SVKP&DrKSRAJUA&SCOLLEGE(A)::PENUGONDA

MasterofComputerApplications(w.e.f.2023onwards)

Course Structure & Syllabus for AB 2023-24

Semester I (First Year) Curriculum

Code	CourseTitle	MaxMarks		Total Marks	Hoursperweek		Credits
		External	Internal		Theory	Practical	
23MCAT101	DiscreteMathematical Structures	70	30	100	4	-	4
23MCAT102	ManagementAccountancy	70	30	100	4	-	4
23MCAT103	CProgramming&Data Structures	70	30	100	4	-	4
23MCAT104	ComputerOrganization	70	30	100	4	-	4
23MCAT105	OperatingSystems	70	30	100	4	-	4
23MCAT106	Design&Analysisof Algorithms	70	30	100	4	-	4
23MCAP107	CProgramming&Data Structures Lab	50	50	100	-	3	2
23MCAP108	OperatingSystemsand ComputerOrganizationLab	50	50	100	-	3	2
23MCAP109	SkillDevelopment Course/ MOOCS	50	50	100	-	3	2
23MCAT110	**Bridge Course*** FundamentalsofComputers (For General B.Sc/B.A./B.ComStudents)	70	30	100	4	-	4
23MCAP111	**BridgeCourseLab*** Fundamentals of Computers Lab (For General B.Sc/B.A./B.ComStudents)	50	50	100	-	3	2
	Total Credits						30

Note: All the General B.Sc/B.A./B.Com Students must pass the **Bridge Course(23MCAT110) and Bridge Course Lab (23MCAP111)** with minimum 50% marks, but the credits allotted for that courses will not be considered for SGPA calculation.

CourseCode&Title:23MCAT101DISCRETEMATHEMATICALSTRUCTURES
Semester:I
CourseIndex:C101

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives
Learnaboutintroductionofdiscretemathematicalstructures.
LearntheCountingTechniquesandPermutationsandcombinations.
LearnaboutindetailaboutGraphsandConnectivity.
LearnaboutindetailaboutTrees,Spanningtreesandtheirapplications
LearnaboutBooleanAlgebra,RepresentingBooleanfunctionsandMinimizationofBooleanfunctionsand Models of Computation.

Course Outcomes:
Bytheendofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C101.1	Understandaboutintroductionofdiscretemathematicalstructures.
C101.2	UnderstandtheCountingTechniquesandPermutationsandcombinations.
C101.3	UnderstandaboutindetailaboutGraphsandConnectivity.
C101.4	UnderstandaboutindetailTrees,SpanningTreesandtheirapplications.
C101.5	UnderstandaboutBooleanAlgebra,RepresentingBooleanfunctionsand Minimization of Boolean functionsand Models of Computation.

23MCAT101DISCRETEMATHEMATICALSTRUCTURES

Instruction:4Periods/week **Time:3 Hours** **Credits:4**
Internal:30Marks **External:70Marks** **Total:100Marks**

UNITI

Introduction: Logic-Prepositional Equivalences-Truth tables-Tautologies-Predicates and Quantifiers-Sets-Operations on sets.

Relations: Relations and their properties- binary relations and their applications - Representation of relations- Closures of relations- Equivalence relations-Partial Orderings.

UNITII

Counting Techniques: BasicsofCounting –Introduction, Basic Counting Principles-Product Rule, Sum Rule- Pigeonhole Principle- Introduction, The Generalized Pigeonhole Principle. **Permutations and Combinations**: Introduction, Permutations, Combinations- Generalized Permutations and Combinations-Permutations with repetition, Combinations with Repetition.

UNITIII

Graphs: Introduction to Graphs-Terminology-Basic terminology, Handshaking Theorem-Sample Graphs, Bipartite Graphs- Representations of Graphs and Graph Isomorphism – Adjacency matrices, Incidence matrices, Isomorphism of Graphs.

Connectivity: Introduction, Connectedness inUndirectedGraphs, Connectedness inDirected Graphs-Euler and Hamiltonian Paths- Shortest Path problems- Dijkstra's Algorithm-Planar Graphs- Graph Coloring.

UNITIV

Trees: Introduction to trees,Properties ofTrees- Applications oftrees- Binary Search Trees, Decision Trees, Prefix Codes- Tree Traversals- Introduction, Traversal Algorithms, Infix, Prefix, and Postfix Notation.

Spanning Trees: Introduction, Depth First Search, Breadth First Search- MinimumSpanning Trees- Introduction, Algorithms for Minimum Spanning Trees- Prim's Algorithm, Kruskal's Algorithm.

UNITV

Boolean Algebra: Introduction, Boolean Expressions and Boolean Functions, Identities of Boolean Algebra - Representing Boolean Functions- Sum-of-Products Expansions- Logic Gates- Examples of Circuits, ADDERS-Minimizations of Circuits-Karnaugh Maps.

Modeling Computation: Languages and Grammars,Finite State Machines with Output, Finite State Machines with No Output.

TextBook:

1. Discretemathematicsanditsapplications,Keneth.H.Rosen,TataMcGraw-Hill Publishing Company, New Delhi

ReferenceBooks:

1. DiscreteMathematicsforcomputerscientists&Mathematicians,JoeL.Mott,Abraham

Kandel&T.P.Baker,PrenticeHallofIndiaLtd,NewDelhi

2. Discretemathematics,RichardJohnsonbaug,PearsonEducation,NewDelhi

***Note:RequesttothePaperSettertoconsiderthestudentsareComputerScienceandsetasperComputer related Questions.**

CourseCode&Title:23MCAT102MANAGEMENTACCOUNTANCY
Semester:I
CourseIndex:C102

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives
LearnthebasicconceptofPrinciplesOfAccountingandFinalAccounts.
LearnaboutindetailaboutRatioAnalysis.
LearnabouttheconceptsofCosting,BudgetandBudgetaryControl
LearnaboutMarginalCosting
LearningtheIntroductionToComputerizedAccountingSystem.

Course Outcomes:
Bytheendofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C102.1	UnderstandthebasicconceptofPrinciplesOfAccountingandFinalAccounts.
C102.2	UnderstandaboutindetailaboutRatioAnalysis.
C102.3	UnderstandabouttheconceptsofCosting,BudgetandBudgetaryControl
C102.4	UnderstandaboutMarginalCosting.
C102.5	UnderstandingtheIntroductionToComputerizedAccountingSystem.

23MCAT102MANAGEMENTACCOUNTANCY

Instruction:4Periods/week **Time:3 Hours** **Credits:4**

Internal:30 Marks **External: 70 Marks** **Total:100Marks**

UNIT I

Principles ofAccounting: Natureand ScopeofAccounting, Double EntrySystemofaccounting introduction to Basic Books of Accounts of Sole Proprietary Concern, closing of books of accounts and Preparation of Trial Balance. Final Accounts: Trading, Profit and Loss Accounts and Balance Sheet of Sole Proprietary Concern with Normal Closing Entries (With numerical problems).

UNITII

Ratio Analysis: Meaning, Advantages, Limitations, Types of Ratio and their usefulness. (Theory only)Fund Flow Statement: Meaning of the Term Fund, Flow of Fund, Working Capital Cycle, Preparation and Inter-preparation of Statement.

UNITIII

Costing: Nature, Importance and Basic Principles. Budget and Budgetary Control: Nature and Scope, Importance, Method of Finalization and Master Budget, Functional Budgets.

UNITIV

Marginal Costing: Nature, Scope, Importance, Construction of Break Even Chart, Limitations and uses of Break Even Chart, practical applications of marginal costing (with numerical problems).

UNITV

Introduction to Computerized Accounting System: Coding Logic and Codes Required, Master Files, Transaction Files, Introduction to documents used for data collection, processing of different files and outputs obtained.

TEXTBOOKS:

1. IntroductiontoAccountancy.T.S.Grewal.
2. ManagementAccountancy,S.P.Jain.

REFERENCEBOOK:

1. IntroductiontoAccounting,G.Agarwal.

CourseCode&Title:23MCAT103CPROGRAMMINGANDDATASTRUCTURES
Semester:I
CourseIndex:C103

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives
LearntheFundamentalsandBasicconceptsofCProgramming.
LearnaboutindetailaboutArrays,FunctionsandPointers.
LearnaboutthePointeranditsimportance
LearntheconceptsofDerivedDataTypesandDataStructures.
LearntheconceptsofLinkedLists,Trees,Graphs,SearchingandSorting.

