UG Syllabus under CBCS 2019 Admission Batch Onwards
Information Technology Management(ITM)

Scheme of UG ITM Under Choice Based Credit System(CBCS)Courses for Honours Students

SEM.	COURSE	COURSE CODE	MARKS	CREDITS	TITLE	REMARKS
I	Core	C-1	100	6	DigitalLogic	Compulsory
		C-2	100	6	Programming using C	
	Generic Elective	GE-1	100	6	DiscreteMathematicalStructures	Compulsory
	Ability Enhancement	AECC-1	100	4	Environmental Science	Compulsory
II	Core	C-3	100	6	ComputerOrganization	Compulsory
		C-4	100	6	DataStructure	
	Generic Elective	GE-2	100	6	Numerical Techniques	Compulsory
	Ability Enhancement	AECC-2	100	4	MIL Communication(English/Odia/Hindi)	Compulsory
III	Core	C-5	100	6	Programming usingC++	Compulsory
		C-6	100	6	Database Systems	
		C-7	100	6	Principle ofManagement	

SEM.	COURSE	COURSE CODE	MARKS	CREDITS	TITLE	REMARKS
III						
	Generic Elective	GE-3	100	6	Theory ofComputation	Compulsory
	SkillEnhancement	SEC-1	100	4	Communicative English	Compulsory
IV	Core	C-8	100	6	JavaProgramming	Compulsory
		C-9	100	6	BusinessAccounting	
		C-10	100	6	Operating Systems	
	Generic Elective	GE-4	100	6	QualityAssuranceand Testing	Compulsory
	SkillEnhancement	SEC-2	100	4	Quantitative Aptitude andLogicalReasoning	Compulsory

SEM.	COURSE	COURSE CODE	MARKS	CREDITS	TITLE	REMARKS
V	Core	C-11	100	6	WebTechnologies	Compulsory
		C-12	100	6	SoftwareEngineering	
	Discipline Specific	DSE-1	100	6	ComputerNetwork Security	Compulsory
		DSE-2	100	6	Organizational Behavior	Compulsory
	Skill Enhancement	SEC-3	100	4	Python Programming	Compulsory
VI	Core	C-13	100	6	Management Accounting	Compulsory
		C-14	100	6	ComputerNetworks	Compulsory
	Discipline Specific	DSE-3	100	6	Marketing Management	Compulsory
		DSE-4	100	6	E-Commerce/ Project	Compulsory
	Skill Enhancement	SEC-4	100	4	Android Programming	Compulsory

ITM (HONOURS) SEMESTER I

Core Course

C-1: Digital Logic

(Theory: 4 Credits; Practical: 2 Credits) Theory Full marks: 75 (Mid-Sem: 15; End-Sem: 60)
Practical Fullmarks: 25 (End Semester evaluation)

Course Objectives

Introduce the concept of digital and binary systems. Be able to design and analyze combinational logic circuits. Be able to design and analyze sequential logic circuits. Understand the basic software tools for the design and implementation of digital circuits and systems.

Course Outcomes: At the end of the course, a student will be able to:

- Convert different type of codes and number systems which are used in digital communication and computer systems.
- Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.
- Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.
- Design different types of with and without memory element digital electronic circuits for particular operation
- Organization of memory management and its concepts.

Unit-1

CharacterCodes,DecimalSystem,BinarySystem,DecimaltoBinaryConversion,Hexadecimal Notation, Boolean Algebra, Basic Logic Functions: Electronic Logic Gates,Synthesis of Logic Functions, Minimization of Logic Expressions, Minimization usingKarnaughMaps,Synthesiswith NANDandNORGates,Tri-StateBuffers

Unit-2

Arithmetic: Addition and Subtraction of Signed Numbers, Addition/ Subtraction LogicUnit,DesignofFastAdders:Carry-LookaheadAddition,MultiplicationofPositiveNumbers, Signed-Operand Multiplication: Booth Algorithm, Fast Multiplication: Bit-PairRecodng Multipliers, Carry-Save Addition of Summands, Integer Division,
Floating-PointNumbersandOperations:IEEEStandardforFloating-PointNumbers,ArithmeticOperationsonFloating-PointNumbers,GuardBitsandTruncation,ImplementingFloating-Point Operations.

Unit-3

Flip-Flops, Gated Latches, Master-Slave Flip-Flops, Edge-Triggering, T Flip-Flops,
JKFlip-Flops.RegistersandShiftRegisters,Counters,Decoders,Multiplexers,ProgrammableLogicDevices(PLDs),ProgrammableArrayLogic(PAL),ComplexProgrammableLogicDevices(CPLDs),Field-ProgrammableGateArray(FPGA),Sequential Circuits, UP/DOWNCounters, Timing Diagrams, The Finite State MachineModel,SynthesisofFiniteState Machines.

Unit-4

MemorySystem:SemiconductorRAMMemories,InternalOrganizationofMemoryChips,Static Memories, Asynchronous DRAMS, Synchronous DRAMS, Structure ofLargeMemories, Memory System Considerations, RAMBUS Memory.Read-OnlyMemories:ROM, PROM, EPROM, EEPROM, Flash Memory, Speed, Size, and Cost of Memory.SecondaryStorage:MagneticHard Disks, Optical Disks, Magnetic TapeSystems.

TextBooks:

1.CarlHamacher,Z.Vranesic,S.Zaky:Computer Organization,5/e(TMH)

ReferenceBooks:

1.M.MorrisMano: Digital LogicandComputerDesign,Pearson

C–1:Practical/Tutorial:DigitalLogicLab

1. IntroductiontoXilinxsoftware(VHDL)

WritetheVHDLcodefor

2. Realizingalllogicgates.

3. CombinationCircuit.

4. ADDER.

5. SUBTRACTOR.

6. MUX.

7. DE-MUX.

8. Encoder.

9. Decoder.

10. PAL.

11. PLA.

Write the VHDL program for the following Sequential Logic Circuits

12. Flip Flops.

13. ShiftRegisters.

14. Counters.

15. MemoryElements.

ITM (HONOURS) SEMESTER

I

CoreCourse

C-2: Programming Using C (Theory: 4 Credits; Practical: 2 Credits)TheoryFullmarks:75(Mid-Sem:15;End-Sem:60)Practical Full marks:25 (End semester evaluation)

COURSE OBJECTIVE:-

The course is designed to provide complete knowledge of C language. Students will be able to develop logics which will help them to create programs, applications in C. Also by learning the basic programming constructs they can easily switch over to any other language in future.

COURSE OUTCOME:-

After learning this paper ,students should be able to know :-

- Introduction of C language, various elements of C ,data types ,operators, expressions, decision making and branching & implementation in programs.
- students will learn loops and their types and will write programs, they will understand array concepts ,programs also pointer uses in programs.
- Students will understand various storage classes, concept of function their types,program using functions, String concepts and string programs, dynamic memory allocation .
- Students will understand structure and union,programs based on structure and union. Students also learn file management in C, various operations in files,programs in file handling

Unit-1

Introduction:IntroductiontoProgrammingLanguage,IntroductiontoCProgramming,Keywords&Identifiers,Constants,Variables,InputandOutputOperations, Compilation and pre-processing, **Data types**: Different data types, Datatypesqualifier,modifiers,Memoryrepresentation,sizeandrange,**Operators:**Operators(Arithmetic,Relational,Logical,Bitwise,Assignment&compoundassignment, Increment &Decrement,Conditional),Operator types(unary, binary,ternary).Expressions,Orderofexpression(Precedenceandassociativity)

Controlstructures:DecisionMakingandBranching(SimpleIFStatement,IF…ELSE Statement,NestingIF…ELSEStatement,ELSEIFLadder),Selectioncontrolstructure(SwitchStatement).

Unit-2

Loops: The WHILE Statement, The DO…WHILE Statement, The FOR Statement,Jumps in Loops, **Array:** Concept of Array, Array Declaration, types of array (one andmultipledimension),CharacterArraysandStrings,Subscriptandpointerrepresentationofarray,Array of Pointers, Limitation of array, **Pointers**: Concept ofPointer(nullpointer,wildpointer,danglingpointer,genericpointer),PointerExpressions,Accessing theAddressofaVariable,DeclaringPointerVariables,Initializations of PointerVariable,Accessinga Variable through its Pointer, Pointerarithmetic.

Unit-3

class:Types(auto,register,static,extern),scoperules,declarationanddefinition.**Function**:Function&

types(Userdefinedfunction,libraryfunction)Function Definition, Declaration, Function Calls, Header file and library, FunctionArguments,stringhandling function (strlen,strcmp,strcpy,strncpy,strcat,strstr),Functionrecursion,FunctionsReturningPointers,Pointer stoFunctions,Commandlinearguments,Applicationofpointer(dynamicmemoryallocation).

Unit-4

Structure and Union: Defining, Declaring, Accessing, Initialization Structure, nestedstructure,self-referentialstructure,bit-field,ArraysofStructures,StructuresandFunctions,Unions,differencebetweenstructureandunion,activedatamember,structurewithin union,Self-referentialStructure.

File:FileManagementinC,DefiningandOpeningaFile,Fileopeningmodes(read,write,append),ClosingaFile,Fileoperations,fileandstream,ErrorHandling During I/O Operations, sequential and random access file,low level and highlevel file.

TextBooks:

1. E.Balagurusamy,"ProgramminginANSIC",4/e,(TMH)

ReferenceBooks:

1. B.Kernighan&DennisRitchie, "The CProgrammingLanguage",2/ePHI
2. PaulDeitel,HarveyDeitel,"C:How toProgram",8/e,PrenticeHall.
3. P.C.Sethi,P.K.Behera,"ProgrammingusingC",KalyaniPublisher,Ludhiana

C2:Practical/Tutorial:ProgrammingFundamentalsusingCLab

1. WriteaProgramtofindgreatestamongthreenumbers.
2. WriteaProgram toallarithmeticoperationusingswitchcase.
3. Write aProgram to printthe sumandproductofdigitsof aninteger.
4. WriteaProgram toreverseanumber.
5. Write aProgram tocompute thesumofthefirstntermsofthefollowingseries

   S= 1+1/2+1/3+1/4+……
6. Write aProgram tocompute thesumofthefirstntermsofthefollowingseries

   S=1-2+3-4+5…….
7. Write a function that checks whether a given string is Palindrome or not.Use thisfunctionto findwhetherthestringenteredbyuserisPalindromeornot.
8. Write a function to find whether a given no. is prime or not. Use the same togeneratetheprimenumbers lessthan100.
9. WriteaProgram tocompute thefactorsofagivennumber.
10. Write aprogramtoswaptwonumbersusingmacro.
11. WriteaProgramtoprintatriangleofstarsasfollows(takenumberoflinesfromuser):

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

12. WriteaProgramto performfollowingactionsonanarrayenteredby theuser:
    a) Printtheeven-valuedelements
    b) Printtheodd-valuedelements
    c) Calculateandprintthe sumandaverageoftheelementsofarray
    d) Print themaximumandminimumelementofarray
    e) Removetheduplicatesfromthearray
    f) Printthearrayinreverseorder

The program should present a menu to the user and ask for one of the options. Themenushould alsoinclude optionsto re-enter array andto quitthe program.

13. Write a Program that prints a table indicating the number of occurrences of eachalphabetinthetextenteredas commandlinearguments.
14. Writeaprogramthatswapstwonumbersusingpointers.
15. Write a program in which a function is passed address of two variables and thenalteritscontents.
16. Writeaprogramwhichtakestheradiusofacircleasinputfromtheuser,passesitto another function that computes the area and the circumference of the circleanddisplaysthevalueofareaandcircumferencefrom themain()function.
17. Write a program to find sum and average of n elements entered by the user. Towrite this program, allocate memory dynamically using malloc() / calloc( )functions.
18. Writeamenudrivenprogramto performfollowingoperationsonstrings:
    a) Showaddressofeachcharacterinstring
    b) Concatenatetwostringswithoutusingstrcatfunction.
    c) Concatenatetwostringsusingstrcatfunction.
    d) Comparetwostrings
    e) Calculatelengthofthestring(usepointers)
    f) Convertalllowercasecharacterstouppercase
    g) Convertalluppercasecharacterstolowercase
    h) Calculatenumberofvowels
    i) Reversethestring
19. Given two ordered arrays of integers, write a program to merge the two-arraysto getanorderedarray.
20. Writeaprogramtocopythe content of one filetoother.

ITM (HONOURS)SEMESTERI

GenericElectiveCourse

GE-1: Discrete Mathematical Structures (Theory: 4 Credits; Practical: 2 Credits)Fullmarks -75(Mid-Sem:15;End-Sem:60)

PracticalFullmarks:25(Endsemesterevaluation)

Course Objective:

To course stresses the students to learn how to think logically and mathematically. It describes different ways to solve mathematical problems and how to use it in computer science. There are four thematic areas covered in this course: mathematical foundations, combinatorial analysis, Graph Theory and Automata theory.

COURSE LEARNING OUTCOMES

Students will be able to:

- Write any justification by using logical notation
- Able to know different proof techniques and use them.
- Understand the basic principles of sets and operations in sets.
- Demonstrate an understanding of relations and functions and be able to determine their properties.
- Apply counting principles in various field of computer science.
- Model problems in Computer Science using graphs and trees.
- Use shortest path and other techniques of Graph theory in Computer Networking.
- Demonstrate different traversal methods for trees and graphs.
- Get basic ideas of Automata theory.

Unit-1

Logics and Proof: Propositional Logic, Propositional Equivalences, Predicates andQuantifiersNestedQuantifiers,Rulesinference,MathematicalInduction.

SetsandFunctions: Sets,Relations,Functions,ClosuresofEquivalenceRelations,Partial ordering well ordering, Lattice, Sum of products and product ofsumsprincipleofInclusions and Exclusions

Unit-2

Combinatory:Permutations,Combinations,Pigeonholeprinciple

RecurrenceRelation: LinearandNon-linearRecurrenceRelations,SolvingRecurrenceRelation using Generating Functions.

Unit-3

Graphs:Introductiontographs,graphsterminologies,Representationofgraphs,Isomorphism,

Connectivity& Paths: Connectivity, Euler and Hamiltonian Paths, Introduction totree, tree traversals, spanning tree and tree search: Breadth first search, Depth firstsearch,cut-set, cut-vertex.

Unit-4

ModelingComputation: FiniteStateMachine,DeterministicFiniteAutomata(DFA),Non-DeterministicFiniteAutomata(NFA),GrammarsandLanguage,ApplicationofPumping

LemmaforRegularLanguage.

TextBooks:

1. "DiscreteMathematics anditsApplicationswithCombinatoryandGraphTheory"7th edition by Kenneth H. Rosen.

ReferenceBooks:

1. ElementsofDiscreteMathematicsbyC.L.LiuandD.P.Mohapatra,TMH,2012
2. J.P Tremblay, R.Manohar, "Discrete Mathematical Structures withApplicationsto ComputerScience",TMH, 1997.

