cloud Application, Migrating Application to Cloud, Cloud Deployment Models: Private Cloud,Outsourced Private Cloud, Community Cloud, On-Premise Community Cloud, Hybrid Cloud. Cloud Service Models: Infrastructure as a Service, : Platform as a Service, Software asa Service, Introduction to Open Source Tools for IaaS, Paas& SaaS : Apache.

UNIT-III

Technological Drivers for Cloud Computing: SOA and Cloud, SOA and SOC, Benefits of SOA, Multi-coreTechnology: Multi-coreProcessorsand VMScalability, Memoryand Storage Technologies,CloudStorageRequirements,NetworkingTechnologies,Web2.0

:Characteristics, Difference from Web 1.0, Applications, Social Media, Marketing, EducationWeb3.0:Components,SemanticWeb,W Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Biocomputing, Mobile Computing, Quantum Computing, Optical Computing, Nano- computing, Network Computing. Cloud Computing Fundamentals: Motivation, Need, Definition ofCloud Computing. Principles ofCloud computing: Five EssentialCharacteristics, Four Cloud Deployment Models, Three Service Offering Models, Cloud Ecosystem, Requirements for Cloud Services. Cloud Computing Architecture: cloud Architecture, User/Client Layer, Network Layer, Cloud Management Layer, Hardware Resource Layer, Network Connectivity in Cloud Computing, Public Cloud Access Networking, Private Cloud Access Networking.
ebServices,Characteristics,Convergence

of Cloud and Web 4.0, Connecting Information: Facebook. Agile Software Models: Agile SDLC forCloud Computing, Features of Cloud SDLC, Agile Software Development Process, Advantages of Agile. Cloud Application Development Platforms: Windows Azure, GoogleApp Engine, Forcecom. IBM Cloud Computing API

UNIT-IV

Virtualization : Full Virtualization, Para virtualization, Hardware-Assisted Virtualization, Hypervisor, OS Virtualization, Server Virtualization, Memory Virtualization, Storage Virtualization, Network Virtualization, Application Virtualization, Processor Virtualization,Memory Virtualization, Storage Virtualization, Network Virtualization, Data Virtualization, Application Virtualization, Hypervisors, Types of Hypervisors, Security Issues and Recommendations, From Virtualization to Cloud Computing VMware. Microsoft Hyper-V.

UNIT-V

Cloud Service Providers ; EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, AmazonWeb Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon SimpleQueue Service, Microsoft Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM SmartCloud. Security in Cloud Computing, Cloud General Challenges,

TextBooks:

- Essentials of Cloud Computing, K Chandrasekaran, CRC Press [ISBN: 3: 978--4822-0544-2]
- RajKumarBuyya,JamesBrobergandrezeiM.Goscinski,-CloudComputing: Principles and Paradigms,-Wiley 2011.
- Srinivasan,J.Suresh,-CloudComputing–aPracticalApproachforLearningand Implementation, Pearson India, [ISBN 978131776513]
- TobyVelte,AnthonyVelte,RobertElsenpeter,-CloudComputing,aPractical Approach - McGraw Hill, 2010 [ISBN: 0071626948]

References:

- GregSchulz-CloudandVirtualDataStorageNetworking,AuerbachPublications [ISBN: 978-1439851739].
- MartyPoniatowski-FoundationsofGreenIt- [ISBN:978-0137043750].
- LearningSpring ApplicationDevelopment,RaviKantSoni,PacktPublishing.
- MichaelMiller,CloudComputing,2008.
- JudithHurwitz,RobinBllor,MarciaKaufman,FernHalper,CloudComputingfor Dummies, 2009.
- ° BorkoFurht, Armando Escalante (Editors), Handbook ofCloud Computing, Springer, 2010.

ArtificialIntelligenceandMachineLearning

(BCA504A)

Course Objective:

- Understanddifferent AIconcepts
- ElucidateknowledgeofArtificialIntelligencetechniquesforproblemsolving
- UnderstandArtificialintelligencesearchstrategiesandneuralnetworks
- ProvideaninsightintothefundamentalsofMachineLearning Techniques
- Becomefamiliarwithregressionmethods,classificationmethods,clustering methods
- Become familiarwithmethodstoimprovethelearning

Course Outcome:

- InterpretArtificialIntelligenceconceptsintelligenceconcepts
- ApplyArtificialintelligencetechniquesforproblemsolving
- Analyzethefundamentalsofmachinelearning,thelearningalgorithmsandthe paradigms of supervised and un-supervised learning
- Identifymethodstoimprove machine learningresultsforbetterpredictiveperformance