Course Outcomes:
Bytheendofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C103.1	UnderstandtheFundamentalsandBasicconceptsofCProgramming.
C103.2	UnderstandaboutindetailaboutArrays,Functions.
C103.3	UnderstandtheconceptsofPointersanditsapplications
C103.4	UnderstandtheconceptsofDerivedDataTypesandDataStructures.
C103.5	UnderstandtheconceptsofLinkedLists,Trees,Graphs,SearchingandSorting.

23MCAT103CPROGRAMMINGANDDATASTRUCTURES

Instruction:4Periods/week **Time:3 Hours** **Credits:4**
Internal: 30 Marks **External: 70 Marks** **Total:100Marks**

UNIT-I

IntroductiontoComputers, Algorithm,flowchart,programdevelopmentsteps,StructureofC program,ASimpleCprogram,identifiers,basicdatatypesandsizes,Constants,variables, arithmetic,relationalandlogicaloperators,incrementanddecrementoperators,conditional operator, bit-wise operators,assignment operators,expressions,type conversions,conditional expressions,precedenceandorderofevaluation.Controlstructuressuchasif,goto,labels,and switch statements. Loops- while, do-while and for statements, break, continue.

UNIT-II

Arrays: Arrays - declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1- D arrays, 2-D arrays – 2-D and character arrays – Multidimensional arrays. **Functions:** basics, parameter passing, storage classes- scope rules, user defined functions, standard library functions, recursive functions, header files, C pre-processor.

UNIT-III

Pointers: Concepts, initialization of pointer variables, pointers and Function arguments, passing byaddress –dangling memory, Characterpointer sand functions, pointer sto pointer s, pointer sandmultidimensionalarrays, dynamic memorymanagement functions, command line arguments.

UNIT-IV

Derived types: structures- declaration, definition and initialization of structures, accessing structures,nested structures, arraysofstructures, structuresand functions, pointerstostructures, self-referential structures, unions, typed of, bit-fields, Input and output – concept ofa file, text files and binary files, Formatted I/o, file I/o operations.

Data Structures: Introduction to Data Structures – Stacks: Definition, Stack implementation one application; Queues: Definition, Queue implementation and types of Queues.

UNIT-V

Linked Lists: SingleLinkedList- Definition, implementation;DoubleLinkedList- Definition, implementation. **Trees:** Binary Trees- representation, traversals. **Graphs:** Introduction, representation,traversals.**Searching:**LinearSearchingandBinarySearching.**Sorting:**Bubble Sort, Quick Sort and Merge Sort.

TEXTBOOKS:

1. CandDataStructures:Asnapshotorientedtreatiseusingliveengineeringexamples,NB Venkateswarlu, E. V Prasad, S Chand &Co.
2. LetUsC,YashwantKanetkar,BPBPublications,5thEdition.
3. Computerscience,AstructuredprogrammingapproachusingC,B.A.Forouzanand R.F.Gilberg, Third edition, Thomson.

REFERENCEBOOKS:

1. FundamentalsofDataStructuresinC,Horowitz,Sahni,Anderson-Freed,2nded,2008.
2. TheCProgrammingLanguage,B.W.Kernighan,DennisM.Ritchie,PHI/Pearson.

CourseCode&Title:23MCAT104COMPUTERORGANIZATION
Semester:I
CourseIndex:C104

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives
LearnthebasicsofDigitalLogicCircuitsandDigitalComponents.
LearnabouttheConceptsofDataRepresentation,RegisterTransferandMicroOperations.
LearntheconceptofAssemblyLanguageInstructions,8085MicroprocessorInstructionSetArchitecture ,BasicComputerOrganizationandDesign.CentralProcessingUnit.
LearnabouttheconceptofCentralProcessingUnit,Input/OutputOrganization.
LearnaboutthePriorityinterrupt,DirectMemoryAccessandMemoryOrganization.

Course Outcomes:
Bytheendofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C104.1	UnderstandthebasicsofDigitalLogicCircuitsandDigitalComponents.
C104.2	UnderstandabouttheConceptsofDataRepresentation,RegisterTransferand MicroOperations.
C104.3	Understand the concept of Assembly Language Instructions, 8085 MicroprocessorInstructionSetArchitecture,BasicComputerOrganizationand Design.CentralProcessingUnit.
C104.4	UnderstandabouttheconceptofCentralProcessingUnit,Input/OutputOrganization.
C104.5	UnderstandabouttheconceptofPriorityinterrupt,DirectMemoryAccessand Memory Organization.

23MCAT104COMPUTERORGANIZATION

Instruction:4Periods/week **Time:3 Hours** **Credits:4**

Internal: 30 Marks **External: 70 Marks** **Total:100Marks**

UNIT-I

DigitalLogicCircuits:

DigitalComputers,LogicGates,BooleanAlgebra,MapSimplification,CombinationalCircuit, Flip-flops Sequential Circuits.

DigitalComponents:

IntegratedCircuits,Decoders,Multiplexers,Registers,ShiftRegisters,Counters,MemoryUnit.

UNIT-II

DataRepresentation:

DataTypes,Complements,Fixed-pointRepresentation,FloatingpointRepresentation.

RegisterTransferandMicroOperations:

RegisterTransferLanguage,RegisterTransfer,BusandMemoryTransfer,Arithmetic MicroOperations.

UNIT-III

AssemblylanguageInstructions,8085MicroprocessorInstructionSetArchitecture.

BasicComputerOrganization and Design:

InstructionCodes,ComputerRegister,ComputerInstructions,TimingandControl,Instruction Cycle, Memory Reference Instructions, Input-Output, Interrupt.

UNIT-IV

CentralProcessingUnit:

Introduction, GeneralRegisterOrganization,Stackorganization,Instructionformats,addressing modes.

Input/OutputOrganization:

PeripheralsDevices,I/OInterface,AsynchronousDataTransfer,ModesofTransfer

UNIT-V

PriorityInterrupt,Directmemoryaccess,Input–OutputProcessor(IOP).

MemoryOrganization:

MemoryHierarchy,Mainmemory,AuxiliaryMemory,AssociateMemory,CacheMemoryand Virtual Memory.

TextBooks:

1. ComputerSystemArchitecture,M.MorrisMano,PrenticeHallofIndiaPvt.ltd.Third Edition, Sept.2008.

ReferenceBooks:

1. ComputerArchitectureandOrganization, WilliamStallings,PHIPvt.Ltd.EasternEconomy Edition, Sixth Edition, 2003.
2. ComputerSystemArchitectureJohnP.Hayes.
3. ComputerArchitectureAQuantitativeapproach3rdEditionJohnL.Hennessy&David A. Patterson Morgan Kufmann (An Imprint of Elseveir)

CourseCode&Title:23MCAT105OPERATINGSYSTEMS

Semester: I

CourseIndex:C105

Course Objectives:

Thelearningobjectivesofthiscourseare:

CourseObjectives
LearntheconceptofIntroductiontoOperatingSystemsandProcessManagement.
LearnaboutProcessSynchronizationandDeadlocksindetail.
LearnabouttheconceptofMemoryManagementandvirtualmemory.
LearnabouttheconceptofFileSystemImplementation,Mass-storagestructure.
LearntheconceptofProtectionandCaseStudy.

Course Outcomes:

Bytheendofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C105.1	Understandtheconcept ofIntroductiontoOperatingSystemsandProcess Management.
C105.2	UnderstandaboutProcessSynchronizationandDeadlocksindetail.
C105.3	UnderstandaboutProcessmemorymanagementandvirtualmemory
C105.4	UnderstandabouttheconceptofFileSystemImplementation,Mass-storage structure.
C105.5	UnderstandtheconceptofProtectionandCaseStudy.

23MCAT105OPERATINGSYSTEMS

Instruction:4Periods/week **Time:3 Hours** **Credits:4**
Internal:30Marks **External:70Marks** **Total:100Marks**

UNITI

Introduction: DefinitionofOperatingSystem, TypesOfOperatingSystems, OperatingSystem Structures, Operating-System Services, System Calls.