GE-1:Practical/Tutorial: Discrete Mathematical Structures Lab

Write the following programs using C/C++

1. TowerofHanoi
2. GraphrepresentationusingAdjacencyList.
3. GraphrepresentationusingAdjacencyMatrix.
4. StringMatchingusingfinitestatemachine.
5. Detectingwhetheranumberisevenor oddusingFiniteStateMachine.
6. To identify keywords such as char, const, continue using Finite State Machine.
7. Tofindthepowersetforagivenset.
8. TofindGCDoftwonumbersusingrecursion.
9. TofindBinomialcoefficients.
10. TofindPermutationandCombination resultforagivenpairofvaluesnandr.
11. Tocheckanumberisprimeornot.
12. TocalculatetheEuclideandistancebetweentwopoints.
13. Tofind theRoots ofpolynomials.
14. Findtheshortestpath pairinaplane.

ITM (HONOURS)SEMESTERI

AbilityEnhancementCompulsoryCourse

AECC-1: Environmental Science (4 Credits)Fullmarks-100(Mid-Sem:20;End-Sem:80)

Unit-1

TheEnvironment:TheAtmosphere,Hydrosphere,Lithosphere,Biosphere,Ecology,Ecosystem, Biogeochemical Cycle (Carbon Cycle, Nitrogen Cycle), Environment Pollution:AirPollution, WaterPollution, SoilPollution,Radiation Pollution.

Unit-2

PopulationEcology:Individuals,Species,Pollution,Community,ControlMethodsofPopulation,UrbanizationanditseffectsonSociety,CommunicableDiseasesanditsTransmission,Non-CommunicableDiseases.

Unit-3

Environmental Movements in India: Grassroot Environmental movements in India, Role ofwomen,EnvironmentalMovementsinOdisha,StatePollutionControlBoard,CentralPollutionControl Board.

Unit-4

Natural Resources: Conservation of Natural Resources, Management and Conservation ofWildlife, Soil Erosion and Conservation, Environmental Laws: Water Act, 1974, Air Act,1981, The Wildlife (Protection) Act, 1972, Environment Protection, 1986, Natural DisastersandtheirManagement.

SuggestedReadings:

Carson,R.2002.*SilentSpring*.HoughtonMifflinHarcourt.

Gadgil,M.,&Guha,R.1993.*ThisFissuredLand:AnEcologicalHistoryofIndia*.Univ.ofCaliforniaPress.

Gleeson,B.andLow,N.(eds.)1999.*GlobalEthicsandEnvironment*,London,Routledge.Gleick,P.H.1993.*WaterinCrisis*.PacificInstituteforStudiesinDev.,Environment&Security. StockholmEnv. Institute,Oxford Univ.Press.

Groom,MarthaJ.,GaryK.Meffe,andCarlRonaldCarroll.*PrinciplesofConservationBiology*. Sunderland: SinauerAssociates, 2006.

Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalayadams.*Science,* 339: 36-37.

McCully,P.1996.*Riversnomore:theenvironmentaleffectsofdams*(pp.29-64).ZedBooks.

McNeill, John R. 2000. Something New Under the Sun: An Environmental History of theTwentiethCentury.

Odum,E.P.,Odum,H.T.&Andrews,J.1971.*FundamentalsofEcology*.Philadelphia:Saunders.

Pepper,I.L.,Gerba,C.P.&Brusseau,M.L.2011.EnvironmentalandPollutionScience.AcademicPress.

ITM (HONOURS)SEMESTERII

CoreCourse

C-3: Computer Organization (Theory: 4 Credits; Practical: 2 Credits)TheoryFull marks:75 (Mid-Sem:15;End-Sem:60)

PracticalFullmarks:25(Endsemesterevaluation)

Course Objectives:

This course is intended to provide basics involved in data representation and manipulation, data transfer techniques, identify types of instructions, architecture of processing of machine instructions and understand the basics of hardwired and micro-programmed control of the CPU, elements of memory hierarchy and hazards.

Course Outcomes:

The student will be able to

- Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation
- Understand computer architecture concepts related to design of modern processors, memories and I/Os.
- Understand performance of ALU implementation and performance of memories.
- Have the knowledge about principle of pipeline and handling of different hazards.

Unit-1

BasicStructureofComputers:ComputerTypes,FunctionalUnits,InputUnit,MemoryUnit,ArithmeticandLogicUnit,OutputUnit,ControlUnit,BasicOperationalConcepts,BusStructures,Software.MachineInstructionsandPrograms:Numbers, Arithmetic Operations, and Characters: Number Representation, Additionof Positive Numbers, Addition and Subtraction of Signed Numbers, Overflow ofIntegerArithmetic,Floating-PointNumbers&Operations,Characters,MemoryLocations andAddresses,ByteAddressability,WordAlignment,AccessingNumbers, Characters, and Character Strings, Memory Operations, Instructions andInstructionSequencing,RegisterTransferNotation,BasicInstructionTypes,Instruction Execution and Straight-Line Sequencing, Branching, Condition Codes,GeneratingMemoryAddresses,AddressingModes,ImplementationofVariablesand Constants,IndirectionandPointers,IndexingandArrays,Relative Addressing.

Unit-2

Basic Processing Unit: Register Transfers, Performance on Arithmetic or LogicOperation, fetching a Word from Memory, Storing a Word in Memory. Execution ofa Complete Instruction, Branch Instruction, Multiple Bus Organization HardwiredControl,ACompleteProcessor.Micro-programmedControl:Microinstructions, Microprogram Sequencing, Wide-Branch Addressing, Microinstructions with Next-AddressField, Prefetching Microinstructions,Emulation.

UNIT-3

Input/ Output Organization: Accessing I/O Devices, Interrupts, Interrupt Hardware,Enabling & Disabling Interrupts, Handling Multiple Devices, Controlling DeviceRequests, Exceptions. Direct Memory Access, Bus Arbitration, Buses, Synchronous Bus,Asynchronous Bus, Interface Circuits: Parallel Port, Serial Port, Standard I/O Interfaces,PeripheralComponentInterconnect(PCI)Bus,SCSIBus,UniversalSerial Bus(USB)

Unit-4

Pipelining: Role of Cache Memory, Pipeline Performance, Data Hazards: OperandForwarding, Handling Data Hazards in Software, Side Effects. Instruction Hazards:Unconditional Branches, Conditional Branches and Branch Prediction. Influence onInstructionSets:AddressingModes,ConditionCodes,DatapathandControlConsiderations.SuperscalarOperation:Out-of-OrderExecution,ExecutionCompletion,Dispatch Operation,RISC & CISCProcessors.

TextBooks

1. CarlHamacher,Z.Vranesic,S.Zaky:ComputerOrganization,5/Ed(TMH)

ReferenceBooks

2. William Stallings: Computer Organization and Architecture (Design forPerformance),9/Ed
3. S. Brown, & Z. Vranesic, “Fundamentals of Digital Logic Design with VHDL”, 2/Ed,McGraw-Hill

C–3:Practical/Tutorial:ComputerOrganizationLab

1. Study of the complete Architecture of 8085 Microprocessor along with its instructionset.
2. IntroductiontoGNUSimulator8085,withitsfeatures.
3. WriteanAssemblyLanguageProgramtoaddNconsecutivenumbers.
4. Write an Assembly Language Program to find the smallest and largestnumberfromagivenseries.
5. Writean AssemblyLanguageProgramforsubtractionoftwo8-bitnumbers.
6. Writean AssemblyLanguageProgramfordisplayingaRollingmessage“Hello123”.
7. Writean AssemblyLanguageProgramtoperform ASCIItoDecimalconversion.
8. Writean AssemblyLanguageProgramtoaddtwounsigned binarynumbers.
9. Writean AssemblyLanguageProgramtosubtractionoftwounsignedbinarynumbers.

Demonstrate the followings:

10. AssemblingandDis-assemblingofcomputer.
11. TroubleshootinginComputer.

ITM (HONOURS)SEMESTERII

CoreCourse

C-4: Data Structure (Theory: 4 Credits; Practical: 2 Credits)Theory Full marks: 75 (Mid-Sem: 15; End-Sem: 60)PracticalFull marks:25 (Endsemesterevaluation)

COURSE OBJECTIVE:-

The course is designed to develop skills to design and analyze simple linear and non linear data structures. It strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem. It enables them to gain knowledge in practical applications of data structures

COURSE OUTCOME:-After learning this paper ,students should be able to know :-

- Basic terminology of data structure ,time and space complexity, review of array, structures, pointer concepts, dynamic memory allocation and various operations in linked lists.
- Concept of stack & queue, its representations, operations & applications.
- Concept of Tree, various types of trees,Binary tree, representation, various operations on trees, applications of trees.
- Concept of sorting, various types of sorting algorithms, Searching method, types of searching(Linear, Binary)

Unit-1

Introduction: Basic Terminology, Data structure, Time and space complexity,ReviewofArray, Structures, Pointers.
Linked Lists: Dynamic memory allocation, representation,Linked list insertionanddeletion,Searching,Traversinginalist,Doublylinkedlist,Sparsematrices.

Unit-2

Stack: Definition, Representation, Stack operations, Applications (Infix–Prefix–PostfixConversion & Evaluation, Recursion).
Queues: Definition, Representation, Types of queue, Queue operations,Applications.

Unit-3

Trees: Tree Terminologies, General Tree, Binary Tree, Representations, Traversing,BST,OperationsonBST,Heaptree,AVLSearchTrees,M-waysearchtree,Applic ationsofall trees.

Unit-4

Sorting: Exchange sorts, Selection Sort, Bubble sort, Insertion Sorts, Merge Sort,QuickSort, Radix Sort, Heap sort.
Searching: Linearsearch,Binarysearch.

TextBooks:

1. ClassicData Structure,P.Samanta,PHI, 2/ed

ReferenceBooks:

1. Ellis Horowitz, SartajSahni, “Fundamentals of Data Structures”, GalgotiaPublications,2000.

2. Sastry C.V., Nayak R, Ch. Rajaramesh, Data Structure & Algorithms,I.K.InternationalPublishingHousePvt.Ltd,NewDelhi.

C–4:Practical/Tutorial:DataStructureLab

WriteaC/C++ Program forthefollowings

1. Toinsertanddeleteelementsfromappropriateposition inan array.
2. Tosearchanelement andprintthetotaltimeofoccurrence inthearray.
3. Todeletealloccurrenceof anelement inanarray.
4. ArrayimplementationofStack.
5. ArrayimplementationofLinearQueue.
6. ArrayimplementationofCircularQueue.
7. To implement linear linked list and perform different operation such as nodeinsertanddelete,searchofanitem,reverse thelist.
8. To implement circular linked list and perform different operation such as nodeinsertanddelete.
9. To implement double linked list and perform different operation such as nodeinsertanddelete.
10. LinkedlistimplementationofStack.
11. LinkedlistimplementationofQueue.
12. Polynomialrepresentationusinglinkedlist.
13. Toimplementa BinarySearchTree.
14. TorepresentaSparseMatrix.
15. Toperformbinarysearch operation.
16. ToperformBubblesort.
17. ToperformSelectionsort.
18. ToperformInsertionsort.
19. ToperformQuicksort.
20. To performMergesort.

ITM (HONOURS)SEMESTERII

GenericElectiveCourse

GE-2: Numerical Techniques (Theory: 4 Credits; Practical: 2 Credits)Fullmarks -75 (Mid-Sem:15;End-Sem:60)

PracticalFullmarks:25(Endsemesterevaluation)

Objective:

Apply numerical methods to obtain approximate solutions to mathematical problems. Use the concepts like- interpolation, numerical differentiation, numerical integration, the solution of linear and nonlinear equations, and the solution of differential equations.

Course Outcomes :

The students will be able to

- Analyze different types of errors and get idea about efficient computation.
- Solve a system of equations
- Know how to find the roots of transcendental equations.
- Learn how to interpolate the given set of values.
- Understand the curve fitting for various polynomials
- learn numerical solution of differential equations.

Able to solve differentiation and integration problem numerically

Unit-1

Floating point representation and computer arithmetic, Significant digits, Errors: Round-offerror, Local truncation error, Global truncation error, Order of a method, Convergence andterminalconditions, Efficient computations.

Unit-2

Bisectionmethod,Secantmethod,Regula−FalsimethodNewton−Raphsonmethod, Newton'smethodforsolvingnonlinearsystems.

Unit-3

Interpolation: Lagrange's form and Newton's form Finite difference operators, GregoryNewton forward and backward differences Interpolation Piecewise polynomial interpolation:Linearinterpolation.

Unit-4

Numerical integration: Trapezoid rule, Simpson's rule (only method), Newton−Cotesformulas, Gaussian quadrature, Ordinary differential equation: Euler's method ModifiedEuler'smethods, Runge-Kuttasecond methods

Textbooks

1. S.S.Sastry,“IntroductoryMethodsofNumericalAnalysis”, EEE, 5/ed.
2. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and EngineeringComputation,NewAgeInternationalPublisher,6/e (2012)

Referencebooks

1. NumericalAnalysis:J. K.Mantri&S.Prahan,LaxmiPublication.
2. IntroductiontoNumericalAnalysis,JosefStoerandRolandBulirsch,Springer.

GE/IC – 2 Practical/Tutorial: Numerical Methods
LabImplementusingC/ C++orMATLAB/Scilab

1. Findthe rootsofthe equationbybisection method.
2. Findtherootsoftheequationbysecant/Regula−Falsimethod.
3. Findthe rootsoftheequationbyNewton‘smethod.
4. Findthe solutionofa systemofnonlinear equationusingNewton’smethod.
5. Findthesolutionoftri-diagonalsystemusingGaussThomasmethod.
6. Findthesolutionof systemofequationsusingJacobi/Gauss-Seidelmethod.
7. Findthecubicsplineinterpolatingfunction.
8. Evaluatetheapproximatevalueoffiniteintegralsusing Gaussian/Rombergintegration.
9. Solvetheboundaryvalue problemusingfinitedifference method.