UNIT-I

Introduction: Artificial Intelligence, Application of AI, AI Problems, Problem Formulation, Intelligent Agents, Types of Agents, AgentEnvironments, PEAS representation for an Agent, Architecture of Intelligent agents. Reasoning and Logic, Prepositional logic, First order logic, Using First-order logic, Inference in First-order logic, forward and Backward Chaining

UNIT-II

Search Strategies: Solving problems by searching, Search- Issues in The Design of Search Programs, Un-Informed Search- BFS, DFS;Heuristic SearchTechniques: Generate-And- Test, Hill Climbing, Best-First Search, AI Algorithm, Alpha beta search algorithm, Problem Reduction, AO*Algorithm, Constraint Satisfaction, Means-Ends Analysis

UNIT-III

Artificial Neural Networks: Introduction, Activation Function, Optimization algorithm-Gradient decent, Networks- Perceptrons, Adaline,Multilayer Perceptrons ,Backpropogation Algorithms Training Procedures, Tuning the Network Size Introduction to ML: Machine Learning basics, Applications of ML,Data Mining Vs Machine Learning vs Big DataAnalytics. Supervised Learning- Naïve Base Classifier, Classifying with k-Nearest Neighbour classifier, Decision Tree classifier, Naive Bayes classifier. Unsupervised Learning - Grouping unlabeled items using k-means clustering, Association analysis with the Apriori algorithm Introduction to reinforcement learning.

UNIT-IV

Forecasting and Learning Theory: Non-linear regression, Logistic regression, Random forest, Baysian Belief networks, Bias/variancetradeoff, Tuning Model Complexity, Model Selection DilemmaClustering:Expectation-MaximizationAlgorithm,Hierarchical

Clustering,Supervised Learning after Clustering, Choosing the number of clusters, Learning using ANN.

UNIT-V

Kernel Machines & Ensemble Methods: Introduction, Optimal Separating Hyperplane, Separating data with maximum, margin, Support Vector Machine (SVM), Finding the maximum margin, The Non-Separable Case: Soft Margin Hyperplane, Kernel Trick, DefiningKernelsEnsembleMethods:MixtureModels,Classifierusing multiple samplesofthe data set, Improving classifier by focusing on error, weak learner with a decision stump, Bagging , Stacking, Boosting ,Implementing the AdaBoost algorithm, Classifying with AdaBoostBootstrapping and cross validation.

Dimensionality Reduction: Introduction, Subset Selection, Principal Components Analysis, Multidimensional Scaling, Linear Discriminant Analysis.

Reference:

- GeorgeFLuger,ArtificialIntelligence,FifthEdition-2009,PearsonEducationPublications ,ISBN-978-81-317-2327-2
- StuartRussell,PeterNorvig,ArtificialIntelligence–AModernApproach,Pearson Education / Prentice Hall of India, 3rd Edition, 2009 .ISBN- 13: 978- 0136042594
- ElaineRich, Kevin Knight,S.B.Nair,ArtificialIntelligence,3rdEdition,TataMcGraw Hill-2008., ISBN 10: 0070087709 / ISBN 13: 9780070087705
- Anandita Das ,Artificial Intelligence and SoftComputingfor Beginners-,2nd Edition, ShroffPublication, ISBN- 9789351106159
- NilsJ.Nilsson,―ArtificialIntelligence:AnewSynthesis,MorganKaufmann Publishers, Harcourt Asia Pvt. Ltd., 2000, ISBN-1-55860-535-5
- Kumar Satish ,Neural Networks, Second edition Tata McGraw Hill-,2013, ISBN1259006166, 9781259006166
- EthemAlpaydın, Introductionto Machine Learning, PHI,Third Edition, ISBN No. 978-81-203- 5078-6. (this can be made the text book)

ArtificialIntelligenceandMachineLearningPracticalList

(BCA506P(A))

1. ImplementationofLogicprogrammingusingLISP/PROLOG-DFSforwaterjugproblem / BFS for tic-tac-toe problem/ Hill-climbing to solve 8- Puzzle Problem.
2. Introduction toPython Programming:Learn thedifferentlibraries-NumPy,Pandas, SciPy, Matplotlib, Scikit Learn.
3. ImplementationofLinearRegression, Logisticregression,KNN- classification.
4. Implementationofdimensionalityreductiontechniques:FeaturesExtractionand Selection, Normalization, Transformation, Principal Components Analysis.
5. ImplementationofK-MeansandK-medoidclustering algorithm.
6. ImplementationofClassifyingdatausingSupportVectorMachines(SVMs).
7. ImplementationofBaggingAlgorithm:DecisionTree,RandomForest.
8. ImplementationofBoostingAlgorithms:AdaBoost,StochasticGradientBoosting, Voting Ensemble.
9. DeploymentofMachineLearning Models.