Process Management: Process Concepts, Operations on Processes, Cooperating Processes, Threads,InterProcessCommunication,ProcessScheduling,Scheduling Algorithms,Multiple - Processor Scheduling. Thread Scheduling.

UNITII

ProcessSynchronization: TheCriticalSectionProblem,Semaphores,AndClassicalProblemsof Synchronization, Critical Regions, Monitors, Synchronization examples.

Deadlocks: Principles of Deadlocks, System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance, Detection&RecoveryfromDeadlocks.

UNITIII

MemoryManagement: LogicalVersusPhysicalAddress,Swapping,ContiguousMemory Allocation, Paging, Structure of the Page Table, Segmentation.

VirtualMemory:Introduction,DemandPaging,PageReplacementAlgorithms,Thrashing.

UNITIV

File System Implementation: Concept of a file, Access Methods, Directory Structure, File System Structure, Allocation Methods, Free Space Management, Directory Management, Device Drivers.

Mass-storage structure: overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management.

UNITV

Protection: GoalsandPrinciplesofProtection,Accessmatriximplementation,Accesscontrol,Revocationof access rights.

Casestudy:LINUX,WindowsOperatingSystems.

TextBook:

1. OperatingSystemPrinciplesbyAbrahamSilberschatz,PeterGalvin,GregGagne. Seventh Edition, Wiley Publication

ReferenceBooks:

1. OperatingSystems,WilliamStallings5thEdition-PHI
2. ModernOperatingSystems,AndrewS.Tanenbaum,2ndedition,1995,PHI.
3. OperatingSystems-Aconceptbasedapproach,Dhamdhere,2ndEdition,TMH,2006.
4. UnderstandingtheLinuxKernel,DanielPBovetandMarcoCesati,3rdEdition,'Reilly,2005.

CourseCode&Title:23MCAT106DESIGNANDANALYSISOFALGORITHMS **Semester:I** **CourseIndex:C106**	
Course Objectives: Thelearningobjectivesofthiscourseare:	
CourseObjectives	
TolearnabouttheAsymptoticNotations,MathematicalAnalysisofNon-recursiveandrecursive Algorithms and sorting techniques.	
TolearnabouttheDivide-and-Conquertechnique,Decrease-and-ConquerandTransform-and-Conquer techniques.	
TolearnabouttheDynamicProgramming.	
TolearnaboutGreedyTechnique,theDecisionTrees,P,NPandNP-completeproblems.	
TolearnaboutBacktracking,Branch-and-Bound,ApproximationAlgorithmsforNP-hardProblems.	
Course Outcomes: Bytheendofthecourse,thestudentwillbe	
C106.1	UnderstandabouttheAsymptoticNotations,MathematicalAnalysisofNon-recursive and recursive Algorithms and
C106.2	Selection Sort and Bubble sort, Sequential Search and Exhaustive Search.UnderstandabouttheDivide-and-Conquertechnique,Decrease-and-Conquer.
C106.3	Transform-and-Conquertechniques.UnderstandtheOptimalBinarySearchTrees, The Knapsack Problem.
C106.4	Prim'sAlgorithm,Kruskal'sAlgorithm,Dijkstra'sAlgorithm. UnderstandabouttheDecisionTrees,P,NPandNP-completeproblems,
C106.5	Backtracking,Branch-and-Bound,ApproximationAlgorithmsforNP-hard Problems.

23MCAT106DESIGNANDANALYSISOFALGORITHMS

Instruction: 4Periods/week **Time:3Hours** **Credits: 4**
Internal: 30Marks **External: 70Marks** **Total:100Marks**

UNITI

Introduction: Fundamentals of algorithmic problem solving, important problem types.

Fundamentalsofanalysisofalgorithmsandefficiency: Analysisframework,Asymptotic Notations and Basic Efficiency classes, Mathematical Analysis ofNon-recursive Algorithms, Mathematical Analysis of recursive Algorithms, Empirical Analysis of Algorithms, Algorithm Visualization.

UNITII

BruteForce: SelectionSortandBubblesort,SequentialSearchandExhaustiveSearch.

Divide-and-Conquer: MergeSort,Quicksort, BinarySearch, BinaryTreeTraversalsand Related Properties.

Decrease-and-Conquer: InsertionSort,Depth-FirstSearchandBreadth-FirstSearch-Topological Sorting, Decrease-by-a-Constant-Factor Algorithms.

UNITIII

Transform-and-Conquer: BalancedSearchTrees,HeapsandHeapsort,Problem Reduction.

DynamicProgramming: Warshall'sandFloyd'sAlgorithm,OptimalBinarySearchTrees,The0/1 Knapsack Problem and Memory Functions.

UNITIV

GreedyTechnique: Prim'sAlgorithm,Kruskal'sAlgorithm,Dijkstra'sAlgorithm

LimitationsofAlgorithmPower: DecisionTrees,P,NPandNP-completeproblems.

UNITV

CopingwiththeLimitationsofAlgorithmsPower:**Backtracking**-n-queensproblem, Hamiltonian circuit problem, Subset-sum problem.

Branch-and-Bound-TheKnapsackProblem,TravellingsalespersonProblem,

ApproximationAlgorithmsforNP-hardProblems.

TextBook:

1. IntroductiontoDesign&AnalysisofAlgorithmsbyAnanyLevitin,Pearson Education, New Delhi, 2003

ReferenceBooks:

1. IntroductiontoAlgorithmsbyThomasH.Corman, CharlesE.Leiserson,RonaldR. Rivest& Clifford Stein, Prentice Hall of India, NewDelhi.
2. TheDesignandAnalysisofcomputerAlgorithms,Aho,Hopcroft&Ullman, Pearson Education, New Delhi, 2003
3. Fundamentalsofalgorithmics,GillesBrassard&PaulBratley,PrenticeHallof India, NewDelhi

CourseCode&Title:23MCAP107CPROGRAMMINGANDDATASTRUCTURESLAB
Semester:I
CourseIndex:C107

CourseObjectives: Thelearningobjectivesofthiscourse are:

CourseObjectives
Learnhowtowritecodefordifferenttypesofprogramsusing CProgramming.
LearnhowtowritecodeprogramsofDataStructures.
Learnhowtowrite/codeandownprogramsusingCProgramming.

Course Outcomes:
Bytheendofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C107.1	AbletowritecodefordifferenttypesofprogramsusingCProgramming.
C107.2	AbletowritecodeprogramsofDataStructures.
C107.3	Thestudentsareabletowrite/codeandownprogramsusingCProgramming.

23MCAP107:CPROGRAMMINGANDDATASTRUCTURESLAB

Instruction: 3Hrs/week	**Time:3Hours**	**Credits: 2**
Internal:50Marks	**External:50Marks**	**Total:100Marks**

1. Write a C program to read x, y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What is the output from your program if the three given points are in a straight line?
2. Write a C program which generates 100 random numbers in the range of 1 to 100. Store them in an array and then print the array. Write 3 versions of the program using different loop constructs (eg. for, while and do-while).
3. Write a programwhich determines the largest and the smallest number that can be stored in different datatypes like short, int, long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?
4. Write a C program which generates 100 random real numbers in the range of 10.0 to 20.0 and sort them in descending order.
5. Write a C function fortransporting a square matrix in place (in place means that you are not allowed to have full temporary matrix).
6. WriteaCfunction,whichwillinvertamatrix.
7. Write a set of string manipulation functions eg. for getting a sub-string from a given position, copying one string to another, reversing a string and adding one string to another.
8. WriteaCprogramforsortingalistusingBubblesortandthenapplybinarysearch.
9. WriteaCprogramtoimplementtheoperationsonstacks.
10. WriteaCprogramtoimplementtheoperationsoncircular queues.
11. WriteaCprogramfortherepresentationofpolynomialsusingcircularlinkedlistandforthe addition of two such polynomials.
12. WriteaCprogramforquicksort.
13. WriteaCprogramforMergesort.
14. WriteaCprogramtocreateabinarysearchtreeandforimplementingtheinorder, preorder, Post order traversal using recursion.
15. WriteaCprogramforfindingtheDepthFirstSearchofagraph.
16. WriteaCprogramforfindingtheBreadthFirstSearchofagraph.