ITM (HONOURS)SEMESTERII

AbilityEnhancementCompulsoryCourse

AECC-2: MIL Communication (English/Odia/Hindi) (4 Credits)Fullmarks -100 (Mid-Sem:20;End-Sem:80)

English

Unit1:ShortStory

(i) JimCorbett–The Fight betweenLeopards
(ii) DashBenhur– TheBicycle
(iii) DinanathPathy– George VHighSchool
(iv) AlexanderBaron–TheManWhoknewtoomuch
(v) WillFJenkins–UneasyHomecoming

Unit2:Prose

(i) MahatmaGandhi–Thewayto EqualDistribution
(ii) SRadhakrishnan–ACall toYouth
(iii) C.V.Raman–Water-TheElixirofLife
(iv) HaroldNicolson–AnEducatedPerson
(v) ClaireNeedellHollander–NoLearningWithoutFeeling

Unit3:

(i) Comprehensionofapassageandansweringthequestions

Unit4:

(ii) Languageexercises-testofvocabularyandgrammar

Text Books:

All StoriesandProsepieces

ReferenceBooks:

(i) The Widening Arc: A Selection of Prose and Stories, Ed. A R Parhi, S Deepika, P Jani, KitabBhavan,Bhubaneswar.
(ii) ACommunicativeGrammarofEnglish,GeoffreyLeech.
(iii) AUniversityGrammarofEnglish,RandolphQuirk andSidneyGreenbaum
(iv) DevelopingReadingSkills.F.Grellet.Cambridge:CambridgeUniversityPress,1981

Odia

ସବିଶେଷ ପାଠ୍ୟ

ଯୋଗାଯୋଗମୂଳକ ମାତୃଭାଷା – ଓଡ଼ିଆ (AECC)

ପାଠ୍ୟ-୧ / **Course – 1**: ଯୋଗାଯୋଗ ଅନୁବିଧି, ରୀତି ଓ ମାଧ୍ୟମ

୧ମ ଏକକ : ଯୋଗାଯୋଗର ପରିଭାଷା, ଅନୁବିଧି, ପରିସର ଓ ପ୍ରକାରଭେଦ

୨ୟ ଏକକ : ସାକ୍ଷାତକାର, ଭାଷଣ କଳା

୩ୟ ଏକକ : ସମ୍ବାଦର ପରିଭାଷା, ପରିସର ଓ ସମ୍ବାଦ ପ୍ରସ୍ତୁତି

୪ର୍ଥ ଏକକ : ଓଡ଼ିଆ ଭାଷାର ବର୍ଣ୍ଣମାଳା, ବର୍ଣ୍ଣାଶୁଦ୍ଧିର ନିରାକରଣ । (ବନାନ ତ୍ରୁଟି - ସାଦୃଶ୍ୟଜନିତ ଅଶୁଦ୍ଧି, ଲିଙ୍ଗଗତ ଅଶୁଦ୍ଧି, ସନ୍ଧିଗତ ଅଶୁଦ୍ଧି, ସମାସଗତ ଅଶୁଦ୍ଧି, ବଚନ ଓ ବିଭକ୍ତିଗତ ଅଶୁଦ୍ଧି, ବାକ୍ୟ ବିଧିଜନିତ ଅଶୁଦ୍ଧି, ସମାର୍ଥବୋଧକ ଶବ୍ଦାଶୁଦ୍ଧି, ପ୍ରତ୍ୟୟ ଜନିତ ଅଶୁଦ୍ଧି, ଶବ୍ଦ ସଂଯୋଗାତ୍ମକ ଓ ସ୍ୱରସଙ୍ଗତି ଜନିତ ଅଶୁଦ୍ଧି)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (ପାଠ୍ୟ-୧ / **Course – 1**)

୧. ଯୋଗାଯୋଗ ମୂଳକ ମାତୃଭାଷା (ଓଡ଼ିଆ) ସାମଲ ବିରଞ୍ଚି ନାରାୟଣ, ସତ୍ୟନାରାୟଣ ବୁକ ଷ୍ଟୋର, କଟକ ।

୨. ସଂଯୋଗ ଅନୁବିଧି, ସନ୍ତୋଷ କୁମାର ତିପାଠୀ, ନାଳନ୍ଦା, କଟକ

୩. ଭାଷଣ କଳା ଓ ଅନ୍ୟାନ୍ୟ ପ୍ରସଙ୍ଗ - କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର,କଟକ

୪. ପ୍ରାୟୋଗିକ ଓଡ଼ିଆ ଭାଷା – ଓଡ଼ିଶା ରାଜ୍ୟପାଠ୍ୟ ପୁସ୍ତକ ପ୍ରଣୟନ ଓ ପ୍ରକାଶନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର

୧. ସମ୍ବାଦ ଓ ସାମ୍ବାଦିକତା – ଚନ୍ଦ୍ରଶେଖର ମହାପାତ୍ର, ଓଡ଼ିଶା ରାଜ୍ୟ ପାଠ୍ୟପୁସ୍ତକ ପ୍ରଣୟନ ଓ ପ୍ରକାଶନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର

୧. ନିର୍ଭୁଲ ଲେଖାର ମୂଳସୂତ୍ର, ନୀଳାଦ୍ରିଭୂଷଣ ହରିଚନ୍ଦନ, ପି.ସି.ଆର ପବ୍ଲିକେସନ, ଭୁବନେଶ୍ୱର

୨. ସର୍ବସାର ବ୍ୟାକରଣ - ନାରାୟଣ ମହାପାତ୍ର ଓ ଶ୍ରୀଧର ଦାସ, ନିଉ ଷ୍ଟୁଡେଣ୍ଟସ୍ ଷ୍ଟୋର, କଟକ

Hindi

AECC : HINDI (MIL)

UNIT - I
कविता

(i) कबीर - साखी : 1 से 10
(ii) तुलसी - विनयपत्रिका - पद 1 और 2
(iii) प्रसाद - मधुमय देश
(iv) निराला - भिक्षुक
(v) अज्ञेय - हिरोशिमा

UNIT - II
गद्य

(i) रामचन्द्र शुक्ल - उत्साह
(ii) हजारी प्रसाद द्विवेदी - कुटज
(iii) हरिशंकर परसाई - सदाचार का तावीज

UNIT - III
शब्द ज्ञान

(i) शब्द शुद्धि
(ii) वाक्य शुद्धि
(iii) पर्यायवाची शब्द
(iv) विलोम शब्द

UNIT - IV
सामान्य ज्ञान

(i) निबंध लेखन (Essay Writing)

पाठ्य पुस्तक :

1. हिन्दी प्रसून - सं. डॉ. अंजुमन आरा, प्लानेट वी, कटक

ITM
(HONOURS)SEMES
TERIII
CoreCourse
C-5: Programming using C++ (Theory: 4 Credits; Practical: 2 Credits)TheoryFull marks:75 (Mid-Sem:15;End-Sem:60)
PracticalFullmarks:25(Endsemesterevaluation)

Course Objectives:-

To know about the Object Oriented Programming conceptsTo learn the fundamental programming concepts and methodologies which are essential to building good C++ programs.To be able to develop logics to create programs/applications in C++.

Course Outcomes:-

After successful completion of the course, the learners would be able to

- Implement different functions for input and output, various data types, basic operators, control structures and functions.
- Describe the procedural and object oriented paradigm with concepts of classes, data and objects and understand dynamic memory management techniques using constructors, destructors, etc.
- Classify inheritance with different types and describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
- Illustrate the process of data file manipulations using C++.

Unit-1

Principles of Object-Oriented Programming: Object-Oriented Programming (OOP)Paradigm,BasicConceptsofOOP,BenefitsofOOP,CharacteristicsofOOPS,ObjectOriented Languages, Applications of OOP. Introduction to C++, Difference betweenC&C++,Tokens,Datatypes,Operators,StructureofC++Program,C++statements,ExpressionsandControlStructures.FunctionsinC++:Argumentpassinginfunction,Inline Functions,DefaultArguments,Const. Arguments,Friendfunction.

Unit-2

ClassesandObjects:DefiningMemberFunctions,MakinganoutsideFunctionInline,Nested MemberFunctions,PrivateMemberFunctions,ArrayswithinaClass,Memory Allocation for Objects, Static Data Members, Static Member Functions,ArraysofObjects,ObjectsasFunctionArguments,FriendFunctions.Constructors & Destructors: Constructors, Parameterized Constructors, ConstructorswithDefaultArguments,DynamicInitializationofObjects,CopyConstructor,D

ynamicConstructors,Destructors.

Unit-3

Inheritance:BasicsofInheritance,TypeofInheritance,VirtualBaseClasses,AbstractClasses, Member Classes, Nesting of Classes. Polymorphism: Pointers, Pointers toObjects, this Pointer, Pointers to Derived Classes, Virtual Functions, Pure VirtualFunctions,Function Overloading, OperatorOverloading.

Unit-4

Managing Console I/O Operations: C++ Streams, C++ Stream Classes, UnformattedI/OOperations,FormattedConsoleI/OOperations,ManagingOutputwithManipulators.
Files:ClassesforFileStreamOperations,OpeningandClosingaFile,Detectingend-of-file, File Modes, File Pointers and their Manipulations, Sequential Input andOutput Operations, Updating a File: Random Access, Error Handling during FileOperations,Command-lineArguments.

TextBooks

1. E.Balgurusawmy,ObjectOrientedProgrammingwith C++,4/e(TMH).
2. PaulDeitel,HarveyDeitel,"C++:How toProgram",9/e.PrenticeHall.

ReferenceBooks:

1. BjarneStroustroup, Programming - Principles and Practice using C++, 2/e,Addison-Wesley2014
2. HerbtzSchildt,C++:TheCompletereference,MGH,4/ed.
3. P.C.Sethi,P.K.Behera,"Programmingin C++"-KalyaniPublisher,Ludhiana

C–5:Practical/Tutorial:ProgrammingusingC++Lab

1. Write a Program to find greatest among three numbers using nested if…elsestatement.
2. Write aProgramto checka numberisprimeornot.
3. Write aProgramtofindthe GCDandLCMoftwonumbers.
4. Writeaprogramtoprinttheresultfor followingseries: 1!+ 2! +3!+……
5. Write aprogramtoprintmultiplicationtablefrom 1to10.
6. Write aProgramforSwappingoftwonumbersusing passbyvalue.
7. Write aProgramforSwappingoftwonumbersusingpassby address.
8. Write aProgramforSwappingoftwonumbersusingpassbyreference.
9. WriteaProgramtofindsum of fournumbersusingdefaultargumentpassing.
10. Write aProgramtofindsquareand cubeofa numberusinginlinefunction.
11. Write aProgramtofindthefactorialofanumber.

12. WriteaProgramtofindreverse ofanumber.
13. Write a program to find sum of four numbers using default argument passing inmemberfunction.
14. Write a Program to find area of circle, triangle and rectangle using functionoverloading.
15. Write aprogramtodistinguishthepropertiesofstatic andnon-staticatamembers.
16. Writeaprogramtoshowthemethodofaccessingstaticprivate memberfunction.
17. Writeaprogramto showthewaysofcallingconstructorsanddestructors.
18. Writeaprogramtoperform ++operator overloadingusingmemberfunction.
19. Writeaprogramtoperform ++operator overloadingusingfriendfunction.
20. Write a program to perform + operator overloading for two complex numberaddition.
21. Writeaprogramtoperform+operatoroverloadingforstringconcatenation.
22. Writeaprogramtoperform singleinheritance.
23. Writeaprogramtoperformmultipleinheritance.
24. Write a program to create an integer array using new operator and find the sumandaverageofarray elements.
25. Writeaprogramtoimplementvirtualdestructor.
26. Create the Person class. Create some objects of this class (by taking informationfrom the user). Inherit the class Person to create two classes Teacher and Studentclass. Maintain the respective information in the classes and create, display anddelete objectsofthesetwo classes (Use RuntimePolymorphism).
27. Write aprogramtoCopythe contentsofonefiletoother.

ITM (HONOURS)
SEMESTER III
CoreCourse
C-6: Database Systems (Theory: 4 Credits; Practical: 2 Credits)Theory Full marks: 75 (Mid-Sem: 15; End-Sem: 60)PracticalFullmarks:25 (Endsemesterevaluation)

COURSE OBJECTIVES:

To explain basic database concepts, applications, data models, schemas and instances. To demonstrate the use of constraints and relational algebra operations. Describe the basics of SQL and construct queries using SQL. To emphasize the importance of normalization in databases. To facilitate students in Database design. To familiarize issues of concurrency control and transaction management.

COURSE OUTCOMES:

At the end of the course the students are able to:

- Apply the basic concepts of Database Systems and Applications.
- Use the basics of SQL and construct queries using SQL in database creation and interaction.
- Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
- Analyze and Select storage and recovery techniques of database system.

Unit-1

IntroductiontoDatabaseandDatabaseUsers,DatabaseSystemConceptsandArchitecture:dataModels,schema,andinstances,ConceptualModelingandDatabaseDesign:EntityRelationship(ER)Model:EntityTypes,EntitySets,Attributes,Keys,RelationshipTypes,RelationshipSets,RolesandStructuralConstraints,WeakEntityTypes,ERNamingConventions.EnhancedEntity-Relationship(EER)Model.

Unit-2

DatabaseDesignTheoryandNormalization:FunctionalDependencies,NormalFormsbasedonPrimaryKeys,SecondandthirdNormalForms,Boyce-CoddNormalForm, Multivalued Dependency and Fourth Normal Form, Join Dependencies andFifthNormalForm.

Unit-3

Relational data Model and SQL: Relational Model Concepts, Basic SQLs, SQL DataDefinition and Data types, Constraints in SQL, Retrieval Queries in SQL, INSERT,DELETE,UPDATEStatementsinSQL,RelationalAlgebraandRelationalCalculus:Unary Relational Operations: SELECT and PROJECT, Binary Relation: JOIN andDIVISION.

Unit-4

IntroductiontoTransactionProcessingConceptsandTheory:IntroductiontoTransactionProcessing,TransactionandSystemConcepts,PropertiesofTransactions,Recoverability,Serializability,ConcurrencyControlTechniques,Locking techniques for Concurrency Control, Concurrency Control based on Time-StampOrdering.

TextBook:

1. Fundamentals of Database Systems, 6th edition, RamezElmasri,ShamkantB.Navathe,Pearson Education

ReferenceBook:

1.An IntroductiontoDatabaseSystem,DateC.J.- PearsonEducation,New Delhi-2005

C-6Practical/Tutorial:DatabaseSystemsLab

Createandusethefollowingdatabaseschematoanswerthegivenqueries.

EMPLOYEESchema				
Field	**Type**	**NULLKEY**		**DEFAULT**
Eno	Char(3)	NO	PRI	NIL
Ename	Varchar(50)	NO		NIL
Job_type	Varchar(50)	NO		NIL
Manager	Char(3)	Yes	FK	NIL
Hire_date	Date	NO		NIL
Dno	Integer	YES	FK	NIL
Commission	Decimal(10,2)	YES		NIL
Salary	Decimal(7,2)	NO		NIL

DEPARTMENTSchema				
Field	**Type**	**NULLKEY**		**DEFAULT**
Dno	Integer	No	PRI	NULL
Dname	Varchar(50)	Yes		NULL

Location	Varchar(50)	Yes		NewDelhi

QueryList

1. Query to display Employee Name, Job, Hire Date, Employee Number; for eachemployeewith theEmployeeNumberappearingfirst.

2. Querytodisplayunique JobsfromtheEmployee Table.

3. QuerytodisplaytheEmployeeName concatenatedbyaJobseparatedbyacomma.
4. Query to display all the data from the Employee Table. Separate each Column by acommaand namethesaid column asTHE_OUTPUT.

5. Query to display the Employee Name and Salary of all the employees earning morethan $2850.

6. QuerytodisplayEmployeeNameandDepartmentNumberfortheEmployeeNo=7900.

7. Query to display Employee Name and Salary for all employees whose salary is notintherangeof$1500and $2850.

8. Query to display Employee Name and Department No. of all the employees in Dept10and Dept 30 in thealphabetical orderby name.

9. QuerytodisplayName andHireDate ofeveryEmployeewho washiredin1981.

10. QuerytodisplayName andJobofallemployeeswhodon’thave acurrentManager.

11. QuerytodisplaytheName,SalaryandCommissionforalltheemployeeswhoearncommissio n.

12. Sortthedatain descendingorderofSalaryand Commission.

13. QuerytodisplayNameofalltheemployeeswherethethirdletteroftheir nameis‘A’.

14. Query to display Name of all employees either have two ‘R’s or have two ‘A’s intheirnameandare either inDeptNo=30ortheir MangersEmployee No= 7788.

15. Query to display Name, Salary and Commission for all employees whoseCommissionAmountis14greaterthantheirSalary increasedby5%.