AdvanceNeuralNetwork&DeepLearning

(BCA504B)

Course Objectives:

- Tounderstandthetheoreticalfoundations,algorithmsandmethodologiesofNeural Network
- Todesignanddevelopanapplicationusingspecificdeeplearningmodels
- Toprovidethepracticalknowledgeinhandlingandanalysingrealworldapplications.

Course Outcomes:

- Recognizethecharacteristicsofdeeplearningmodelsthatareusefultosolvereal- world problems.
- Understanddifferentmethodologiestocreateapplicationusingdeepnets.
- Identifyandapplyappropriatedeeplearningalgorithmsforanalyzingthedatafor variety of problems.
- Implementdifferentdeeplearningalgorithms
- Designthetestprocedurestoassesstheefficacyofthedevelopedmodel.
- Combineseveralmodelsintogainbetterresults

UNIT-I

MACHINE LEARNING BASICS: Learning algorithms, Maximum likelihood estimation, Building machine learning algorithm, Neural Networks Multilayer Perceptron, Back-propagation algorithm and its variants Stochastic gradient decent, Curse of Dimensionality

UNIT-II

DEEP LEARNING ARCHITECTURES: Machine Learning and Deep Learning, Representation Learning, Width and Depth of Neural Networks, Activation Functions: RELU, LRELU, ERELU, Unsupervised Training of Neural Networks, Restricted BoltzmannMachines, Auto Encoders, Deep Learning Applications.

UNIT-III

CONVOLUTIONAL NEURAL NETWORKS: Architectural Overview,Motivation, Layers, Filters, Parameter sharing, Regularization, Popular CNN Architectures: ResNet, AlexNet - Applications.TRANSFER LEARNING:Transfer learning Techniques, Variants of CNN: DenseNet, PixelNet.

SEQUENCEMODELLING–RECURRENTANDRECURSIVENETS:RecurrentNeural Networks, Bidirectional RNNs, Encoder-decoder sequence to sequence architectures - BPTT for training RNN, Long Short Term Memory Networks.

UNIT-IV

AUTO ENCODERS: Under complete Auto encoder, Regularized Auto encoder, stochastic Encoders and Decoders,Contractive Encoders.

UNIT-V

DEEPGENERATIVE:DeepBeliefnetworks,BoltzmannMachines,DeepBoltzmann Machine, GenerativeAdversial Networks.

Text Book(s) andJournals

- Ian Goodfellow,YoshuaBengioandAaron Courville,“ DeepLearning”,MITPress, 2017.
- JoshPatterson,AdamGibson"DeepLearning:APractitioner'sApproach",O'Reilly Media, 2017
- Umberto Michelucci “Applied Deep Learning. A Case-based Approach to Understanding Deep Neural Networks” Apress, 2018.

ReferenceBooks

- KevinP.Murphy"MachineLearning:AProbabilisticPerspective",TheMITPress, 2012.
- EthemAlpaydin,"Introductionto Machine Learning”, MITPress,Prentice HallofIndia, Third Edition 2014.
- GiancarloZaccone,Md.RezaulKarim,AhmedMenshawy"DeepLearningwith TensorFlow: Explore neural networks with Python", Packt Publisher, 2017.
- Antonio Gulli,SujitPal"DeepLearningwithKeras",PacktPublishers,2017.
- FrancoisChollet"DeepLearningwithPython",ManningPublications,2017.

AdvanceNeuralNetwork&DeepLearning

Lab

(BCA506P(B))

Practical will be based on Paper Computer Graphics & Multimedia Application: Covers Units of Syllabus.

InternetofThings(IOT)

(BCA504C)

Course Objective:

This course elucidates concepts related to Internet of Things. The students will get hands-on experience in working with Raspberry Pi 3 and exploring IoT.