REFERENCEBOOKS:

1. LetUsC,YashwantKanetkar,BPBPublications,5thEdition.
2. ComputerScience,AstructuredprogrammingapproachusingC",B.A.Forouzanand R.F.Gilberg, 3rd Edition, Thomson, 2007.
3. TheC–ProgrammingLanguage'B.W.Kernighan,DennisM.Ritchie,PHI
4. DataStructuresandAlgorithms,2008,G.A.V.Pai,TMH
5. ClassicDataStructures,2/e,Debasis,Samanta,PHI,2009

CourseCode&Title:23MCAP108OPERATINGSYSTEMSAND COMPUTER ORGANIZATION LAB

Semester:I

CourseIndex:C108

Course Objectives:

Thelearningobjectivesofthiscourseare:

CourseObjectives
LearnhowtowritecodeinUNIXoperatingsystemusingsomebasiccommands.
LearnhowtowritecodesomebasicprogramsusingShellProgramming.
Learnhowtowrite/codedifferenttypesofalgorithmsusingC/C++/JAVA.
LearnhowtodoDigitalLogicDesignExperiments
Learnhowtodo8085/86AssemblyLanguagePrograms

Course Outcomes:

Bytheendofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C108.1	ThestudentsabletowritecodeinUNIXoperatingsystemusingsomebasic commands.
C108.2	ThestudentsabletowritecodesomebasicprogramsusingShellProgramming.
C108.3	Thestudentsareabletowrite/codedifferenttypesofalgorithmsusing C/C++/JAVA.
C108.4	ThestudentsabletodoDigitalLogicDesignExperiments
C108.5	Thestudentsabletowrite8085/86AssemblyLanguagePrograms

23MCAP108OPERATINGSYSTEMSANDCOMPUTERORGANIZATIONLAB

Practical:3Periods/week **Time:3Hours** **Credits:2**
Internal:50Marks **External:50Marks** **Total:100Marks**

OPERATINGSYSTEMSLAB

1. BasicUNIXcommands

ImplementthefollowingusingShellProgramming

2. Inputnumberevenorodd.
3. Countthenumberoflinesintheinputtext.

ImplementthefollowingusingC/C++/JAVA

4. FCFSCPUschedulingalgorithm.
5. SJFCPUschedulingalgorithm.
6. RoundRobinCPUschedulingalgorithm.
7. PriorityCPUschedulingalgorithm.
8. ImplementSemaphores.

REFERENCEBOOKS:

1. OperatingSystemPrinciplesbyAbrahamSilberschatz,PeterGalvin,GregGagne.
Seventh Edition, Wiley Publication
2. UnderstandingtheLinuxKernel,DanielPBovetandMarcoCesati,3rdEdition,Reilly,2005.
3. Unixprogramming,Stevens,Pearson Education.
4. Shellprogramming,YashwanthKanetkar.

COMPUTERORGANIZATIONLAB

DigitalLogicDesignExperiments

1. TTLCharacteristicsandTTLICGates
2. Multiplexers&Decoders
3. Flip-Flops
4. Counters
5. BinaryAdders&Subtractors

8085/86AssemblyLanguageProgramming:

1. Additionoftwo8bitnumbers.
2. Additionoftwo16bitnumbers.
3. Sumofseriesof8bitnumbers.
4. Subtractionoftwo8bitnumbers.
5. Largestnumberinanarray.

REFERENCEBOOKS:

1. ComputerSystemArchitecture:MorrisMano.
2. AdvancedMicroProcessorandPeripherals-Hall/AKRay.
3. ComputerOrganizationandArchitecture–WilliamStallingsSixthEdition,Pearson/PHI.
4. StructuredComputerOrganizationandDesign-AndrewS.Tanenbaum,4th Edition PHI/Pearson.

CourseCode&Title:23MCAT110BRIDGECOURSE FUNDAMENTALS OF COMPUTERS
Semester:I
CourseIndex:C110

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives
Learntheconcept ofinput andoutput devicesofComputersandhowit worksandrecognizethebasic terminology used in computer programming
Learntodeveloptechniquesofwritingalgorithmspseudocodesandlogic
LearntoSummarizetheconceptsofOperating Systems.
LearntoRecognizetheComputernetworks, typesof networksandtopologies, networkdevicesand introduction to internet and email
LearntoProblemSolvingandProgramming.

Course Outcomes:
Bytheendofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C110.1	Explaintheconceptofinputandoutputdevices ofComputersandhowitworks and recognize the basic terminology used in computer programming
C110.2	Abletodeveloptechniquesofwritingalgorithmspseudocodes andlogic
C110.3	SummarizetheconceptsofOperatingSystems.
C110.4	RecognizetheComputernetworks,typesofnetworksandtopologies, network devices andintroduction to internet and email.
C110.5	AbletoProblemSolvingandProgramming.

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BRIDGE COURSE

(ForGeneralB.Sc/B.A./B.ComStudents)

FUNDAMENTALSOFCOMPUTERS

Theory:3Hrs/Week **Credits:4**

Internal:30 Marks **External:70Marks** **Total:100Marks**

UNIT-I

Introduction to Computers: History of Computers, Central processing unit, Characteristics andlimitationsofcomputer,TypesofComputers,Typesofmemories.Blockdiagramof Computer,PeripheralDevices:Input,Outputandstorage,Inputdevices,Outputdevices, Secondarydevices,CommunicationbetweentheCPUandInput/Outputdevices.Software:Types of software. Number Systems (Binary, Octal, Hexadecimal).

UNIT-II

Operating System: Introduction to OS, Types of OS, Functions of OS, Evolution of Operating Systems - Simple Batch, Multi programmed, time-shared, Parallel, Distributed Systems, Real- Time Systems. MSDOS Internal Commands: chdir, cls, path, prompt, label, ver, vol, echo, set. External Commands: scandisk, discopy, diskcomp, format, backup, restore, Operating System installation steps.

UNIT-III

MS-Office Tools (Word, Excel & PowerPoint): Introduction of Word Processing, MSWord: Creating, Editing, printing, page formatting, inserting tables, pictures, Mail Merge. MS Excel: Introduction to spreadsheet, creating, formatting, printing, usage of formulae, Graphs of worksheets. MS PowerPoint: Creating a presentation with designs and animations.

UNIT IV

ComputerNetworks: Introductionto computer Networks, Networktopologies -Bus topology,star topology, Ring topology, Mesh topology, Hybrid topology. Types of Networks: Local area Network, Wide Area Networks, Metropolitan Networks, Campus/ Corporate Area Network, Personal Area Network. Network Devices: Hub, Repeater, Switch, Bridge, Router, Gateway, Network interface Card.

Introduction to Internet: Web Browsers, Searching and Surfing, Creating an E-Mail account, sendingandreceivingE-Mails. WebBrowsers, SearchingandSurfing, CreatinganE-Mailaccount, sending and receiving E-Mails.

UNIT V

ProblemSolvingandProgramming: Algorithmdevelopment,Flowcharts,Looping, some programmingfeatures, Pseudo code, Structured Programming concepts.

ProgrammingLanguages: MachineLanguageandassemblylanguage,high-levelandlowlevel languages, Assemblers, Compilers and Interpreters.

TEXTBOOKS:

An Introduction to Computer studies –Noel Kalicharan-Cambridge. FundamentalsofComputers– ReemaThareja-Oxfordhighereducation.

Silberschatz,GalvinandGagne,"OperatingSystemsConcepts",Wiley.

ComputerNetworks: Tannenbau

REFERENCEBOOKS:

PeterNorton_s,IntroductiontoComputers,TataMcGrawHill.

ComputerFundamentals,AnitaGoel,PearsonEducation,2017.