16. QuerytodisplaytheCurrentDate.

17. Query to display Name, Hire Date and Salary Review Date which is the 1st Mondayaftersix months ofemployment.

18. Query to display Name and calculate the number of months between today and thedateeach employeewashired.

19. Query to display the following for each employee <E-Name> earns <Salary>monthlybutwants<3*CurrentSalary>.Labelthe ColumnasDreamSalary.

20. Query to display Name with the 1st letter capitalized and all other letter lower caseand length of their name of all the employees whose name starts with 'J', 'A' and'M'.

21. QuerytodisplayName,HireDate andDayofthe weekonwhichtheemployeestarted.
22. QuerytodisplayName, DepartmentNameandDepartmentNoforalltheemployees.

23. QuerytodisplayUnique ListingofallJobsthatareinDepartment#30.

24. Query to display Name, Department Name of all employees who have an 'A' in theirname.

25. Query to display Name, Job, Department No. and Department Name for all theemployeesworking at theDallas location.

26. Query to display Name and Employee no. Along with their Manger's Name and theManager's employee no; along with the Employees Name who do not have aManager.

27. QuerytodisplayName,DepartmentNo.AndSalaryofanyemployeewhosedepartment No. and salary matches both the department no. And the salary of anyemployeewho eans acommission.

28. Query to display Name and Salaries represented by asterisks, where each asterisk(*)signifies $100.

29. QuerytodisplaytheHighest,Lowest,SumandAverageSalariesof allthe employees.

30. Queryto displaythenumberofemployees performingthesameJobtypefunctions.

31. Querytodisplaytheno.ofmanagerswithoutlistingtheirnames.

32. Query to display the Department Name, Location Name, No. of Employees and theaveragesalary forall employeesin that department.

33. QuerytodisplayName andHireDate forall employeesinthesamedept.asBlake.

34. Query to display the Employee No. And Name for all employees who earn morethantheaveragesalary.

35. Query to display Employee Number and Name for all employees who work in

adepartmentwith any employeewhosenamecontains a‘T’.

36. QuerytodisplaythenamesandsalariesofallemployeeswhoreporttoKing.

37. Query to display the department no, name and job for all employees in the Salesdepartment.

ITM (HONOURS)SEMESTERIII

CoreCourse

C-7: Principle of Management (Theory: 4 Credits; Practical: 2 Credits)Theory Full marks:75 (Mid-Sem:15;End-Sem:60)

PracticalFullmarks:25(End semester evaluation)

Course Objective:

The objective of this course is to help the students to get aware towards varied management principles and practices. This course covers the explanations about the fundamentals of management discipline in organizational context. It details the different functions of management such as planning, organizing, staffing, directing, and controlling.

COURSE OUTCOME

On completion of this course, the students will be able to

- Understand the concepts related to Business.
- Demonstrate the roles, skills and functions of management.
- Focus on the theories of management.
- Demonstrate a clear understanding of the concepts, tools & techniques used by executives in developing and executing strategies and will appreciate its integrative and interdisciplinary nature.

Unit 1

Nature of Management: Meaning, Definition, it's nature purpose, importance &Functions,ManagementasArt,Science&Profession-ManagementassocialSystemConceptsofmanagement-Administration-Organization.

EvolutionofManagementThought:ContributionofF.W.Taylor,HenriFayol ,Elton Mayo, Chester Barhard& Peter Drucker to the management thought. Variousapproachestomanagement(i.e.SchoolsofmanagementthoughtIndianManagement Thought.

Unit-2

FunctionsofManagement(Part-I)

Planning - Meaning - Need & Importance, types levels– advantages & limitations,Forecasting - Need & Techniques, Decision making - Types - Process of rationaldecision making &techniques of decision making,**Organizing**-Elementsoforganizing&processes:Typesoforganizations,Delegation ofauthority -Need, difficultiesindelegation –Decentralization,

Unit-3

FunctionsofManagement(Part-II)

Staffing - Meaning & Importance, Direction - Nature – Principles, Communication -Types & Importance, Motivation - Importance – theories, Leadership - Meaning -styles, qualities & functions of leaders**Controlling**-Need,Nature,importance,Process&Techniques,Coordination-Need,Importance.

Unit-4

StrategicManagement

Definition, Classes of Decisions, Levels of Decision, Strategy, Role of differentStrategist, Relevance of Strategic Management and its Benefits, Strategic ManagementinIndia.

TextBooks:

1. Horold Koontz and IteinzWeibrich, Essential of Management, McGraw HillsInternational
2. K.Aswathapa,EssentialofBusinessAdministration,HimalayaPublishingHouse

ReferenceBooks:

1. L.M.Parasad Principles & practice of management - Sultan Chand & Sons -

NewDelhi
2. Tripathi,Reddy,PrinciplesofManagement,TataMcGraw Hill

C-7:Practical/Tutorial:PrinciplesofManagement

1. Assessingtechnologicalopportunitiesandthreats:anintroductiontotechnologyforecasting.
2. OrganisationalStructureinIT/ITESIndustries.
3. PresenceofWebbasedCommunicationinOrganisationswithreferencetoServiceSectors
4. Role of Human Resource Information Systems (HRIS) in Strategic Human Resource Management(SHRM).
5. ForcesofmotivationinIT/ITESSector.(video based)
6. RoleofStrategicmanagersinICT basedOrganisations.
7. ITStrategiesinOrganisationalAdministration

CaseStudies:

8. Casestudyonorganisationsadopting ERP.
9. CasestudyonDropboxasacommunicationtool.
10. CasestudyonLeadershiptypesandstyles.
11. Casestudyondisasterandcrisismanagement.
12. Casestudyonvision,goalandmissionstatementofIT/ ITESindustries.

ITM (HONOURS)SEMESTERIII

GenericElectiveCourse

GE-3: Theory of Computation (Theory: 4 Credits; Practical: 2 Credits)Fullmarks -75(Mid-Sem:15;End-Sem:60)

PracticalFullmarks:25(Endsemesterevaluation)

Course Objectives:

This course focuses on the basic theory of Computer Science and formal methods of computation like automata theory, various machines, grammars and Turing Machines. To explore the theoretical foundations of computer science from the perspective of formal languages and classify machines by their power to recognize languages.

Course Outcomes:

The student will be able to: ·

- Understand the basic properties of formal languages and grammars. Differentiate regular, context-free and recursively enumerable languages.
- Make grammars to produce strings from a specific language.
- Minimize the finite automata.
- Acquire concepts relating to the theory of computation and computational models including decidability and intractability.
- Design and deal with turingmachines.Get the basic foundation of compiler design

Unit-1

Alphabet, Languages, Grammars, Chomsky Hierarchy Of Languages, RegularGrammars, RegularExpressions, FiniteAutomata(DFA, NFA), FiniteAutomatonWithE Moves,EquivalenceofNFAandDFA

Unit-2

Minimization Of Finite Automata, Closure And Decision Properties Of RegularSets,PumpingLemmaOfRegularSets,LeftAndRightLinearGrammars

Unit-3

Types Of Grammar, Context Free Grammars, Context Free Languages, DerivationTress, Ambiguity, Properties Of Context Free Languages, Simplification Of CFG,Elimination Of Useless Symbols, Unit Productions, Null Productions, ChomskyNormalForm.
Pushdown Automata, Deterministic Pushdown Automata, Equivalence OfPushdown Automata And Context Free Languages, Pumping Lemma For ContextFreeLanguages

Unit-4

Turing Machines, Turing Computability, Type 0 Languages, Techniques For

TuringMachine Construction, Multihead And Multitape Turing Machines, Church TuringHypothesis,Recursiveand Recursively EnumerableSet.

Textbooks:

- Introduction To Automata Theory, Languages and Computation, J. E. Hopcrpft and J. D.Ullman,PearsonEducation, 3rdEdition.
- IntroductiontothetheoryofComputation,MichaelSipser,CengageLearning

Referencebooks:

- JFLAP - An Interactive Formal Languages and Automata Package Rodger, Finley, ISBN:0763738344
- JFLAPUserManualandExercises,TobiasFransson.AvailableintheWeb.

GE-3Practical/Tutorial:TheoryofComputationLab

Use Java Formal Language and Automata Language (FLAP) software Package (can be down loadfrom www.jflap.org)tocarryoutthe followingexperiments:

1. RegularLanguage-Create:DFA,NFA,RegularGrammar,andRegularExpression.
2. Regular Language – conversions: NFA to DFA to Minimal DFA, NFA to regular expression &viceversa,
NFAtoregular grammar&vice-versa.
3. Context-freelanguage–create:push-downautomaton,context-freegrammar.
4. Context-free language – transform: PDA to CFG, CFG to PDA (LL parser), CFG to PDA (SLRParser),CFGto CNF,CFGtoLLparse tableand parser,CFGto SLRparse tableandparser
5. Recursively Enumerable language: Turing machine (1 tape), Turing machine (multi tape), Turingmachine(buildingblocks),unrestrictedgrammar.

ITM (HONOURS)SEMESTERIII

Skill Enhancement Course

SEC-1:Communicative English(4Credits)Fullmarks-100(Mid-Sem:20;End-Sem:80)

Unit-1:Introduction

(i) Whatiscommunication?
(ii) Typesofcommunication(Horizontal,Vertical,Interpersonal,Grapevine),
(iii) Uses of Communication, Inter-cultural communication, Communicationtoday:
(iv)Distinct features of Indianisation, alternative texts of language learning, globalEnglish andEnglishintheprintandelectronicmediainIndia.

Unit-2:TheFourSkillsandProspectofnewmaterialinlanguagelearning

(i) Listening-Passiveandactive,Speakingeffective,intelligibilityandclarity
(ii) Methods and techniques of reading such as skimming, scanning and searching forinformation;Readingtounderstandtheliteral,metaphoricalandsuggestedmeaningofapassage,
(iii) Identifying the tone (admiring, accusatory, ironical, sympathetic, evasive,indecisive,ambiguous, neutral)ofthe writerandview-points.
(iv) CohesiveandCoherentwriting

Unit-3:GrammaticalandCompositionSkills

(i) Doing exercises like filling in the blanks, correcting errors, choosing correct forms outof alternative choices, joining clauses, rewriting sentences as directed, and replacingindicated sections with single words / opposites / synonyms, choosing to use correctpunctuation marks, getting to understand and use formal and informal styles, learningtounderstand theusagesofofficialese, sexism, racism,jargon.
(ii) Learningtounderstand informationstructureofthesentencesuchastopic-focusrelationship;strategiesofthematization,postponement,emphasis,structuralcompression(deletionofredundantparts,nominalization, cleftandpseudo-cleftsentences, elliptical structures etc.), Logical Connectors between sentences, Methodsofdevelopingaparagraph,structureofanessayand methodsofdevelopinganessay

Unit-4:ExercisesinWrittenCommunication

(i) Préciswriting
(ii) Note-takingskills
(iii) Writingreports
(iv)Guidelines and essentials of official correspondence for making enquiries, complaintsandreplies

(v) Making representations; writing letters of application for jobs; writing CV, writinglettersto theeditorandsocial appeals intheformofletters/pamphlets.

TextBooks:

1.State Model Syllabus for Under Graduate Couse in Skill Enhancement Course (I), pdffile is available in the internet: http://dheodisha.gov.in/Higher-Education/Listmodule-syllabus.aspx

ReferenceBooks:

Ways of Reading: Advanced reading Skills for Students of English Literature. MartinMontgomeryet al. London: Routledge, 2007.

Applying Communication Theory for Professional Life: A PracticalIntroduction. Dainton and Zelley,http://tsime.uz.ac.zw/claroline/backends/download.php?url=L0ludHJvX3RvX2NvbW11bmljYXRpb25fVGhlb3J5LnBkZg%3D%3D&cidReset=true&cidReq=MBA563

LiteratureandtheartofCommunication,CambridgeUniversityPress.

Vistas and Visions. Orient Black Swan (writing and grammar exercises at the end oflessons are recommended) From *Remapping An Anthology for Degree Classes*,('WritingSkills'), OrientBlack Swan.

*Indian English through Newspapers (*Chapter 4,5 and 6), Concept, New Delhi,2008.*ContemporaryCommunicativeEnglish,* S Chand

Technical Communication: A Reader Centred Approach. P.V. Anderson. Wadsworth,Cengage.

ITM (HONOURS)SEMESTERIV

CoreCourse

C-8: Java Programming (Theory: 4 Credits; Practical: 2 Credits)Theory Full marks: 75 (Mid-Sem: 15; End-Sem: 60)PracticalFullmarks:25(End semesterevaluation)

Course Objectives:

- To understand the basic concepts and fundamentals of platform independent object oriented language.
- To demonstrate skills in writing programs using exception handling techniques and multithreading.
- To understand streams and efficient user interface design techniques.

Course Outcomes:

After successful completion of the course, the students are able to

- Use the syntax and semantics of java programming language and basic concepts of OOP.
- Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
- Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.
- Design event driven GUI and web related applications which mimic the real word scenarios.

Unit-1

IntroductiontoJava:JavaHistory,ArchitectureandFeatures,Understandingthesemantic and syntax differences between C++ and Java, Compiling andExecutinga Java Program, Variables, Constants, Keywords (super, this, final, abstract, static,extends, implements, interface) , Data Types, Wrapper class,Operators (Arithmetic,Logical and Bitwise) and Expressions, Comments, DoingBasic Program Output,Decision Making Constructs (conditional statements andloops) and Nesting, JavaMethods (Defining, Scope, Passing and ReturningArguments, Type Conversion andType and Checking, Built-in Java ClassMethods). Input through keyboard usingCommandlineArgument, theScannerclass,BufferedReaderclass.

Unit-2

Object-OrientedProgrammingOverview:PrinciplesofObject-OrientedProgramming, Defining & Using Classes, Class Variables & Methods, Objects,Objectreference,Objectsasparameters,finalclasses,GarbageCollection.Constructor-typesofconstructor,thiskeyword,superkeyword.Methodoverloadingand Constructor overloading. Aggregation vs Inheritance, Inheritance: extends vsimplements,typesofInheritance,Interface,Up-Casting,Down-Casting,Auto-Boxing,Enumerations,Polymorphism,MethodOverridingandrestrictions.Package:Pre-definedpackages and Custom packages.

Unit-3

Arrays: Creating & Using Arrays(1D, 2D, 3D and Jagged Array), Array of Object,Referencing Arrays Dynamically. Strings and I/O: Java Strings: The Java Stringclass,Creating & Using String Objects, Manipulating Strings, String Immutability& Equality,PassingStringsTo&FromMethods,StringBufferClassesandStringBuilderClasses.IOpackage: Understanding StreamsFile class and its methods, Creating, Reading,Writingusing

Classes: Byte and Character streams,FileOutputStream, FileInputStream, FileWriter,FileReader,InputStreamReader,PrintStream,PrintWriter.CompressingandUncompressingFile.

Unit-4

Exception Handling, Threading, Networking and Database Connectivity:Exceptiontypes,uncaughtexceptions,throw,built-inexceptions,Creatingyourownexceptions;Multi-threading:TheThreadclassandRunnableinterface,creatingsingleandmultiplethreads,Threadprioritization,synchronizationandcommunication,suspending/resumingthreads.Usingjava.netpackage,OverviewofTCP/IPandDatagramprogramming.AccessingandmanipulatingdatabasesusingJDBC.