Course Outcome:

After completion of the course, the students will be able to understand the working of Raspberry Pi, its features and how various components can be used with Pi. The students will be able to understand IoT practically

UNIT-I

Overview of IoT: Understanding IoT fundamentals, IOT Architecture, protocols, Various Platforms for IoT, Real time Examples of IoT, Overview of IoT components and IoT Communication TechnologiesGetting started with Raspberry Pi:Introduction to Raspberry Pi, Comparison of various Rpi Models, Understanding SoC architecture and SoCs used in Raspberry Pi, Pin Description of Raspberry Pi, On-board components of Rpi, Projects using Raspberry Pi

UNIT-II

Booting Up RPi- Operating System and Linux Commands: Linux- Introduction, Architecture, FileSystem, RaspbianO.S.- Introduction, Tools likeLeafpadEditor, InstallingRaspbianonPi, First boot and Basic Configuration of Pi, Popular Linux Commands

UNIT-III

Working with RPi using Python and Sensing Data using Python: Introduction, Python vs.Other Languages, Applications of Python, Understanding Python, Interpreted Languages, Variables, Keywords, Operators and Operands, Data Types in Python, Importing Libraries, Flow Control, Conditional Statement, Loops, Sensors Interfacing- Temperature and Humidity Sensor (DHT11), Motion Sensor(PIR), Obstacle detection using Ultrasonic sensor, etc., Communicating using RPi- GSM interfacing, Accessing on-board Wi-Fi, Connecting Database with RPi.

UNIT-IV

C Language- Imbibing RPi with C: C Basics- compiled language, C Concepts- data types, variables, conditional statement, loops, Library installation, Compiling C programs, Using Wiring Pi for GPIO Programming, Interfacing Rpi using C

UNIT-V

IoT Design using Raspberry Pi: IoT Applications based on Pi, LAMP Web-server, GPIO Controlover WebBrowser, Creating CustomWeb Page for LAMP, Communicating data using on-board module, Home automation using Pi, Node-RED, MQTT Protocol, Using Node-RED Visual Editor on Rpi.

Text&References:

- Simon Monk, “Programming the Raspberry Pi: Getting Started with Python”, January 2012, McGraw Hill Professional
- EbenUptonandGarethHalfacree,“RaspberryPiUserGuide”,August2016,4th edition, John Wiley & Sons
- Alex Bradburyand BenEverard, “Learning PythonwithRaspberryPi”, Feb2014, John Wiley & Sons.

ListofPrograms:

1. Getting startedwithRaspberryPi,InstallRaspianon yourSD card
2. Linuxbasiccommands.
3. CodingsimpleprogramsinPython.
4. HowtousePython-basedIDE(integrateddevelopment environments)fortheRaspberryPi and how to trace and debug Python code on the device
5. Howtohave your RaspberryPiinteract withonlineservicesthroughtheuseofpublic APIs and SDKs.

InternetofThings(IOT)-Lab

(BCA506P(C))

Practical will be based on Paper Computer Graphics & Multimedia Application: Covers Units of Syllabus.

DigitalMarketingandBusinessAnalytics

(BCA505A)

Course Objective:

1. Examine and explore the role and importance DigitalMarketing in the current business scenario.
2. FamiliarizewiththevariousDigitalMarketingTools.
3. ApplyDigitalMarketingtoolsforformulatingaDigitalMarketingStrategy.
4. UnderstandDigitalMarketingCampaignsusingvariousToolsandmeasuretheireffectiveness .

Course Outcome:

1. UnderstandtheroleofDigitalMarketingRemembering
2. DemonstrateuseofvariousDigitalMarketing Tools.
3. DiscusskeyelementofDigitalMarketingStrategy.
4. UnderstanduseofDigitalMarketingTools forDigitalMarketing Campaigns
5. Assess/MeasuretheeffectivenessoftheDigitalMarketingCampaigns.
6. DemonstratepracticalskillsusingcommondigitalmarketingtoolslikeSEO,SEM, Content Marketing

Unit-I

Fundamentals of Digital Marketing: Digital Marketing. Digital Marketing Strategy. Skills Required in Digital Marketing, Digital Marketing Plan, Digital Marketing: Introduction to Display Marketing, Types of Display Ads, Buying Models, Display Plan, Analytics Tools. Dignified Digital Marketing – Ethics and Data Privacy.

Unit-II

Search Engine Advertising: Introduction, Understanding Ad Placement, Understanding AdRanks, Creating First Ad Campaign, Enhance Your Ad Campaign, Performance Reports. Social Media Marketing: Building a Successful Strategy, Facebook Marketing: Facebook Marketing for Business, Anatomy of an Ad Campaign, Adverts, Facebook Insights, Other Marketing Tools, Other Essentials. Instagram Mobile Marketing: Mobile Usage, Mobile Advertising, Mobile Marketing Toolkit, Mobile Marketing Features, Campaign Development Process, Mobile Analytics.