CourseCode&Title:23MCAP111BRIDGECOURSELAB
FUNDAMENTALS OF COMPUTERS
Semester:I
CourseIndex:C111

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives
LearnandUnderstandabouttheinternalpartsofcomputer,peripherals,I/Oports,connecting cables
LearntoinstallOperatingSystem,abletowritebasiccommand line interfacecommandson MSDOS
LearnaboutInternet,Browsing,Email
LearntoworkonOfficeToolssuchas Wordprocessors, Spreadsheetsand Presentation tools
LearntoWriteAlgorithms,FlowChartsforsimpleprogramsin C

Course Outcomes:
Bythe endofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C111.1	Understandabouttheinternalpartsofcomputer,peripherals,I/Oports, connecting cables
C111.2	AbletoinstallOperatingSystem,abletowritebasiccommand line interface commands on MSDOS
C111.3	KnowaboutInternet,Browsing, Email
C111.4	AbletoworkonOfficeToolssuchasWordprocessors, Spreadsheets and Presentation tools
C111.5	AbletoWriteAlgorithms,FlowCharts forsimple programsinC

SVKP&DrKSRAJUA&SCOLLEGE(A)::PENUGONDA

23MCAP111-BRIDGECOURSELAB
(ForGeneralB.Sc/B.A./B.ComStudents)

FUNDAMENTALSOFCOMPUTERS

Theory:3Hrs/Week		**Credits:2**
Internal:50 Marks	**External:50Marks**	**Total:100Marks**

ComputerHardware:

Experiment1:IdentificationofperipheralsofaPC,Laptop,ServerandSmartPhones
Experiment 2:Preparareport containingtheblockdiagramalong with theconfigurationof eachcomponent and its functionality, Input/ Output devices, I/O ports and interfaces, main memory, cache memory and secondary storage technologies, digital storage basics, networking components and speeds.

OperatingSystems:

Experiment 3:OperatingSysteminstallation: InstallinganOperatingSystemsuchas Windows on Computer hardware.
Experiment4:MSDOSOperatingSystemInternalCommands:chdir,cls,path,prompt,label,ver,vol, echo, set.
Experiment 5:MSDOSOperatingSystemExternalCommands:scandisk,discopy,diskcomp,format, backup, restore

IntroductionofInternet:

Experiment6:WebBrowsers,SearchingandSurfing,CreatinganE-Mailaccount,sendingand receiving E-Mails.

OfficeTools:

Experiment7:OfficeTools:DemonstrationandpracticeonMicro soft word.

Experiment 8:Demonstration and practice on Microsoft Excel.

Experiment9:DemonstrationandpracticeonPowerPoint.

IntroductiontoProgramming:

Experiment10:WritesimpleCProgramswith AlgorithmsandFlow Charts

SVKP&DrKSRAJUA&SCOLLEGE(A)::PENUGONDA

MasterofComputerApplications(w.e.f.2023)

Course Structure & Syllabus for AB 2023-24

Semester II (First Year) Curriculum

Code	CourseTitle	MaxMarks		Total Marks	Hoursperweek		Credits
		External	Internal		Theory	Practical	
23MCAT201	ComputerNetworks	70	30	100	4	-	4
23MCAT202	Object Oriented Programmingthrough JAVA	70	30	100	4	-	4
23MCAT203	DatabaseManagement Systems	70	30	100	4	-	4
23MCAT204	FormalLanguagesand Automata Theory	70	30	100	4	-	4
23MCAT205	DataMiningConceptsand Techniques	70	30	100	4	-	4
23MCAT206	Elective-I 1. ArtificialIntelligence and Expert Systems 2. InternetofThings 3. ImageProcessing	70	30	100	4	-	4
23MCAP207	ObjectOriented Programmingthrough JAVA Lab	50	50	100	-	3	2
23MCAP208	DatabaseManagement Systems Lab	50	50	100	-	3	2
23MCAP209	SkillDevelopmentCourse with Python	50	50	100	1	2	2
	TotalCredits						30

Note:2labHrs and1TheoryHrs/Weekor2TheoryHrs/WeekforSkillDevelopmentCourseandonlyLab Examwillbeconducted.

SummerInternship(Mandatory)afterFirstYear(tobeevaluatedduringIIISemester).

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CourseCode&Title:23MCAT201COMPUTERNETWORKS Semester: II **CourseIndex: C201**	
Course Objectives: Thelearning objectivesofthiscourseare:	
CourseObjectives	
TolearnaboutthebasicsofcomputernetworksandDataCommunication.	
TolearnaboutDataLinkLayerandIEEEStandards	
TolearnaboutdesignissuesinNetworksandInternet transport protocols	
TolearnaboutvariousApplicationlayer protocols	
TolearnaboutvarioustypesofNetworkDevicesanddifferenttypesofNetworks	
CourseOutcomes: Bytheendofthe course,the studentwillbe	
C201.1	UnderstandthebasicsofcomputernetworksandDataCommunication.
C201.2	UnderstandaboutDataLinkLayerandIEEE Standards
C201.3	UnderstandthedesignissuesinNetworksandInternettransport protocols
C201.4	UnderstandvariousApplicationlayerprotocols.
C201.5	OverviewofvarioustypesofNetworkDevicesanddifferenttypesofNetworks

23MCAT201COMPUTERNETWORKS

Instruction:4Hrs/week	**Time:3 Hours**	**Credits:4**
Internal: 30Marks	**External: 70Marks**	**Total:100Marks**

UNIT I

IntroductiontoComputerNetworks: Introduction,NetworkHardware,Network Software, ReferenceModels, DataCommunicationServices &NetworkExamples, Internet Based Applications.

Data Communications: Transmission Media, Wireless Transmission, Multiplexing, Switching, Transmission in ISDN, Broad Band ISDN, ATM Networks

UNITII

Data Link Layer : Data Link Control, Error Detection & Correction, Sliding Window Protocols, LANs & MANs: IEEE Standards for LANs& MANs-IEEE Standards 802.2, 802.3, 802.4, 802.5, 802.6, High Speed LANs.

UNITIII

Design Issues in Networks: Routing Algorithms, Congestion Control Algorithms, Network Layer in the Internet, IP Protocol, IP Address, Subnets, and Internetworking.

InternetTransportProtocols: TransportService, ElementsofTransportProtocols, TCP and UDP Protocols, QualityofService Model, Best Effort Model, Network Performance Issues.

UNITIV

Application Layer : Over View of DNS, SNMP, Electronic Mail, FTP, TFTP, BOOTP, HTTP Protocols, World Wide Web, Firewalls.

UNITV

Network Devices: Over View of Repeaters, Bridges, Routers, Gateways, Multiprotocol Routers, Brouters, Hubs, Switches, Modems, Channel Service Unit CSU, Data Service Units DSU, NIC, Wireless Access Points, Transceivers, Firewalls, Proxies.

Overview of Cellular Networks, Ad-hoc Networks, Mobile Ad-hoc Networks, Sensor Networks

TextBooks:

1. ComputerNetworks,AndrewsSTanenbaum, Edition5,PHI,ISBN:-81-203-1165-5
2. DataCommunicationsandNetworking,BehrouzAForouzan,TataMcGraw-HillCo Ltd, Second Edition

ReferenceBooks:

1. ComputerNetworks,MayankDave,Cengage.
2. ComputerNetworks, ASystemApproach, 5thed, LarryLPetersonandBruceSDavie, Elsevier.
3. AnEngineeringApproachtoComputerNetworks-S.Keshav,2ndEdition,Pearson Education.
4. UnderstandingCommunicationsandNetworks,3rdEdition,W.A.Shay,Thomson.

CourseCode&Title:23MCAT202ObjectOrientedProgrammingthroughJAVA

Semester:

IICourseIndex:C20

2

Course Objectives:

Thelearning objectivesofthiscourseare:

CourseObjectives
LearnIntroductiontobasicconceptsof OOP.
LearnaboutInheritance,Interfaces, PackagesandEnumeration.
LearnaboutExceptionsandMultiThreading.
LearnaboutAppletsandEvent Handling.
LearnaboutAbstractWindowToolkitandSwings.

CourseOutcomes:

Bytheendofthe course,the studentwillbe

CourseIndex	CourseOutcomes
C202.1	UnderstandIntroductiontobasicconceptsofOOP.
C202.2	UnderstandaboutInheritance,Interfaces,PackagesandEnumeration.
C202.3	UnderstandaboutExceptionsandMultiThreading.
C202.4	UnderstandaboutAppletsandEvent Handling.
C202.5	UnderstandaboutAbstractWindowToolkitandSwings.

23MCAT202 Object Oriented Programming through JAVA

Instruction: 4 Periods/week **Time: 3 Hours** **Credits:4**
Internal: 30 Marks **External: 70 Marks** **Total:100Marks**

UNIT I

Introduction to OOP :Introduction, Principles of Object Oriented Languages, Applications of OOP, Programming Constructs: Variables, Primitive Data types, Identifiers- Naming Conventions, Keywords, Literals, Operators-Binary, Unary and ternary, Expressions, Precedence rules and Associativity, Primitive Type Conversion and Casting, Flow of control-Branching, Conditional, loops. Classes and Objects- classes, Objects, Creating Objects, Methods, constructors-Constructor overloading, cleaning up unused objects-Garbage collector, Class variable and Methods-Static keyword, this keyword, Arrays, Command line arguments.