TextBooks:

1. E.Balagurusamy,“ProgrammingwithJava”,TMH, 4/Ed,

Referencebooks:

1.HerbertSchildt,“TheCompleteReferencetoJava”,TMH,10/Ed.

C-8:Practical/Tutorial:JavaProgrammingLab

1. Tofindthesumofany numberofintegersenteredascommand linearguments.
2. Tofindthefactorialofa givennumber.
3. Toconvertadecimalto binarynumber.
4. To check if a number is prime or not, by taking the number as input from thekeyboard.
5. To find the sum of any number of integers interactively, i.e., entering everynumber from the keyboard, whereas the total number of integers is given as acommandlineargument
6. WriteaprogramthatshowworkingofdifferentfunctionsofStringandStringBufferclasssli

kesetCharAt(),setLength(),append(),insert(),concat()andequals().

7. Write a program to create a – "distance" class with methods where distance iscomputedintermsoffeetandinches,howtocreateobjectsofaclassandtoseetheuseofthis pointer
8. Modify the–"distance"class by creatingconstructorforassigningvalues(feetandinches)to the distance object. Create another object and assign secondobject as reference variable to another object reference variable. Further create athirdobject which is acloneofthefirst object.

9. Write a program to show that during function overloading, if no matchingargument is found, then Java will apply automatic type conversions(from lowertohigherdatatype)

10. Writeaprogramtoshowthedifferencebetweenpublicandprivateaccessspecifiers. The program should also show that primitive data types are passed byvalueand objectsarepassed byreferenceand tolearn useoffinal keyword.

11. Write a program to show the use of static functions and to pass variable lengthargumentsin afunction.

12. Writeaprogramto demonstratetheconcept ofboxingand unboxing.

13. Create a multi-file program where in one file a string message is taken as inputfrom the userand the function to display the message on the screen is given inanotherfile(makeuseofScannerpackagein this program).

14. Write a program to create a multilevel package and also creates a reusable classto generate Fibonacci series, where the function to generate Fibonacci series isgivenin adifferent filebelonging tothesamepackage.

17. Writeaprogramthatcreatesillustratesdifferentlevelsofprotectioninclasses/subclassesbelonging tosamepackageordifferentpackages

15. Write a program – "DivideByZero" that takes two numbers a and b as input,computes a/b,and invokes Arithmetic Exception to generate a message when thedenominatoris zero.

16. Write a program to show the use of nested try statements that emphasizes thesequenceofchecking forcatch handlerstatements.

17. Writeaprogramtocreateyourownexceptiontypestohandlesituationspecifictoyourapplication(Hint:DefineasubclassofExceptionwhichitselfisasubclassofThrowable).

18. Writeaprogramtodemonstrateprioritiesamongmultiplethreads.

19. Writeaprogramtodemonstratedifferentmousehandlingeventslikemouse Clicked(),mouseEntered(),mouseExited(),mousePressed(),mouseReleased( )&mouseDragged().

20. Writeaprogramtodemonstratedifferentkeyboardhandlingevents.

ITM (HONOURS)SEMESTERIV

CoreCourse

C-9: Business Accounting (Theory: 4 Credits; Practical: 2 Credits)Theory Full marks: 75 (Mid-Sem: 15; End-Sem: 60)PracticalFullmarks:25(End semesterevaluation)

Course Objective:

The objective of this course is to introduce problems of financial accounting such as measuring and reporting issues related to assets and liabilities and preparing the financial statements. Students are expected to gain the ability of using accounting information as a tool in applying solutions for managerial problems, evaluating the financial performance, and interpreting the financial structure.

Course Outcome:

On completion of this course, the students will be able to:

- Enable the students learn basic accounting principles, concepts, principles and conventions.
- Practice Financial and Management accounting applications.
- Construct the financial statements of company.
- Able to understand the provisions of Companies Act, 1956.
- Exposure on the different accounting software packages.

Unit-1

Introduction: Financial Accounting-definition and Scope,objectives of FinancialAccounting,Accountingv/sBookKeepingtermsusedinaccounting,usersofaccountinginformation and limitations of Financial Accounting.**ConceptualFramework:**AccountingConcepts,PrinciplesandConventions,AccountingStandardsconcept,objectives,benefits,briefreviewofAccountingStandards in India, Accounting Policies, Accounting as ameasurementdiscipline,valuation Principles, accountingestimates

Unit-2

Recording of transactions: Voucher system; AccountingProcess, Journals, SubsidiaryBooks,Ledger,Cash Book,BankReconciliationStatement, TrialBalance.
Depreciation: Meaning,need&importanceofdepreciation,methodsofchargingdepreciation.

Unit-3

Preparation of final accounts: Preparation of Trading and Profit & Loss AccountandBalanceSheet ofsoleproprietary business

Unit-4

Introduction to Company Final Accounts: Important provisions of CompaniesAct, 1956 in respect of preparation of Final Accounts, Understanding of finalaccounts of a Company. **Computerized Accounting:** Computers and Financialapplication, Accounting Software packages, Anoverviewof computerizedaccountingsystem -Salientfeatures and significance, Concept of grouping of accounts, Codification of accounts, Maintaining thehierarchyofledger, Generating Accounting Reports.

TextBooks :

1. Anil Chowdhry,“Fundamentals of Accounting & Financial Analysis”, PearsonEducation

2. Agarwal,R.Srinivasan,“AccountingMadeEasy”, TMH

ReferenceBooks:

1. AmrishGupta,“Financial AccountingforManagement”,PearsonEducation

2. S.N.Maheshwari,“FinancialAccountingforManagement:VikasPublishingHouse

C-9:Practical/Tutorial:BusinessAccountingTutorial

1. Problemsandprospectsof computerised accountingsystemsintheBFSISector.
2. Adoption of computerised accounting techniques and its impact on the financialperformanceinorganisations.
3. ICTandAccountingInformationSystem.
4. ComparativeanalysisofFinal AccountsinOrganisations.
5. OnlinepaymentsystemandCustomerSatisfaction.
6. Onlineinteractivebanking.
7. Phishingandfrauddetectioninonlinetransactions.
8. Electronictransactions:currentscenarioandscopeforimprovements.
9. Cloudcomputing-basedaccounting
10. EvolutionoftheCompaniesAct–2012:ameta-analysis.

ITM (HONOURS)SEMESTERIV

CoreCourse

C-10: Operating System (Theory: 4 Credits; Practical: 2 Credits)Theory Full marks: 75 (Mid-Sem: 15; End-Sem: 60)PracticalFullmarks:25(End semesterevaluation)

COURSE OBJECTIVES

This course has two components: a theory component to teach you the concepts and principles that underlie modern operating systems, and a practice component to relate theoretical principles with operating system implementation. In the theory component, you will learn about processes and processor management, concurrency and synchronization, memory management schemes, file system and secondary storage management, security and protection, etc.

COURSE OUTCOMES

- Understands the different services provided by Operating System at different level.
- They learn real life applications of Operating System in every field.
- Understands the use of different process scheduling algorithm and synchronization techniques to avoid deadlock.
- They will learn different memory management techniques like paging, segmentation and demand paging etc.

Unit–1

Introduction to Operating System, System Structures: Operating system services,systemcalls,systemprograms,Operatingsystemdesignandimplementation,Operating system structure.

Unit–2

ProcessManagement:ProcessConcept,Operationsonprocesses,Processschedulingand algorithms, Inter-process Communication, Concepts on Thread and Process,Deadlocks:Deadlockdetection,deadlockprevention,anddeadlockavoidancefundamentals.

Unit-3

MemoryManagementStrategies:Swapping,ContiguousMemoryAllocation,Paging,Segmentation,VirtualMemoryManagement:Concepts,implementation(DemandPaging), PageReplacement, Thrashing.

Unit–4

Storage Management: File System concept, Access Methods, File System

Mounting,FileSharingandFileProtection,ImplementingFileSystems,Kernel I/OSystems.

Textbook:

1. Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, and GregGagne, EighthEdition, WileyStudentEdition2009.

Referencebook:

1. ModernOperatingSystem,Tanenbaum,Pearson,4/Ed.2014
2. Richard F Ashley, Linux with Operating System Concepts, Chapman andHall/CRCPublishedAugust26,2014
3. Richard Blum,LinuxCommandLineandShellScriptingBible,O' Reilly

C-10:Practical/Tutorial:OperatingSystemLab

1. Write a program (using *fork()* and/or *exec()* commands) where parent and childexecute:
   same program, same
   code.sameprogram,differentcode.
   beforeterminating,theparentwaitsfor thechild to finishitstask.
2. Write a program to report behavior of Linux kernel including kernel version, CPUtype andmodel. (CPU information)
3. Write a program to report behavior of Linux kernel including information onconfiguredmemory,amount offreeandusedmemory.(memoryinformation)
4. Write a program to print file details including owner access permissions, fileaccesstime,wherefilenameisgivenasargument.
5. Write aprogramto copyfilesusing system calls.
6. WriteaprogramusingCtoimplementFCFSschedulingalgorithm.
7. WriteaprogramusingCtoimplementRound Robin schedulingalgorithm.
8. WriteaprogramusingCto implementSJFschedulingalgorithm.
9. Write a program using C to implement non-preemptive priority basedschedulingalgorithm.
10. Write a program using C to implement preemptive priority based schedulingalgorithm.
11. Write aprogramusingCto implementSRTFschedulingalgorithm.
12. Write a program using C to implement first-fit, best-fit and worst-fit allocationstrategies.

ITM (HONOURS)SEMESTERIV
GenericElectiveCourse
)GE-4: Quality Assurance and Testing (Theory: 4 Credits; Practical: 2 Credits)Fullmarks -75(Mid-Sem:15;End-Sem:60)
PracticalFullmarks:25(Endsemesterevaluation

Course objectives:
This course is intended to acquire the knowledge about what software quality means and how to do test the software product using various testing techniques and tools. This course helps to develop methods and procedures for software development that can scale up for large systems that can be used to consistently produce high-quality software at low cost and with a small cycle time.

Course Outcomes:

The student will be able to

- Understand software testing and quality assurance as a fundamental component of software life cycle.
- Define the scope of S/W T&QA projects.
- Use available resources to develop software, reduce cost of software and how to maintain quality of software.
- Prepare test plans and schedules for a T&QA project
- Do data flow testing, control flow testing and integration testing during testing of software
- Describe the impact of ISO 9000 and the capability maturity model on software quality and testing

Unit-1

Quality Revolution, Software Quality, Role of Testing, Verification and Validation, Failure,Error, Fault and Defect, Notion of Software Reliability, Objective of Testing, What is a TestCase?, Expected Outcome, Concept of Complete Testing, Testing Activities, Test Oracle,Testing Levels, Regression Testing, White-Box and Black Testing, Test Planning and Design,Monitoringand Measuring TestExecution, TestToolsand Automation

Unit Testing: Concept of Unit Testing, Static and Dynamic unit Testing, Mutation Testing,Debugging,Unit Testing in eXtremeProgramming.

Unit-2

Control Flow Testing: Outline of Control Flow Testing, Control Flow Graph, Path in a CFG,Path selection Criteria, All-Path Coverage Criterion, Statement Coverage Criterion, BranchCoverageCriterion, GenerationofTestInput, ExampleofTestDataSelection.

DataFlowTesting:DataFlowAnomaly,.OverviewofDynamicDataFlowTesting,DataFlowGraph,DataFlowTerms,DataFlowTestingCriteria,ComparisonofDataFlowTestSelectionCriteria,FeasiblePathsandTestSelectionCriteria,ComparisonofTestingTechniques.

System Integration Testing: Concept of Integration Testing, Different Types of Interfaces andInterface Errors, Granularity of System Integration Testing, System Integration Techniques,SoftwareandHardwareIntegration,TestPlanforSystemIntegration,Off-the-ShelfComponentIntegration,Off-the-ShelfComponentTesting, Built-inTesting

Unit–3

System Test Categories: Basic Tests, Functionality Tests, Robustness Tests, InteroperabilityTests, Performance Tests, Scalability Tests, Stress Tests, Load and Stability Tests, ReliabilityTests,Regression Tests,Documentation Tests.

FunctionalTesting:EquivalenceClassPartitioning,BoundaryValueAnalysis,DecisionTables,Random Testing, ErrorGuessing,Category Partition.

System Test Planning And Automation: Structure of a System Test Plan, Introduction andFeature Description, Assumptions, Test Approach, Test Suite Structure, Test Environment,TestExecutionStrategy,TestEffortEstimation,SchedulingandTestMilestones,System TestAutomation,EvaluationandSelectionofTestAutomationTools,TestSelectionGuidelinesfor

Automation, Characteristics of Automated Test Cases, Structure of an Automated Test Case,TestAutomation Infrastructure.

AcceptanceTesting:TypesofAcceptanceTesting,AcceptanceCriteria,SelectionofAcceptance Criteria, Acceptance Test Plan, Acceptance Test Execution, Acceptance TestReport,AcceptanceTesting in eXtremeProgramming.

Unit-4

Software Reliability: Definition, FactorsInfluencing Software Reliability, Application ofSoftwareReliability, Operational Profiles.

Software Quality: Five Views of Software Quality, McCall's Quality Factors and Criteria,Quality Factors Quality Criteria, Relationship between Quality Factors and Criteria, QualityMetrics, ISO 9126 Quality Characteristics, ISO 9000:2000 Software Quality Standard ISO9000:2000Fundamentals, ISO9001:2000 Requirements.

MaturityModels:BasicIdeainSoftwareProcess,CapabilityModel(CMM)Model,Architecture, Five Levels of Maturity and Key Process Areas, Common Features of KeyPractices, Application of CMM, CMMI, Test Process Improvement (TPI), Testing MaturityModel(TMM).

Textbook:

- SoftwareTestingandQualityAssurance:TheoryandPractice,Kshirasagar(Sagar)Naik,University ofWaterloo,Priyadarshi (Piyu)Tripathy,NEC, Wiley , 2008.

ReferenceBook:

- SoftwareQualityAssurance,DanielGalin,Pearson Education

GE-4:Practical/Tutorial:QualityAssuranceandTesting.

1. Understand The Automation Testing Approach (Theory Concept): Introduction toSelenium- Selenium IDE, Selenium Core, Selenium RC and Selenium Grid. Installation ofIDE.Opening theIDE.

2. UsingSeleniumIDE, writeatestsuitecontainingminimum4testcases

3. ConductatestSuitefortwowebsites.

4. Understanding of Selenium – RC. Install Selenium server and demonstrate it using a scriptinJava/PHP. InstallationofSeleniumRC and Eclipse.

5. Writeandtestaprogramtologinaspecificwebpage.

6. Understanding of TestNG framework. Installation of TestNG in eclipse. Launch tests inEclipse.

7. Selenium Tests with Microsoft Excel. Write and test a program to update 10 studentsrecordsinto tableinto Excel file.

8. Write and test a program to select the number of students who have scored more than 60 inanyonesubject (orall subjects).