Unit-III

LinkedIn Marketing: Importance of LinkedIn Presence, LinkedIn Strategy, Sales Leads Generation Using LinkedIn, Content Strategy, LinkedIn Analytics, Targeting, Ad Campaign. Twitter Marketing: Getting Started with Twitter, Building a Content Strategy, Twitter Usage, Twitter Ads, Twitter Analytics, Twitter Tools and Tips for Marketers.

Unit-IV

SEO: Search Engine, Concept of Search Engine Optimization (SEO), SEO Phases, On Page Optimization, Off Page Optimization, Social Media Reach, Maintenance.

Unit-V

Web Analytics: Data Collection, Key Metrics, Making Web Analytics Actionable, MultiChannel Attribution, Types of Tracking Codes, Mobile Analytics, Universal Analytics, Competitive Intelligence.

ReferenceBooks:

1. DigitalMarketing, SeemaGupta, McGrawHillEducation(India)PrivateLimited
2. SocialMedia&MobileMarketing:IncludesOnlineWorksheetsPuneetSingh Bhatia,ISBN: 9788126578078
3. Digital Marketingfor Dummies,Ryan Deiss& Russ Henneberry,John Wiley & Son, Inc.
4. SocialMediaMarketing All-In-One, JanZimmerman, DeborahNg, John Wiley&Sons Inc.
5. EpicContentMarketing,JoePulizzi,McGrawHillEducation
6. Youtility,JayBaer, GildanMedia, LLC
7. HitMakers:TheScienceAgeof Diceof Popularity inan Ageof Distraction,Derek Thompson, Penguin Press
8. TheArtofSEO,EricEnge, StephanSpencer, JessieStricchiola,O'ReillyMediaInc,
9. DigitalMarketing2020,DannyStar,

EthicalHacking

(BCA505B)

Course Objective:

- Teach students to thinklike an ethical hacker and at the same time follow the code ofprofessional ethics and the prescribed cyber laws.
- Makeoneselfaware ofthe cybercrimesthataretakingplaceinthe realworld.
- Learnaboutthe different hacking toolsand techniquesand practicallyuse these toolsto gain better understanding of the ethical hacking concepts.
- Provideadeepunderstandingofsecurityissues, threatsandconcerns inthecyberworld and provide countermeasures to curb hacking.

Course Outcome:

- Recall the networking, sql, and encryption algorithm concepts to further study ethicalhacking techniques, threats, tools and
- preventionagainstattacks.
- Understandethicalhackingconcepts,cases,ethicsand cyberlaws.
- Applyavailablehacking toolstofind asolutionto agivenhackingissue.
- Analyzeandclassifythereal-worldhackingcases and situations.

UNIT-I

Introduction to ethical Hacking: What is ethical hacking? Types of hacking, advantages, disadvantages and purpose of hacking, Types of hackers, Code of ethics, Types of attacks and attack vector types, Prevention from hackers, The Indian IT Act 2000 and 04Amendments to the Indian IT Act(2008) ,Phases of hacking.

Footprinting and Reconnaissance:What is footprinting? Active and passive footprinting, purpose of footprinting, objectives of footprinting, footprinting threats, Types of footprinting, footprinting countermeasures.

UNIT-II

Scanning networks, Enumeration and sniffing: Scanning networks: Network scanning and its types, objectives of network scanning, scanning live systems, scanning techniques-TCP Connect /FullOpenScan, TypesofStealthscans, port scanning countermeasures, IDSevasion techniques, Banner grabbing and its tools, vulnerability scanning, proxy servers, anonymizers, IP spoofing and its countermeasures.

Enumerationand Sniffing: What isEnumeration? Enumerationtechniques, Enumerationtypes, Enumeration countermeasures, what is sniffing? Wiretrapping and its types, packet sniffing, sniffing threats, how sniffers work?, sniffing methods-ARP spoofing and MAC flooding,active and passive sniffing, types of sniffing attacks, sniffing countermeasures, sniffing detection techniques.

UNIT-III

Trojans and other Attacks: Worms, viruses, Trojans, Types of worms, viruses and worms, Preventing malware attacks, types of attacks: (DoS /DDoS), Waterhole attack, brute force, phishing and fake WAP, Eavesdropping, Man-in-the-middle, buffer overflow, DNS poisoning, ARP poisoning, Identity Theft, IoT Attacks, BOTs and BOTNETs, Steganography - text,image and audio and video, types of Social Engineering: Physical social engineering, Remote social engineering and hybrid social engineering.