UNITII

Inheritance: Types of Inheritance, Deriving classes using extends keyword, Method overloading, super keyword, final keyword, Abstract class.

Interfaces, Packages and Enumeration: Interface-Extending interface, Interface Vs Abstract classes, Packages-Creating packages, using Packages, Access protection, java.lang package.

UNITIII

Exceptions & Assertions : Introduction, Exception handling techniques- try… catch, throw, throws, finally block, user defined exceptions, Exception Encapsulation and Enrichment, Assertions.

MultiThreading: java.lang.Thread, The main Thread, Creation of new threads,Thread priority, Multithreading- Using isAlive () and join (), Synchronization, suspending and Resuming threads, Communication between Threads. **Input/Output**: reading and writing data, java.io package.

UNITIV

Applets– Applet class, Applet structure, An Example Applet Program, Applet Life Cycle, paint(), update() and repaint().

Event Handling -Introduction, Event Delegation Model, java.awt.eventDescription, Sources ofEvents, Event Listeners, Adapter classes, Inner classes.

UNITV

Abstract Window Toolkit :Why AWT?, java.awt package, Components and Containers, Button, Label, Checkbox, Radio buttons, List boxes, Choice boxes, Text field and Text area, container classes, Layouts, Menu, Scroll bar.

Swing:Introduction, JFrame, JApplet, JPanel, Components inswings, Layout Managers, JList and JScrollPane, Split Pane, JTabbedPane, Dialog Box Pluggable Look and Feel.

TextBooks:

1. ProgramminginJAVA,SachinMalhotra,Saurabhchoudhary,Oxford.
2. TheCompleteReferenceJava,8ed,HerbertSchildt,TMH

References:

1. JAVAforBeginners,4e,JoyceFarrell,AnkitR.Bhavsar,CengageLearning.
2. IntroductiontoJavaprogramming, 7thed, YDanielLiang,Pearson.

CourseCode&Title:20MCAT203DATABASEMANAGEMENTSYSTEMS **Semester:** **IICourseIndex:C20** **3**	
Course Objectives: Thelearning objectivesofthiscourseare:	
CourseObjectives	
TolearnabouttheIntroductionofDatabaseSystem,DataModelingUsingtheEntity- Relationship Model.	
TolearnaboutRelationalDataModelandRelationalDatabaseConstraints, Relational Algebra and RelationalCalculus, Schema Definition, Basic Constraints and Queries.	
Tolearnaboutmapping fromERtoRelational, EERtorelational, SchemaDefinition, Basic Constraints and Queries.	
TolearnaboutRelationalDatabaseDesign, Indexing Structuresforfiles.	
TolearnaboutTransactionProcessing,ConcurrencyControlTechniques.	
CourseOutcomes: Bytheendofthe course,the studentwillbe	
C203.1	AbletounderstandtheIntroductionofDatabaseSystem,DataModeling Using the Entity-Relationship Model
C203.2	AbletounderstandRelationalDataModelandRelationalDatabase Constraints, Relational Algebra and Relational Calculus.
C203.3	Abletomapping fromERto Relational,EERtorelational,Schema Definition, Basic Constraints and Queries
C203.4	AbletounderstandRelationalDatabaseDesign,Indexing Structuresfor files
C203.5	AbletounderstandTransactionProcessing,ConcurrencyControl Techniques

23MCAT203DATABASEMANAGEMENTSYSTEMS

Instruction: 4Periods/week	**Time:3 Hours**	**Credits:4**
Internal:30 Marks	**External:70Marks**	**Total:100Marks**

UNITI

Database and Database Users: Data models, schemas, and instances, three-schemas architecture and data independence, database languages and interfaces, the database system environment, Centralized and client/server architectures for DBMSs, Classification of database management system.

Data Modeling Using the Entity-Relationship Model: Using High—Level Conceptual data model, Entity types, entity sets, Attributes and keys, Relationships types, relationship sets, roles and structural constraints, Weak Entity types, ER diagrams Meaning conventions and design issues, Enhance EntityRelationship model.

UNITII

Relational data model and relational database constraints: Relational model constraints and relational schemas, update operations.

Relational Algebra and Relational Calculus: Unary Relational operations, Relational Algebra operations, BinaryRelationaloperation, Additional Relationaloperation, Examples of Queries in Relational Algebra, Domain Relational Calculus.

UNITIII

Relational database design by ER and EER Relational Mapping: Relational database design using ER to Relational Mapping, Mapping EER Model Construct to Relations, **Schema Definition, Basic Constraints and Queries:** SQL Data definition, Specifying basic constraints in SQL, Schema change Statements in SQL, Basic queries in SQL, More complex SQL queries, INSERT DELETE UPDATE queries in SQL, Views in SQL, Data base stored Procedures

UNITIV

Relational Database Design: Informal design Guide lines for Relation Schema, Functional Dependences, Normal forms based on Primary keys,General definitions of Second and Third Normal form, BOYCE-CODE Normal form, Algorithm for Relational database schema design, Multi-valued dependencies and fourth Normal forms,

File Organization and Indexes: Introduction, Secondary Storage Devices, Buffering Blocks, placing file records on disk, Operations on Files, Hashing Techniques, Parallelizing Disk Access using RAID Technology, Indexing Structures for files.

UNITV

Algorithm for query processing and Optimization: Translating SQL Queries into Relational Algebra, Algorithms for SELECT and JOIN Operations, Algorithms for PROJECT and SET Operations,

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Process, Transaction and System Concepts, Characterizing Schedules, Concurrency Control Techniques, Database Recovery Concepts, RecoveryTechniques.

TextBook:

1. FundamentalsofDatabaseSystem,Elmasri,Navathe,PearsonEducation.

ReferencesBooks:

1. DatabaseManagement Systems,RaghuRamakrishnan,JohannesGehrke,McGraw-Hill.
2. DatabaseConcepts,AbrahamSilberschatz,HenryFKorth, SSudarshan,McGraw-Hill

CourseCode&Title:23MCAT204FORMALLANGUAGES&AUTOMATA THEORY
Semester:
IICourseIndex:C20
4

Course Objectives:
Thelearning objectivesofthiscourseare:

CourseObjectives
Learntheconcept ofFiniteAutomataandRegularExpressions,
LearntheconceptofRegularsets&RegularGrammars.
LearntheconceptofContextFreeGrammarsandLanguages,PushdownAutomata
LearnaboutTuringMachines,UniversalTuringMachinesandUndecidabilityindetail.
LearntheconceptofThePropositionalcalculus andThePredicatecalculus.

CourseOutcomes:
Bytheendofthecourse,the studentwillbe

CourseIndex	CourseOutcomes
C204.1	UnderstandtheconceptofFiniteAutomataandRegular Expressions .
C204.2	UnderstandtheconceptofRegularsets&Regular Grammars
C204.3	Understandtheconcept ofContextFreeGrammarsandLanguages, Pushdown Automata
C204.4	UnderstandaboutTuringMachines,UniversalTuringMachinesand Undecidabilityindetail.
C204.5	Understandtheconcept ofThePropositionalcalculusandThePredicate calculus.

23MCAT204 FORMALLANGUAGES&AUTOMATA THEORY

Instruction:4Periods/week **Time:3Hours** **Credits:4**
Internal:30 Marks **External:70Marks** **Total:100Marks**

UNIT-I

Finite Automata and Regular Expressions: Basic Concepts of Finite StateSystems, Chomsky Hierarchy of Languages, Deterministic and Non-Deterministic Finite Automata, Finite Automata with ϵ-moves, Regular Expressions.

UNIT-II

Regular sets &Regular Grammars: Basic Definitions of Formal Languages and Grammars, Regular Setsand Regular Grammars, Closure Properties ofRegular Sets, Pumping Lemma for Regular Sets, Decision Algorithm for Regular Sets, Minimization of Finite Automata.