9. Writeandtestaprogram toprovidetotalnumberofobjectspresent/availableonthepage.

10. Writeand testaprogramto getthenumberoflist itemsin alist/combo box.

11. Write and test a program to count number of check boxes on the page checked anduncheckedcount.

ITM
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SkillEnhancementCourse
SEC-2: Quantitative Aptitude and Logical Reasoning (4 Credits)Fullmarks -100 (Mid-Sem:20;End-Sem:80)

Course Objective:

- Understand relevance & need of quantitative methods for making business decisions
- Demonstrate a sound knowledge of fundamentals of statistics and statistical techniques
- Be able to read and interpret statistical information
- Be able to perform statistical analysis
- Be able to apply quantitative methods to solve a variety of business problems

Course outcome :

- Understand various quantitative & statistical methods
- Understand data and draw inference from data Calculate and interpret statistical values by using statistical tool (correlation & regression) .
- Design various types of graphs.
- Demonstrate an ability to apply various statistical tool to solve business problem
- Become familiar with reasoning problems.
- Able to use logic in mathematics.

Unit-1

Whole Numbers, Integers, Rational and irrational numbers, Fractions, Square rootsandCuberoots, SurdandIndices,Problems withnumbers, Divisibility.
Different formulae of Percentage, Profit and loss, Discount, Simple interest, RatioandProportion, Mixture, Mixture
Time and work, Pipes and Cisterns, Basic concepts of Time, Distance and Speed:relationshipamong them.

Unit-2

Concept of Angles, Different Polygons like triangles, rectangular, square, rightangled triangle, Pythagorean Theorem, Perimeter and Area of Triangles, Rectangles,Circles
Raw and Grouped Data, Bar Graphs, Pie Chart, Mean, Median, Event and SampleSpace,Probability.

Unit-3

Analogy basing on kinds of relationships, Simple Analogy: Pattern and Series

ofNumbers, Letters, Figures. Coding-Decoding of Numbers, Letters, Symbols(Figures),Blood relations.

Unit-4

Logical statement: Two premise argument, More than two premise argument usingconnectivity.
VennDiagram,MirrorImages,ProblemsonCubesandDices.

TextBooks:

2. State Model Syllabus for Under Graduate Couse in Skill Enhancement Course(II), pdf file is available in the internet: http://dheodisha.gov.in/Higher-Education/Listmodule-syllabus.aspx

ITM
(HONOURS)SEMES
TERV
CoreCourse

C-11: Web Technology (Theory: 4 Credits; Practical: 2 Credits)Theory Full marks: 75 (Mid-Sem: 15; End-Sem: 60)PracticalFullmarks:25(Endsemesterevaluation)

Course objectives:

On completion of this course, a student will be familiar with client server architecture and able to develop a web application using web technologies. Students will gain the skills and project-based experience needed for entry into web application and development careers. Students are able to develop a dynamic webpage by the use of java script.

Course Learning Outcomes:

The student will be able to:

- Analyze a web page and identify its elements and attributes.
- Create web pages using HTML and Cascading Style Sheets.
- Build dynamic web pages using JavaScript (Client side programming).
- Work with PHP application (server side Programming) for any database operation

Unit-1

WebEssentials:Clients,ServersandCommunication:
The Internet –Basic Internet protocols–The WWW,HTTP request message –responsemessage,webclients webservers –casestudy.
Introduction to HTML: HTML, HTML domains, basic structure of an HTML document–creating an HTML document, mark up tags, heading, paragraphs, line breaks, HTMLtags. Elements of HTML, working with text, lists, tables and frames, working withhyperlink,images and multimedia, forms and controls

Unit-2

Introduction to cascading style sheets: Concepts of CSS, creating style sheet, CSSproperties,CSSstyling(background,textformat,controllingfonts),workingwiththebloc k elements and objects. Working who lists and tables, CSS ID and class.Boxmodel(introduction, border properties, padding properties, margin properties), CSScolour,groping,Dimensions,display,positioning,floating,align,pseudoclass,Navigatio nbar, imagesprites.

Unit-3

Java scripts: Client side scripting, what is java script, simple java script, variables,functions, conditions, loops and repetitions. Java scripts and objects, java

script ownobjects,theDOMandwebbrowserenvironment,formsandvalidations.DHTML: Combining HTML, CSS, java scripts, events and buttons, controlling yourbrowser.

Unit-4

PHP: Starting to script on server side, PHP basics, variables, data types, operators,expressions, constants, decisions and loop making decisions. Strings – creating,accessingstrings,searching,replacingandformattingstrings.Arrays:Creation,acce ssingarray, multidimensionalarrays, PHPwith Database.

TextBook:

1. WebTechnologies–BlackBook–DreamTechPress

2. MattDoyle,BeginningPHP5.3(wrox-Willeypublishing)

3. JohnDuckett,BeginningHTML,XHTML,CSSandJavascript.

ReferenceBook:

1. HTML,XHTMLand CSSBible,5ed,WilleyIndia-StevenM.Schafer.

C-11:Practical/Tutorial:WebTechnologyLab

1. Acquaintancewithelements,tagsandbasicstructureofHTMLfiles.
2. Practicingbasicand advancedtextforformatting.
3. Practiceuseofimage,video andsoundinHTMLdocuments.
4. Designingofwebpages- Documentlayout,list,tables.
5. PracticingHyperlinkofwebpages,workingwithframes.
6. Workingwithformsand controls.
7. Acquaintancewithcreatingstylesheet,CSSpropertiesandstyling.
8. Workingwithbackground,text,font,listproperties.
9. WorkingwithHTMLelementsboxpropertiesinCSS.
10. Develop simple calculator for addition, subtraction, multiplication anddivisionoperation using javascript.
11. Create HTML page with java script which takes integer number as a inputandtells whetherthenumberis odd oreven.
12. CreateHTMLpagethatcontainsformwithfieldsname,Email,mobilenumber, gender, favoritecolour and button; now write a java script code tovalidate each entry. Also write a code to combine and display the informationintext box when button is clicked.
13. Write a PHP program to check if number is prime or not.14.WriteaPHP program toprint first ten Fibonaccinumbers.

15. CreateaMySQLdatabaseandconnect withPHP.

16. WritePHPscriptforstringandretrievinguserinformationfrommySQLtable.

    a. Write a HTML page which takes Name, Address, Email and Mobilenumberfrom user(registerPHP).

    b. StorethisdatainMySQLdatabase.

    c. NextpagedisplayalluserinHTMLtableusingPHP(display.PHP).

17. Using HTML, CSS, Javascript, PHP, MySQL, design a authentication module of awebpage.

ITM
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CoreCourse

C-12: Software Engineering (Theory: 4 Credits; Practical: 2 Credits)TheoryFullmarks:75(Mid-Sem:15;End-Sem:60)Practica lFull marks:25 (Endsemesterevaluation)

Course Objectives: The course's main objective is

Basic knowledge and understanding of the analysis and design of complex systems. To apply software engineering principles and techniques. Ability to develop, maintain and evaluate large-scale software systems. To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases. To provide an idea of using various process models in the software industry according to given circumstances. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project. To perform independent research and analysis. Ability to work as an effective member or leader of software engineering teams.

Learning outcomes: Upon successful completion of this course, students should be able to:

- A basic understanding of software process models such as waterfall and evolutionary models is required.
- Ability to understand the problem statement and able to describe the Requirement analysis, creating a data model, use cases, computing function point, effort , architectural design and path testing of a software project.
- Software requirements and SRS papers are understood.
- An understanding of project management's responsibilities, which includes planning, scheduling, risk management, and so on.
- Explain the differences between data models, object models, context models, and behavioural models.
- Knowledge of various software architectural styles.
- Familiarity with implementation difficulties like modularity and coding standards.
- Knowledge of verification and validation methods, such as static analysis and reviews.
- Knowledge of software testing methodologies such as unit and integrated testing.
- Describe how to measure software and how to avoid software risks.

Unit-1

Introduction:EvolutionofSoftwaretoanEngineeringDiscipline,SoftwareDevelopment Projects, Exploratory Style of Software Development, Emergence ofSoftwareEngineering,ChangesinSoftwareDevelopmentPractices,ComputerSystems Engineering.

Software Lifecycle Models: Waterfall Model and its Extensions, Rapid ApplicationDevelopment(RAD), AgileDevelopment Models,SpiralModel.

Unit-2

SoftwareProjectManagement:SoftwareProjectManagementComplexities,Responsibilitiesofa SoftwareProjectManager,ProjectPlanning,MetricsforProjectSize Estimation, Project Estimation Techniques, Empirical Estimation Techniques,COCOMO, Halstead's SoftwareScience, Staffing Level Estimation, Scheduling, Organization and Team Structures,Staffing,Risk Management,SoftwareConfigurationManagement.

Unit-3

RequirementAnalysisandSpecification:RequirementsGatheringandAnalysis,SoftwareRequirementSpecifications,FormalSystemSpecificationAxiomaticSpecification,AlgebraicSpecification,ExecutableSpecificationand4GL.Software Design: Design Process, Characterize a Good Software Design, Cohesionand Coupling, Layered Arrangements of Modules, Approaches to Software Design(FunctionOriented & Object-Oriented).

Unit-4

Coding and Testing: Coding: Code Review, Software Documentation, Testing, UnitTesting, Black Box and White Box Testing, Debugging, Program Analysis Tools,IntegrationTesting, SystemTesting, SoftwareMaintenance.

TextBook:

1. FundamentalofSoftwareEngineering,RajibMall,FifthEdition,PHIPublication,India.

ReferenceBooks:

1. SoftwareEngineering– IanSommerville,10/Ed,Pearson.

2. Software Engineering Concepts and Practice – UgrasenSuman, Cengage LearningIndiaPvt, Ltd.

C-12:Practical/Tutorial:SoftwareEngineering Lab

S.No.PracticalTitle

1. ProblemStatement,
   - ProcessModel
2. RequirementAnalysis:
   - CreatingaDataFlow
   - DataDictionary, UseCases
3. ProjectManagement:
   - ComputingFP
   - Effort
   - Schedule,RiskTable,Timelinechart
4. DesignEngineering:
   - ArchitecturalDesign
   - DataDesign,ComponentLevelDesign
5. Testing:
   - BasisPathTesting

SampleProjects:

1. **Criminal Record Management:** Implement a criminal record managementsystem forjailers,policeofficersandCBIofficers.
2. **Route Information**: Online information about the bus routes and theirfrequencyandfares
3. **Car Pooling**: To maintain a web based intranet application that enables thecorporateemployees within an organization to avail the facility of carpoolingeffectively.
4. PatientAppointmentandPrescriptionManagementSystem
5. OrganizedRetailShoppingManagementSoftware
6. OnlineHotelReservationServiceSystem

7. ExaminationandResultcomputationsystem
8. AutomaticInternalAssessmentSystem
9. ParkingAllocationSystem
10. WholesaleManagement System

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TERV
DisciplineSpecificElectiveCourse
DSE-1: Computer Network Security (Theory: 4 Credits; Practical: 2 Credits)TheoryFull marks:75(Mid-Sem:15;End-Sem:60)
PracticalFullmarks:25(Endsemesterevaluation)

Course Objectives:
This course provides in-depth knowledgeRegarding the following points:

- Explain the objectives of information security.
- Explain the importance and application of each of confidentiality, integrity, authentication and Availability.
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec.
- Understand Intrusions and intrusion detection.
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls.

Learning Outcomes:

Upon completion of the course, student should possess the following skills:

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.TCP/IP security attacks.
- Student will be able to understand network security services.
- Student will be able to understand authentication methods, Authorization concepts and concepts regarding firewalls and network infrastructures.
- Student will be able to understand Simple security protocols and authentication using symmetric key, public key, and SSH/TSL and PGP.

Unit-1
Introduction to Security: What is security? Why we need Security? Security concerns,Security Goals: Confidentiality, Integrity, Availability, Authenticity and Accountability,Computer security challenges, Security Breach Impact levels: Low, Moderate and High,Security threats/attacks: passive and active, Security Policy, Security issues, Brief History ofMalware,TypesofMalware,NetworkSecurityAudit,TheOrangeBook, LegalIssues.

TCP/IPSecurityAttacks:
TCP Segment Format, TCP Connection Setup, TCP Disconnection, IP Address Spoofing,Covert Channel, IP Fragment Attacks, TCP Flags, Syn Flood, Ping of Death, Smurf, Fin,UDP Flood Attack, Connection Hijacking, ARP Spoofing, DNS Spoofing, E-Mail Spoofing,WebSpoofing.

Unit-2

Introduction to Cryptography, Symmetric-Key Cryptography: Traditional Ciphers, SimpleModern Ciphers, Modern Round Ciphers, Mode of Operations. Asymmetric-keyCryptography:RSAand Diffie-Hellman.

Network Security: Security Services, Message Confidentiality, Message Integrity, MessageAuthentication: MAC and HMAC, Digital Signature, Key Management: Symmetric-keyDistribution: KDC, Session Keys, Kerberos, Public-key Distribution: Certification Authority,X.509,PKI.

Unit-3

Authentication, Authentication methods, Passwords, Challenge-Response, Biometrics,Somethingyouhave,Two-factor authentication., SingleSign-OnandWeb Cookies.
Authorization, A brief history of authorization, Access control matrix, Compartments, CovertChannel, Inference Control, CAPTCHA, Firewalls and Proxies, Defense in depth, ComputerNetworks security zones, Concept of Demilitarized Zones (DMZ) in designing CorporateNetworks, Analysis of Network Infrastructure, DMZ: Mail server, WWW Server, DNSServer.Network flooding, Anticipating attacks,IDS.

Unit-4

Simple Security Protocols, Authentication Protocols: authentication using symmetric keys,authentication using public keys, session keys, perfect forward secrecy, mutualauthentication, session keys, and PFS, Timestamps, Authentication and TCP, Zeroknowledgeproofs.

SSH, SSL/TSL: SSL and Man-in-the-Middle, SSL connections, SSL Versus IPSec, , IPSec:IKE Phase I: Digital Signature, Symmetric Key, Public Key Encryption, IPSec Cookies, IKEPhase II, IPSec and IP Datagrams, Transport and Tunnel Modes, ESP and AH, ApplicationLayerSecurity: Pretty Good Privacy (PGP).

Textbooks:

- Mark Stamp, Information Security: Principles and Practices, John Wiley & Sons,Hoboken,NJ,2011. Chapters 1,7,8,9, 10,11,13
- BehrouzaForouzan, Data Communications and Networking, McGraw-Hill, 2006.Chapters30,31,32.
- Matt Bishop, Introduction to Computer Security, Addison-Wesley, 2005. Chapters 9,10.4.2,11,22,23.
- Gert De Laet and GertSchauwere, Network Security Fundamentals, Cisco Press, Indiana,2004.Chapters1, 2,9.10.

Referencebooks:

- Richard Bejtlich, The Tao of Network Security Monitoring: Beyond Intrusion Detection,Addison-Wesley.**Use thisbookforPractical**.