UNIT-IV

Hacking web servers, web applications and sql injection: Session hijacking: What is session hijacking? , why session hijacking is successful? session hijacking techniques, session hijacking process, Types of session hijacking,session hijacking countermeasures: protecting and preventing, Hacking web servers and web applications: Causes of webservers being compromised, web server attacks, stages of webserver attacks, defending against web server attacks, web application components, its working, architecture, web server attack vectors, web applicationthreatsand countermeasures. SQLInjection: What isSQLinjection, SQL injection threats, SQL injection attacks, SQLinjection detection, Types of SQL injection, SQL injection methodology, SQL injection prevention and countermeasures.

UNIT-V

Wireless network hacking, cloud computing security, cryptography, Pen testing: Types of wireless Architecture, wireless encryption techniques-WEP and WPA, breaking WEP/WPA and defending WPA encryption, wireless Sniffing, Characteristics, types of cloud computing services, models and benefits, threats and attacks, cryptography and its objectives, cryptography types, cryptography attacks, what is Pen Testing, need for pen testing, types and techniques of pen testing, phases of pen testing.

Reference:

1. MattWalker,All-In-One-CEH-Certified-Ethical-Hacker-Exam-Guide.
2. ManthanDesaiBasicsofethicalhackingforbeginners.
3. SunitBelapureandNinaGodbole,CyberSecurity:UnderstandingCyberCrimes, Computer Forensics and Legal Perspectives.
4. Srinivasan,J.Suresh,CloudComputing:Apracticalapproachforlearningand implementation, Pearson.
5. Sean-PhilipOriyano,Sybex,CertifiedEthicalHackerStudyGuidev9,StudyGuide Edition,2016.
6. EmmettDuleyandChuckEasttom,ComptiaSecurity+StudyGuide.
7. AlanaMaurushat,EthicalHacking.
8. TutorialsPointProfessionals,EthicalHackingbyTutorialsPoint.

ITSecurity

(BCA505C)

Course Objectives:

- UnderstandthefundamentconceptsofCyberandInformationSecurity
- Gaintheknowledgeof differenttypesandworkingofmalwareandsecurityhazards incident of real-world.
- Understandcryptography techniquesandapply themforsecuredatacommunication and authentications
- UnderstandtheworkingandimplementationofFirewall.
- Understandtheconceptofcyberspaceandcybercrimeanddigitalsignature.

Course Outcomes:

- Explainvarioussecurityconceptsandapplythem indailycyberuse.
- Configurefirewallandothersecuritysettingincomputer
- Performthemalwareandspamemailidentification,analysis,virusscanningandcleaning and other services using security tools
- Explain andpracticetheCyberLaw,Ethics,andIntellectual Property Rights,Patent and Trademark and Design Law

UNIT-I

Information security: overview, information security importance, information security components. Threats to information system- external and internal thread, security threat and vulnerability- overview, malware, type of malware: virus, worms, trojans, rootkits, robots, adware's, spywares, ransom wares, zombies etc., desktop security.

UNIT-II

Application security- database security, e- mail security, internet security, principles of security- confidentiality, integrity, vailability, introduction to cryptography- symmetric key cryptography, asymmetric key cryptography, message authentication, applications of cryptography. Security technology- firewall, type of firewall, firewall benefits, VPN, antivirus software.

UNIT-III

Cyberspace- cloud computing &security, social network sites security, attack preventionpasswords, protection against attacks in social media, securing wireless networks, security threats.

UNIT-IV

Cybercrime-concept of cybercrime, type of cybercrime, phishing, cybercrime prevention, case study, security threats to e- commerce- electronic payment system, Digital Signature– digital signature process.

UNIT-V

ISO- international organization for standardization, world intellectual property organization, cyber law- cyber law in India, IT act 2000, intellectual property rights- definition, intellectual property, categories of intellectual property, rights protected under intellectual property,copyright, patent and trademark, design- design law in India.

References:

- AllanFriedmanandP.W.Singer,CyberSecurityandCyberwar:WhatEveryone Needs to Know by Published Oxford University
- DonFranke,CyberSecurityBasics:ProtectYourOrganizationbyApplyingthe Fundamentals by Publisher CreateSpace Independent Publishing Platform, 2016
- MayankBhushan, FundamentalofCyber Security

InternshipAssessment

(BCA509P)

SEMESTER–VI

Internship/MajorProject
(BCA601P)

Seminar
(BCA602P)