UNIT-III

Context Free Grammars and Languages: Context Free Grammars andLanguages, Derivation Trees, simplification of Context Free Grammars, Normal Forms, Pumping Lemma for CFL, Closure properties of CFL's.

Push down Automata: Informal Description, Definitions, Push-Down Automata and Context free Languages, Parsing and Push-Down Automata.

UNIT-IV

Turing Machines: The Definition of Turing Machine, Design and TechniquesforConstruction of Turing Machines, Combining Turing Machines.

Universal Turing Machines and Undecidability: Universal Turing Machines. The Halting Problem, Decidable & Undecidable Problems - Post Correspondence Problem.

UNIT-V

The Propositional calculus: The Prepositional Calculus : Introduction – Syntax of the Prepositional Calculus – Truth-Assignments – Validity and Satisfiability – Equivalence and Normal Forms – resolution in Prepositional Calculus.

The Predicate calculus: Syntax of the Predicate Calculate Calculus – Structures and Satisfiability – Equivalence – Un-solvability and NP-Completeness.

TEXTBOOKS:

1. IntroductiontoAutomataTheory,Languagesand Computations –J.E.Hopcroft,&J.D. Ullman , Pearson Education Asia.
2. ElementsofTheTheoryOfComputation, HarryRLewis, Cristosh. Papadimitriou, Pearson Education / Prentice-Hall of India Private Limited.

REFERENCEBOOKS:

1. Introductiontolanguages and theoryofcomputation– JohnC.Martin(MGH)
2. TheoryofComputation,KLPMishraandN.Chandra Sekhar,IVthEdition,PHI
3. IntroductiontoTheoryofComputation–MichaelSipser(ThomsonNrools/Cole)

CourseCode&Title:23MCAT205DATAMININGCONCEPTSANDTECHNIQUES
Semester:
IICourseIndex:C20
5

Course Objectives:
Thelearning objectivesofthiscourseare:

CourseObjectives
TolearnabouttheoverviewofDataWarehouseandOLAPtechnology,DataPreprocessing.
TolearnabouttheDataTransformationandData Discretization, IntroductiontoDataMining.
Tolearnaboutthe GettingtoknowyourData,ConceptDescription.
TolearnabouttheMiningFrequentPatterns,AssociationsandCorrelations, ClassificationBasicConcepts
TolearnabouttheBayesClassificationMethods, ClassificationbyBackPropagation,Cluster Analysis.

CourseOutcomes:
Bythe endofthe course,thestudentwillbe

CourseIndex	CourseOutcomes
C205.1	Abletounderstandabout overview ofDataWarehouseandOLAPtechnology, Data Preprocessing.
C205.2	AbletounderstandabouttheDataTransformationandDataDiscretization, Introduction to Data Mining.
C205.3	AbletounderstandabouttheGettingtoknowyourData,Concept Description.
C205.4	AbletounderstandabouttheMiningFrequentPatterns,Associationsand Correlations, Classification Basic Concepts
C205.5	AbletounderstandabouttheBayesClassificationMethods,ClassificationbyBack Propagation, Cluster Analysis.

23MCAT205DATAMININGCONCEPTSANDTECHNIQUES

Instruction:4Periods/week	**Time:3Hours**	**Credits:4**
Internal:30Marks	**External:70Marks**	**Total:100Marks**

UNIT I

Data Warehouse and OLAP Technology: An overview Data Warehouse Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Implementation

DataPreprocessing:AnOverview,DataCleaning, DataIntegration,DataReduction

UNITII

DataTransformationandDataDiscretization,FromDataWarehousingtoDataMining.

Introduction to Data Mining: Motivation and importance, what is Data Mining, Data Mining onwhat kind ofdata, what kinds ofpatterns can be mined, whichtechnologies are used, which kinds ofapplications are targeted, Major issues in Data Mining.

UNITIII

Getting to know your Data: Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring data Similarityand Dissimilarity

Concept Description: Characterization and comparison What is Concept Description, Data Generalization by Attribute-Oriented Induction(AOI), AOI for Data Characterization, Efficient Implementation of AOI, AOI for Class comparisons.

UNITIV

Mining Frequent Patterns, Associations and Correlations: Basic Concepts,Frequent Itemset Mining Methods: Apriori method, generating Association Rules, Improving the Efficiency of Apriori, Pattern-Growth Approach for mining Frequent Item sets, Mining Frequent Itemsets using vertical data format, Mining Closed and Max Patterns.

Classification Basic Concepts: Basic Concepts, Decision Tree Induction: Decision Tree Induction, Attribute Selection Measures, Tree Pruning

UNITV

BayesClassificationMethods,ClassificationbyBackPropagation,Support VectorMachines.

Cluster Analysis: Cluster Analysis, Partitioning Methods, Hierarchal methods, Density based methods-DBSCAN and OPTICS.

TextBook:

1. DataMiningConceptsandTechniques—JiaweiHan,MichelineKamberandJianPei,Morgan Kaufman Publications 3rd edition.

ReferenceBooks:

1. IntroductiontoDataMining–Pang-NingTan,MichaelSteinbach,VipinKumar
2. IntroductiontoDataMining,Adriaan,AddisonWesleyPublication
3. DataMiningTechniques,A.K.Pujari,UniversityPress.

CourseCode&Title:23MCAT206INTERNETOFTHINGS(Elective-I) Semester: II
CourseIndex: C206

Course Objectives:
Thelearning objectivesofthiscourseare:

CourseObjectives
TolearnabouttheIntroductiontoInternetofThings,IoTEnablingTechnologies,IoTLevels & DeploymentTemplatesDomainSpecific IoTs
TolearnabouttheIOT&M2M, SNMP
TolearnabouttheIoTPlatformsDesignMethodology
TolearnabouttheIoTPhysicalDevices&Endpoints
Tolearnabout CloudStorageModels,WAMP,DJango,SkyNetIoTMessagingPlatform.

CourseOutcomes:
Bytheendofthe course,the studentwillbe

CourseIndex	CourseOutcomes
C206.1	Ableto understandabouttheIntroductiontoInternetofThings, IoTEnabling Technologies, IoT Levels & Deployment Templates Domain Specific IoTs
C206.2	Ableto understandabouttheIOT&M2M,SNMP
C206.3	Abletounderstand abouttheIoTPlatformsDesignMethodology
C206.4	Abletounderstand abouttheIoTPhysicalDevices&Endpoints
C206.5	AbletounderstandaboutCloudStorageModels,WAMP,DJango, SkyNetIoTMessaging Platform.

23MCAT206INTERNETOFTHINGS (Elective-I)

Instruction:4Periods/week **Time:3Hours** **Credits: 4**

Internal: 30Marks **External:70Marks** **Total:100Marks**

UNIT-I

Introduction to Internet of Things: Definition & Characteristics ofIoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels &DeploymentTemplates

UNIT-II

IOT&M2M: DomainSpecificIoTs:Home,Cities,Environment,Energysystems,Logistics, Agriculture, Health&Lifestyle. Introduction, M2M, DifferencebetweenIoTandM2M, SDN and NFV for IoT, Need for IoT Systems Management.

UNIT-III

SNMP & NETCONF-YANG & IoT Design Methodology: Simple Network Management Protocol (SNMP), Limitations of SNMP, Network Operator Requirements, NETCONF-YANG, IoT Systems Management with NETCONF-YANG, NETOPEER. **IoT Design Methodology**, Case Studyon IoT System for Weather Monitoring.

UNIT-IV

Motivation for Using Python, IoT Systems : Logical Design using Python,InstallingPython , Python Data Types & Data Structures ,Control Flow , Functions,Modules,Packages, File Handling, Date/Time Operations , Classes ,Python Packages of Interestfor IoT.

IoT Physical Devices & Endpoints: Raspberry Pi , About the Board , Linux on Raspberry Pi, RaspberryPiInterfaces , Programming RaspberryPiwith Python , Other IoT Devices,

UNIT-V

IoT Physical Servers & Cloud Offerings: Introduction to Cloud Storage Models & Communication APIs , WAMP - AutoBahn for IoT, Xively Cloud for IoT, Python Web Application Framework- Django, Designing a RESTful Web API, Amazon Web Services for, SkyNetIoTMessagingPlatform.