DSE-1:Practical/Tutorial:ComputerNetworkSecurity

1. **Experiment # 1 Objective:** Learn about IPconfig, ping, arp, nslookup, whois, tracert,netstat,route, hosts file
1. FindtheIPaddresses ofwww.google.com
2. Modify the hosts file to mapwww.google.comto yahoo's IP address and do a googlesearch.Removethemodification to thehost fileand repeat.
3. Findthedomainname of128.272.165.7(reversetheaddress andadd.in-addr.arpa)
4. Findtheownerofwww.google.comdomain
5. Findroutefromyourcomputertowww.google.com
6. FindtheMACaddressofyourcomputer
7. Print your ARP cache table. Find a server on your local network. Change its ARP entry inyour computer to point to your computer's MAC address. Print new ARP cache table. Nowusetheserviceand seewhat happens.
8. Printyourrouting tableand explaineachline(upto line#20iftoomany)
9. Whatisthenumberof packetssentwith"destinationunreachable"
10. Findthelocationof128.252.166.33(usewww.ipaddresslocation.org)

Inaddition,studentsshouldhavehandson experienceinthefollowingtopics:

1. IPaddressing
2. IPConfiguring
3. ProxyAddress
4. Domainnamefinding
5. TracingofGoogle IP
6. FindingMACaddress
7. TTL,PingingLAN/WAN

2. **Experiment#2Objective:**FamiliarizeTCPDUMPPacketcaptureand analysisutility.

Lab task: Use the TCPDUMP to parse and analyze Traffic. The following tasks must beperformedin this Lab

- BasicusageofTCPDUMPtool.
- UseTCPDUMPtooltostorefullcontentdata.
- UseTCPDUMPtooltoreadstored contentdata.
- VerifyTimestampsinstoredfullcontentdata.
- Use of –e and –v switches to increase detail in TCPDUMP full content

data.Inaddition, students must befamiliarwith:

1. Client/servernetwork.
2. CreatingDomainnamewithitsdirectories.
3. Findinglocalanddomainmachine.
4. ApplyingsecurityinaDCnetwork.

3. **Experiment # 3 Objective:** Familiarize with the basic network security tools i.e. Ethereal.LabTask: Readabout thefollowing tools

- **Ethereal**,networkprotocolanalyzer,www.ethereal.com
- Start Ethereal to capture all traffic. Openwww.google.comin a web browser.StopEthereal. Listall packets seenand interpret them.

In addition,studentsmustbefamiliarwith:

1. Basicnetworksecurity.
2. ProtocolsandResourcessharingsecurityinanetwork.

4. **Experiment # 4 Objective:** Familiarize with the basic network security tools i.e.SuperscanandNetwork surveyor.
Readaboutthefollowingtools

- **Superscan4**, network port scanner (like nmap),http://www.lock-mypc.com/SuperScan4.html
- **Network Surveyor**, network mapping,http://www.solarwindssoftware.com/lansurveyor.aspx

- Use superscan4 to scan one to three hosts on your local net to find their openports.Selectscantype “connect”intheHostandServicediscoverypanel.

- Usenetworksurveyortoshowthemapofall hostsonyourlocalnet.

In addition,studentsmustbefamiliarwith:

1. Securityofserver.
2. Securitypolicymanagementbysystemnetwork.
3. Policyblockinheritance.

5. **Experiment # 5 Objective:** To analysis the secure connection establishment through SSHandTelnet on client serverapplication.
This Lab experiment requires two computers with OpenSSH and Telenet client and serversinstalled.You can use1st PCas client and 2nd PCasserver.

- Startethereal(orwireshark)onthe clientmachine.
- telnettotheserver andloginwithyourusernameandpassword.Logout.
- Sshtotheserverandloginwithyourusernameandpassword.Logout.

- Stopetherealandreadthetrace.

Notethedifferenceinthetwologins?

In addition,studentsmustbefamiliarwith:

1. ImplementationofTelnet andSSH.
2. Startingofarouter.
3. Hostnaming,IPaddressassignment.
4. ConnectionestablishmentofWANbyrouter.
5. ApplyingTelnet,SSHinrouterwithloginusername/password.

6. **Experiment # 6 Objective:** Familiarize them with the basic functionality of the Nmapscanningtool using Windows.

LabTaskincludes

- Use NMAP in command line to scan a host/network, so to find out the possiblevulnerablepoints in thehosts.

In addition,studentsmustbefamiliarwith:

1. Routersecurity.
2. SecurityofdifferentterminalsofRouter.

7. **Experiment # 7 Objective:** Familiarize with a common free Intrusion Detection Systemcalled Snort. Snort was written initially for Linux/Unix, but most functionality is nowavailablein Windows.Inthis lab, wewill usethewindows version.

LabTasks:

- WhatisSnort,whenandhowwouldyouuseit?.
- Listallthepossible“action”syoucanuseinsnortandwhatdotheydo?
- Whatarethedifferent“protocol”sthatmaybeused?
- Explain what these rules do:log

udp any any -> 10.1.1.0/24 1:1024logtcp
any any ->10.1.1.0/24 :5000
logtcp any :1024 ->192.168.1.0/24 500:
logtcp anyany ->192.168.1.0/24 !5000:5010
alerttcpanyany->192.168.1.0/2421(content:"userroot";msg:"Alert";)

- Write a Snort rule that will display an alert when it detects both the SYN and FINflagsareset on thesametime.

- Write a Snort rule that will log all root login to any ftp box on the 10.1.1.0/24network.

In addition,studentsmustbefamiliarwith:

1. SnortinWindowversionandmaintenancesite.
2. Configuringsites
3. Securitysites.
4. Maintainingreplicationinasites,sitelink,andsitelink bridge.

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DisciplineSpecificElectiveCourse

DSE-2: Organizational Behavior (Theory: 4 Credits; Practical: 2 Credits)TheoryFull marks:75 (Mid-Sem:15;End-Sem:60)
PracticalFullmarks:25(Endsemesterevaluation)

Course Objectives:

The objective of this course is to learn the modern trends, theories and changes in organizational behaviour. This course covers the explanations about the human behavior in the organizational context. It details the impact of individual, group and organizational factors on human behavior. The course also focuses on understanding the behavior of the employees working in the organization. It highlights the significance of Challenges and Opportunities of OB, perception, attribution, learning, organizational change, organizational culture, motivation, leadership and conflict management.

Course Outcomes:

On completion of this course, the students will be able to:

- Understand the behaviour of people in the organization.
- Analyze the complexities associated with management of individual behaviour in the organization.
- Understand the motivation (why) behind behaviour of people in the organization.
- Cover the explanations about human behavior in the organizational context.
- Impact of individual, group and organizational factors on human behavior.
- Understand the concepts of personality, learning and attitude.

Unit-1

OrganizationalBehaviour-Meaning,Definitionandimportance,FoundationsofOB,OBModels,and Challenges to OB.

Unit-2

IndividualBehaviour

Perception: Definition &Concept; Personality: Concept, Determinants and Personality Types(Type A and Type B, Big Five Model, MBTI Model); Learning: Concept and Theories(Classicaland OperantConditioning); Attitude: Components& Formation

Unit-3

GroupBehaviour

Group Dynamics: Meaning, Formation and Types of Groups (Formal & Informal Groups),Stages of Group Development, Individual vs. Group decision making. Group vs Team. TypesofTeam.

GroupCommunication

CommunicationTypes,CommunicationProcess,Barrierstocommunication;EffectiveCommunicatio nMethods.

Unit-4

Motivation-Meaning,Nature&Importance.MotivationalTheories(Maslow'sNeedHierarchyTheory,Herzberg'stwofactorTheory,McClelland'sNeedTheory,Vroom'sExpectancyTheory, Equity Theory);Motivational Challenges.

Leadership - Leadership: Nature and Importance; Leadership Styles; Leadership Theories(TraitTheory, BehaviourTheory, Contingency Theory)

Textbooks:

1. OrganisationalBehaviour:L.M.Prasad
2. OrganisationalBehaviour:Rao&Narayana
3. OrganizationalBehaviour:Guptaand Joshi(KP)

Referencebooks:

1. OrganisationalBehaviour:KAswathappa(HPH)
2. OrganisationalBehaviour:StephenRobbins(PHI)

DSE-2Practical/Tutorial:OraganizationalBehaviorTutorial

1. Organisation'sadaptabilitytowardsartificialintelligence.
2. LeadershipChallengesandtransformationusingAI.
3. Socialmediaandgroupbehaviour.
4. Peopleanalyticsinorganisationalbehaviour.
5. Technologyenabledworkpracticesinorganisations.
6. Convergingtechnologiesandemployeeperception.
7. Industry4.0
8. CaseStudyNeedHierarchicaltheoryinTeambuilding.
9. ExpectancyTheorytowardsTechnologicalAdaptation
10. PracticeofTelecommutingandremoteworkinginIT /ITES.
11. TeambuildingExercises.
12. PersonalityTypes.

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SkillEnhancementCourse

SEC-3:PythonProgramming(4Credits)

Full marks -75 (Mid-Sem: 15; End-Sem: 60)PracticalFullmarks:25(Endsemesterevaluation)

Course objectives

To acquire programming skills in core Python. To acquire Object Oriented Skills in Python. To develop the ability to write database applications in Python

Course Outcomes

At the end of the course, the student will be able to

- Explain basic principles of Python programming language
- Implement object oriented concepts
- Implement database and GUI applications

Unit-1

Python: Features of Python , Installing Python for windows and setting up paths, writing andExecutingofapythonprograms,PythonVirtualmachine,Frozenbinaries,Comparisonbetween C, Java and python , Comments , Docstrings ,How python sees variables, Data typesinPython,builtintypes,sequencesinpython,sets,literalsinPython,userdefineddatatypes,identifiers& reserved words, Naming convention inpython,

Unit-2

various Operators in Python , Input & Output , Control statements, if statements, while loop,for loop, infinite loop, nested loop ,else suit, break, continue, pass ,assert, return statements,commandlinearguments.

Arrays in python,advantages using arrays, creating arrays, importing the array module,indexingand slicing onarrays, Processing thearrays, Comparing arrays.

Strings in Python, Creating strings, Length of a string, Indexing in strings, Slicing strings,Concatenationand Comparingstrings,FindingSubStrings,ReplacingaString.

Unit-3

FunctionsinPython,Defineafunction,Callingafunction,returnfromfunction,passbyobjectReference, Positional arguments,Default arguments, Recursivefunctions.

Introduction to OOP, features of OOP, creating classes, the self variable, constructor, types ofvariables,namespaces, types ofmethods.

Unit-4

Inheritance:Defineinheritance,typesofinheritance,constructorsininheritance,overridingsuperclass constructors& methods, thesuper()method, MRO

Polymorphism:DucktypingphilosophyofPython,operatoroverloading,methodoverriding,interfaces in python

Exceptions:Errorsinapythonprogram,Exceptions,Exceptionhandling,TypesofExceptions,TheException block, theassertstatement, userdefined exceptions

Python Database Connectivity: DBMS, types of databases used with Python, installation ofMySQL database , setting path, verifyingMySQL , installingMySQL connector, Workingwith MySQL database, Using MySQL from python, retrieving rows ,deleting rows, updatingrowsin atable.

TextBooks

1. T.Budd,ExploringPython,TMH, 1stEd, 2011.
2. CorePythonProgramming, Dr.R.NageswarRao,DreamtechPress
3. Python ProgrammingforAbsoluteBeginners,MichaelDawson, CENGAGELearning

ReferenceBooks

1. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist :learningwith Python , Freely availableonline.2012

OnlineReferences:

1. PythonTutorial/Documentationwww.python.or2015
2. http://docs.python.org/3/tutorial/index.html
3. http://interactivepython.org/courselib/static/pythonds
4. http://www.ibiblio.org/g2swap/byteofpython/read/

SEC-3:SoftwareLabbasedonPythonProgramming:

1. Write a menu driven program to convert the given temperature from Fahrenheit toCelsiusand viceversadepending upon users choice.

2. Write a Program to calculate total marks, percentage and grade of a student. Marksobtained in each of the three subjects are to be input by the user. Assign grades according tothefollowing criteria:

GradeA:Percentage>=80

Grade B: Percentage>=70 and

<80Grade C: Percentage>=60 and

<70Grade D: Percentage>=40 and

<60GradeE: Percentage<40

3. Write a menu-driven program, using user-defined functions to find the area ofrectangle,square, circleandtrianglebyaccepting suitableinputparameters fromuser.

4. WriteaProgramtodisplaythefirstntermsof Fibonacciseries.

5. WriteaProgramtofind factorialofthegivennumber.

6. WriteaProgramto find sumofthefollowingseries fornterms: 1 –2/2!+3/3!----- n/n!

7. WriteaProgramtocalculatethesumandproductoftwocompatiblematrices.
8. Install MySQL and connector. Write Python programs to retrie, inserting, delete,updaterowsinatable.

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CoreCourse

C-13: Management Accounting (Theory: 4 Credits; Practical: 2 Credits)TheoryFull marks:75(Mid-Sem:15;End-Sem:60)
PracticalFullmarks:25(Endsemesterevaluation)

Course Objectives:

The key aim of this course is to provide a comprehensive understanding to the interaction between business environment and managerial accounting. In addition, the course emphasizes the use of accounting information for internal planning and control purposes. The course covers the role of management accounting in decisions concerning resource allocation and performance evaluation.

Course Outcome:

On completion of this course, the students will be able to:

- Demonstrate the applicability of the concept of Accounting to understand the managerial Decisions and financial statements.
- Apply the Financial Statement Analysis associated with Financial Data in the organization.
- Analyse the complexities associated with management of cost of product and services in the Organization.
- Demonstrate how the concepts of accounting and costing could integrate while identification and resolution of problems pertaining to financial Sector.

Unit-1

Nature, Scope of Management Accounting: Meaning, definition, nature and scope ofManagementAccounting;ComparisonofManagementAccountingwithCostAccounting and Financial Accounting. Cost concepts: Meaning, Scope, Objectives,andImportanceofCostAccounting;Cost,Costing,CostControl,andCostReduction;Elements of Cost, Components of total Cost, Cost Sheet. Classification of Costs:Fixed, Variable, Semi-variable, and Step Costs; Product, and Period Costs; Direct,and Indirect Costs; Relevant, and Irrelevant Costs; Shut-down, and Sunk Costs;Controllable,andUncontrollableCosts;Avoidable,andUnavoidableCosts; Imputed /HypotheticalCosts;Out-of-pocketCosts;OpportunityCosts;Expired,andUnexpired Costs; Conversion Cost. Cost Ascertainment: Cost Unit and Cost Center.IntroductiontoOverheadallocation,Overheadapportionment,andOverheadabsorption.

Unit-2

Cost-Volume-Profit Analysis: Contribution, Profit-Volume Ratio, Margin of safety,Cost Break-even Point, Composite Break-even Point, Cash Break-even Point, KeyFactor, Break-even Analysis. Relevant Costs and Decision Making: Pricing, ProductProfitability, Make or Buy, Exploring new markets, Export Order, Sell or ProcessFurther,Shut down vs. Continue.

Unit-3

Budgets and Budgetary Control: Meaning, Types of Budgets, Steps in BudgetaryControl, Fixed and Flexible Budgeting, Cash Budget. Responsibility Accounting:Concept, Significance, Different responsibility centers, Divisional performance –Financialmeasures, Transferpricing.

Unit-4

Standard Costing and Variance Analysis: Meaning of Standard Cost and StandardCosting,Advantages,LimitationsandApplications;Material,Labor,OverheadandSales variances. Introduction to Target Costing, Life Cycle Costing, Quality Costing, andActivitybased Costing.

TextBooks:

1. C.T. Horngren, Gary L. Sundem, Jeff O. Schatzberg, and DaveBurgstahler:IntroductiontoManagementAccounting,Pearson
2. M.N. Arora: A Textbook of Cost and Management Accounting, VikasPublishingHouse Pvt. Ltd.

ReferenceBooks:

1. M.Y. Khan, and P.K. Jain, Management Accounting: Text Problems andCases,McGrawHill Education(India)Pvt.Ltd.
2. A.K.Nadhani,andK.K.Nadhani,ImplementingTally7.2,BPBPublication.
3. Sudalaimuthu,ComputerApplicationinbusiness,HimalayaPublishingHouse,Mumbai
4. VishnuPriyaSingh,LearnTally7.2,AsiancomputechBook.

CORE–13Practical/Tutorial:ManagementAccountingTutorial

1. IntroductiontoTally,FeaturesandVersionsofTally.
2. ComponentsofTallyScreen,Creation,Alteration&DeletionofCompany.
3. PrimaryGroup&Subgroup,Creation.
4. Alteration&DisplayofLedgerAccounting.
5. RecordingofTransactionsthroughvouchers.
6. DisplayofFinancialreportsF11andF12configuration.
7. Introduction to Inventory system: Advantages of maintaining inventory system in TallystockgroupStockcategory, stockitemunitsofmeasure,creationofinventorysystem.

8. Zerobasedbudgetingandperformance/outcomebudgeting

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CoreCourse

C-14: Computer Networks (Theory: 4 Credits; Practical: 2 Credits)Theory Full marks: 75 (Mid-Sem: 15; End-Sem: 60)PracticalFull marks:25 (Endsemesterevaluation)

Course Objectives:

This course is intended to provide an overview of the concepts and fundamentals of data communication and computer networks. It will help the students in understanding of various types of computer networks, different components of computer networks, various protocols, e-mail and communication protocols, network naming and addressing, modern technologies used in networking and their applications.

Course Outcomes:

The student will be able to

- Understand network communication using the layered concept, Open System Interconnect (OSI) and the Internet Model.
- Understand various types of transmission media, network devices.
- Understand the concept of flow control, error control and LAN protocols.
- Explain the design of and algorithms used in the physical, data link layers.
- Understand the working principles of LAN and the concepts behind physical and logical addressing, subnetting and supernetting.
- Analyze the contents in a given Data Link layer packet, based on the layer concept.
- Determine the various modulation and error detection and correction techniques and their application in communication systems.

Unit-1

Introduction to Data Communications and Network Models: Protocols and Standards, Layersin OSI Models, Analog and Digital Signals, Transmission Modes, Transmission Impairment,Data Rate Limits, Performance, Digital Transmission, Network Devices & Drivers: Router,Modem,Repeater,Hub,Switch, Bridge(fundamentalconcepts only).

Unit-2

Signal Conversion: Digital-to-Digital Conversion, Analog-to-Digital Conversion, Digital-to-analogConversion, Analog-to-analog Conversion.
Transmission Media: Guided Media, Unguided Media, Switching Techniques: PacketSwitching, Circuit Switching, Datagram Networks, Virtual-Circuit Networks, and StructureofaSwitch.

Unit-3

Error Detection and Correction: Checksum, CRC, Data Link Control: Framing, Flow andError Control, Noiseless Channels, Noisy channels, (Stop and Wait ARQ, Slidding WindowProtocol , Go Back N, Selective Repeat) HDLC, Point-to-Point Protocol. Access Control:TDM,CSMA/CD,and Channelization(FDMA, TDMA, andCDMA).

Unit-4

Network Layer: Logical Addressing, IPv4 Addresses, IPv6 Addresses, Virtual-CircuitNetworks: Frame Relay and ATM, Transport Layer: Process-Process Delivery: UDP, TCP.Application layers: DNS, SMTP, POP, FTP, HTTP, Basics of WiFi (Fundamental conceptsonly), Network Security: Authentication, Basics of Public Key and Private Key, DigitalSignaturesand Certificates (Fundamental conceptsonly).

TextBooks:
1.DataCommunicationsandNetworking,Fourth EditionbyBehrouzA.Forouzan,T

ReferenceBooks:
ComputerNetworks,A.S.Tanenbaum,4thedition, PearsonEducation.

C-14: Practical/Tutorial Computer Networks
LabUseC/C++/ any Network Simulator

1. SimulateEvenParitygeneratorandchecker.
2. SimulatetwodimensionalParitygeneratorandchecker.
3. Simulatechecksumgeneratorand checker.

4. SimulateHammingcodemethod.

5. Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisychannel.

6. Simulateandimplementstopandwaitprotocolfornoisychannel.

7. Simulateandimplementgobacknslidingwindowprotocol.

8. Simulateandimplementselectiverepeatslidingwindowprotocol.

9. Simulateandimplementdistancevectorroutingalgorithm.

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DisciplineSpecificElectiveCourse
DSE-3: Marketing Management (Theory: 4 Credits; Practical: 2 Credits)TheoryFullmarks:75(Mid-Sem:15;End-Sem:60)Practical Full marks:25 (Endsemesterevaluation)

The key aim of this course is to understand the concepts of marketing management, to learn about the marketing process for different types of products and services, to understand the tools used by marketing managers in decision situations and to understand the marketing environment.

Course Outcomes

- Students will demonstrate strong conceptual knowledge in the functional area of marketing management.
- Students will demonstrate effective understanding of relevant functional areas of marketing management and its application.
- Students will demonstrate analytical skills in identification and resolution of problems pertaining to marketing management.
- This course enables a student to understand the 'Marketing mix' elements and the strategies and principles underlying the modern marketing practices.
- Encourages students to explore for themselves the role of a marketing manager and the boundaries of marketing

Unit-1

ConceptsofMarketing,ObjectivesofMarketing,MarketingvsSelling,MarketingEnvironment,ConsumerBehaviour,ConsumerBuyingProcess,Factorsinfluencingconsumerdecisionmaking

Unit-2

Product: Product concept, Product classification, New Product Development, Product lifecycle, Product mix, Branding – Meaning & Types, Packaging – Meaning & Types, MeaningofProduct Labelling.

Unit-3

Price: Objective of pricing, Factors Influencing Product Pricing, Methods of PriceDetermination. Place – Classification of Markets, Classification of Distribution Channels,TypesofIntermediaries.

Unit-4

Promotion: Meaning, Importance of Promotion, Promotional Mix: Personal Selling – Merits,Limitations,Methods,Process;Advertising–Meaning,Role,MethodsofAdvertisingAppropriation; Sales Promotion – Objectives, Tools; Public relation – Meaning, Significance,Tools.

TextBooks

1. MarketingManagementin IndianContext,Sontakki,KP

2. MarketingManagement,Karunakaran,

ReferenceBooks:

1. MarketingManagement,Kotler,Keler,Koshi,Jha,Pearson

DSE-3Practical/Tutorial:MarketingManagementTutorial

1. Case studyonMarketingMix
2. Role ofMISinEnhancingSales
3. Impactof ICTonadvertisement
4. Case study: BrandingonConsumerBuyingBehaviour
5. Casestudy:Impact ofproductqualitybrandloyalty
6. Effect ofproductinnovationontheproductivityof ITindustry.
7. Casestudy:Impact ofbrandingandpackagingonsalespromotion
8. Significanceofpriceinconsumer purchasedecision
9. Effect ofpricechangesonsalesofconsumergoods
10. ProductdifferentiationstrategiesonsalesperformanceofIT/serviceindustry
11. Casestudy: Impactofdistributionchanneltothemarketingofaproduct
12. Casestudy:Marketingthroughsocialmediasites.
13. Measuringtheimpact ofAIoncustomersatisfaction
14. AnalysisofPromotionMixasa toolofmarketingcommunication.

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DisciplineSpecificElectiveCourse

DSE-4: E-Commerce (Theory: 4 Credits; Practical: 2 Credits)Theory Full marks: 75 (Mid-Sem: 15; End-Sem: 60)PracticalFullmarks:25(Endsemesterevaluation)

Unit-1

Introduction to E-Commerce: Definition and scope of E-Commerce and M-Commerce,Ecommerce trade cycle, Electronic Markets, Internet Commerce, Benefits and Impacts ofECommerce.

Elements of E-Commerce: Various elements, e-visibility, e-shops, Delivery of goods andservices,Online payments,After-salesservices,InternetE-Commerce security.

Unit-2

EDI and Electronic Payment Systems: Introduction and definition of EDI, EDI layeredArchitecture, EDI technology and standards, EDI communications and transactions, Benefitsand applications of EDI with example, Electronic Payment Systems: credit/debit/smart cards,e-creditaccounts,e-money.

Unit-3

Introduction to EC models: Inter-organization and intra-organization E-Commerce,ECommerce
Models: B2B, B2C,C2B,C2C,G2C, C2G

E-Business: Introduction to Internet bookshops, Grocery Suppliers, Software Supplies andsupport,Electronic newspapers,Virtualauctions,Online share dealing,e-diversity.

Unit-4

E-Security and Legal Issues: Security concerns in E-Commerce, Privacy, integrity,authenticity, non-repudiation, confidentiality, SSL, Digital Signatures and fire walls, IT Act2000,Cyber-crimesandcyber laws

Mobile Commerce and Future of E-Commerce: Introduction to Mobile Commerce,Benefits of Mobile Commerce, Impediments of M-Commerce, M-Commerce framework,Emergingand futuretrends.

TextBooks

1. G.S.V.Murthy,E-CommerceConcepts,Models,Strategies,HimalayaPublishingHouse.
2. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, "E-CommerceFundamentalsand Applications,WileyStudentEdition.

ReferenceBooks:

1. GrayP.Schneider,Electroniccommerce,InternationalStudentEdition.

DSE-4:Practical/Tutorial:E-Commerce

1. Roleof ICTInBusiness
2. M-CommerceandItsRevolution
3. Security,Legal andEthicalissuesinM-Commerce
4. Potentialbenefitsandlimitationsofecommerce
5. Ecommerceon businessmodels
6. IssuesofEDI: legal,securityandprivacyissues

7. E– Payment systems
8. ApplicationsofM-Commerce
9. Riseof ecommerce
10. EPS:Ausercenteredperspective

ITM
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DisciplineSpecificElectiveCourse
DSE-4:Project(6Credits)

Objective:
An elective course designed to acquire special/advanced knowledge, such as supplementstudy/support study to a project work, and a candidate studies such a course on his own with anadvisorysupportbyateacher/facultymember iscalled dissertation/project.

Guidelines:
Astheprojectworkconstitutesamajorcomponentinmostoftheprofessional programsanditistobe carriedoutwithdue careandshouldbeexecutedwithseriousnessbythecandidates.

Type ofProject
As majority of the students are expected to work out a real-life project in some industry/researchand development laboratories/educational institutions/software companies, it is suggested that theproject is to be chosen which should have some direct relevance in day-to-day activities of thecandidatesinhis/herinstitution.Itisnotmandatoryfora studenttoworkonareal-life project.
Thestudentcanformulateaprojectproblemwiththehelpof Guide.

ProjectProposal(Synopsis)
The project proposal should be prepared in consultation with the guide. The project proposalshould clearly state the project objectives and the environment of the proposed project to beundertaken. The project work should compulsorily include the software development. The projectproposalshouldcontaincompletedetailsin thefollowing form:

1. Titleofthe Project
2. IntroductionandObjectivesoftheProject
3. Project Category (RDBMS/OOPS/Networking/Multimedia/Artificial Intelligence/ExpertSystemsetc.)
4. Analysis (DFDs at least up to second level, ER Diagrams/ Class Diagrams/ Database Designetc.aspertheproject requirements).
5. A complete structure which includes: Number of modules and their description to providean estimation of the student's effort on the project. Data Structures as per the projectrequirements for all the modules. Process Logic of each module. Testing process to be used.Reportsgeneration
6. Tools/Platform,HardwareandSoftwareRequirementspecifications
7. Futurescopeandfurtherenhancementoftheproject.

EvaluationoftheProject
FollowingSchemeshallbe followedforevaluationoftheproject:

Background of the Problem: 10
marksReview of Literature: 20
marksMethodology:10marks
Observation and Analysis: 20
marksViva Voce: 20marks

Seminar:20marks
Total:100marks

ITM
(HONOURS)SEM
ESTERVI
SkillEnhancementCourse
SEC-4:AndroidProgramming
(4Credits)Fullmarks-75(Mid-Sem:15;End-Sem:60)
PracticalFullmarks:25(Endsemesterevaluation)

Course objective:

This course aims to provide learning and hands-on experience, exposure to developing mobile applications for Android devices. Starting with basics , this course builds strong background about Android architecture and internals.

Course outcomes:

At the end of the course the students will able to learn:-

- Recapping of Object Oriented Programming of java, which is perquisite of Android Application Development.
- Basics of Android Programming, various development tools and details of android architecture.
- Installing and configuring Eclipse for android application development.
- Design and develop user Interfaces (UI) for the Android platform.
- Process to connect the SQLite database into Android Platform and perform various operation like inserting, updating, searching and deleting records.

Unit-1

Introduction: HistoryofAndroid,IntroductiontoAndroidOperatingSystems,AndroidDevelopment Tools, Android Architecture.

OverviewofobjectorientedprogrammingusingJava:OOPsConcepts:Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading andOverriding,JavaVirtualMachine.

Unit-2

DevelopmentTools: InstallingandusingEclipsewithADTplug-in,InstallingVirtualmachineforAndroidsandwich/Jellybean(Emulator),configuringtheinstalled tools, creating an android project – Hello Word, run on emulator, Deploy itonUSB-connected Android device.

Unit-3

UserInterfaceArchitecture: Applicationcontext,intents,Activitylifecycle,multiplescreen sizes.

User Interface Design: Form widgets, Text Fields, Layouts, Button control, togglebuttons,Spinners(Comboboxes),Images, Menu, Dialog.

Unit-4

Database:UnderstandingofSQLitedatabase, connectingwiththedatabase.

TextBooks:

1. Android application development for java programmers. By James C. Sheusi.Publisher:CengageLearning, 2013.

ReferenceBook:

1. James C. Sheusi, “Android application Development for Java Programmers”,Cengage Learning,2013.
2. M. Burton, & D. Felker, “Android Application Development for Dummies”, 2/e,Wiley India.

OnlineReferences:

1. http://www.developer.android.com
2. http://docs.oracle.com/javase/tutorial/index.htm (Available in the form of freedownloadableebooks also).
3. http://developer.android.com/guide/components/fundamentals.html
4. http://developer.android.com/training/multiscreen/screensizes.html
5. http://developer.android.com/guide/topics/ui/controls.html

SEC-4:Practical/TutorialAndroidProgramming

1. Create "Hello World" application. That will display "Hello World" in the middle ofthescreenintheemulator.Alsodisplay"HelloWorld"inthemiddleofthescreenintheAndroidPhone.
2. Createanapplicationwithloginmodule.(Checkusernameandpassword).
3. Create spinner with strings taken from resource folder (res >> value folder) andonchangingthespinnervalue,Imagewillchange.
4. Createamenuwith5optionsandselectedoptionshouldappearintextbox.
5. Create a list of all courses in your college and on selecting a particular courseteacher-in-chargeofthatcourseshouldappearatthebottomofthescreen.
6. Create an application with three option buttons, on selecting a button colour ofthescreenwillchange.
7. CreateandLoginapplicationasabove.Onsuccessfullogin,pop upthemessage.
8. Create an application to Create, Insert, update, Delete and retrieve operation onthedatabase.

THEEND