Text Book:

1. InternetofThings,A.BahgyaandV.Madisetti,UnivesityPress, 2015

ReferenceBook:

1. FundamentalsofPython, K.A.LambertandB.L.Juneja, CengageLearning,2012

CourseCode&Title:23MCAP207ObjectOrientedProgrammingthroughJAVALab Semester: II
CourseIndex: C207

Course Objectives:
Thelearning objectivesofthiscourseare:

CourseObjectives
LearnhowtowriteprogramsinJavausingOOP.
Learnhowtowriteprogramsrelatedtoreallifescenario.
LearnhowtowriteprogramsinJavausingInheritanceandusingAdapterclasses.

CourseOutcomes:
Bytheendofthe course,the studentwillbe

CourseIndex	CourseOutcomes
C207.1	Studentscanabletowriteprograms inJavausingOOP.
C207.2	Students canabletocodeprogramsrelatedtoreallifescenario.
C207.3	StudentscanabletocodeprogramsinJavausingInheritanceandusing Adapterclasses.

23MCAP207 Object Oriented Programming through JAVA Lab

Instruction: 3 Periods/week **Time: 3 Hours** **Credits: 2**

Internal: 50 Marks **External: 50 Marks** **Total:100Marks**

1.a) WriteAJavaProgramtoprintQuadraticrootsusingcommandlinearguments.

b)Writeajavaprogramtoprintmultiplicationtableusing arrays.

2. Write a java program to find the volume of a Box using method overloading with different number of parameters.

3. Develop anappletinJavathatreceivesanintegerinonetextfield,andcomputes its factorialValue and returns it inanother text field, when the button is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. If Num1 or Num2 is not an integer, the program would throw a Number Format Exception. If Num2 is Zero, program would throw an Arithmetic Exception.Display the exception in a message dialog box.

5. Write a Java programthat implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square ofthe number and prints. Ifthe value is odd,the third thread will print the value of cube of the number.

6. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.

7. Write a Java programto create anabstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains onlythe method print Area () that prints the area ofthe given shape.

8. Writeajavapackageforbookclassandthenimportanddisplaytheresult.

9. WriteaJavaprogramtoillustratethemultipleinheritancebyusingInterfaces.

10. Write a Java programthat handlesallmouse eventsand showsthe event name at the center ofthe window when a mouse event is fired (Use Adapter classes).

TEXTBOOKS

1. JavaThecompletereference,9thedition,HerbertSchildt,McGrawHillEducationPvt.Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

CourseCode&Title:23MCAP208DATABASEMANAGEMENTSYSTEMSLAB **Semester:** **IICourseIndex:C20** **8**	
Course Objectives: Thelearning objectivesofthiscourseare:	
CourseObjectives	
Learnhowto writeSQLqueriesusing DDL,DML,DCLcommands	
Learnhowtowrite SQLqueriesonaggregateand conversion functions	
LearnhowtowritePL/SQLprogramsonexceptionhandling,controlstructures	
Learnhowtowrite PL/SQLprogramsoncursors,procedures,triggers.	
CourseOutcomes: Bytheendofthecourse,the studentwillbe	
C208.1	AbletowriteSQLqueriesusingDDL,DML,DCLcommands
C208.2	Abletowrite SQLqueriesonaggregateandconversionfunctions
C208.3	Abletowrite PL/SQLprogramsonexceptionhandling,controlstructures
C208.4	AbletowritePL/SQLprogramsoncursors,procedures,triggers.

23MCAP208DATABASEMANAGEMENTSYSTEMSLAB

Practical:3Periods/week	**Time: 3Hours**	**Credits: 2**
Internal:50Marks	**External: 50Marks**	**Total:100Marks**

SQL

1) SimplequeriestounderstandDDL,DMLand DCLcommands
2) Creation, altering and dropping of tables and inserting rows in to a table (use constraints while creating tables) examples using SELECT command.
3) Queries(alongwithsubQueries)using ANY, ALL,IN,EXISTS,NOTEXISTS, UNION, INTERSET, Constraints.
4) QueriesusingAggregatefunctions(COUNT,SUM,AVG,MAXandMIN), GROUP BY, HAVING and Creation and dropping ofViews.
5) Queries using Conversion functions like (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap,length, substr and instr), date functions like (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)

PL/SQL

1) Simpleprogramstounderstand PL/SQL
2) Writea PL/SQLprogramtodemonstrateexception–handling
3) DemonstratetheworkingofCOMMIT,ROLLBACKandSAVEPOINT in PL/SQL block.
4) Develop a program that includes the features NESTED IF, CASE and CASE expression.
5) Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE-APPLICATIONERROR.
6) ProgramsusingCURSORS
7) Programsdevelopmentusingcreationofproceduresandfunctions.
8) DevelopProgramsusingBEFOREandAFTERTriggers,RowandStatement Triggers

TextBooks:

1. OracleDatabase11g, JasonPrice,OraclePress
2. OraclePL/SQLforDummies, MichaelRosenblum,PaulDorsey, WileyPublications.

CourseCode&Title:23MCAP209SKILLDEVELOPMENTCOURSEWITHPYTHON
Semester:II
CourseIndex:C209

Course Objectives:
Thelearning objectivesofthiscourseare:

CourseObjectives
Tointroducetothe basicsofPythonProgramminglanguage
TodiscussvariousfunctionsandmethodsofPythonProgramming
TolearnaboutMultithreadProgrammingandGUI Programming
TostudyWebProgramming andDatabaseProgramming

CourseOutcomes:
Bytheendofthecourse,the studentwillbe

CourseIndex	CourseOutcomes
C209.1	AbletounderstandthebasicsofPythonProgramminglanguage
C209.2	Ableto usevariousfunctions andmethodsofPythonProgramming
C209.3	Abletocomprehend MultithreadProgrammingandGUI Programming
C209.4	AbletounderstandWebProgrammingandDatabaseProgramming

23MCAP209SKILLDEVELOPMENTCOURSEWITH PYTHON

Instruction: 3Hrs/week	**Time: 3 Hours**	**Credits: 2**
Internal: 50 Marks	**External: 50 Marks**	**Total:100Marks**

ListofExperiments:

1. WritePythonaprogramthattakesinputandprintsitssum,multiplication,subtraction,divisionand remainder values.
2. WriteaPythonprogramtofindthesquarerootofanumberbyNewton'sMethod.
3. Writea Pythonprogrambiggestofthree numbers.
4. WriteaPythonprogramtofindthesumofdigitsofagivennumber.
5. WriteaPythonprogramtofindtheGCDof two numbers.
6. WriteaPythonprogramtoprintthefollowingpattern.

```
        1
      2   2
    3   3   3
  4   4   4   4
5   5   5   5   5
```

7. WriteaPythonprogramtofindFactorialofagivennumber.
8. WriteaPythonprogramtoprintalltheprimenumbersbelowthegivennumber.
9. WriteaPythonprogramtocountthenumbersof charactersinthestringusingloop.
10. Writea Pythonprogramtoreada stringfromtheuser andprint lower casecharacter inupper caseand upper case character in lower case.
11. WriteaPythonprogramtoperformLinearSearch.
12. WriteaPythonprogramtoperformBinarySearch.
13. WriteaPythonprogramtosortperformbubblesort.
14. WriteaPythonprogramtoperformselectionsort.
15. WriteaPythonprogramtodemonstratetrywithmultipleexceptionstatements.

TEXTBOOKS:

1. CorePythonProgramming, WesleyJ.Chun,SecondEdition,Pearson.
2. MarkLutz,"LearningPython",OReily,4th Edition, 2009.

REFERENCES:

1. TimHallandJ-PStacey,"Python3for AbsoluteBeginners",2009.
2. MagnusLieHetland,"BeginningPython:FromNovicetoProfessional",2ndEdition,2009.

SVKP & Dr K S RAJU A & S COLLEGE (A) :: PENUGONDA

Master of Computer Applications(w.e.f. 2023)

Course Structure & Syllabus for AB 2023-24

Semester III & IV (MCA Second Year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours Per Week		Credits
		External	Internal		Theory	Practical	
23MCAT301	Information Security and Cryptography	70	30	100	4	-	4
23MCAT302	Big Data Analytics	70	30	100	4	-	4
23MCAT303	Object Oriented Software Engineering	70	30	100	4	-	4
23MCAT304	Web Technologies	70	30	100	4	-	4
23MCAT305	Elective II 1. Block chain Technology 2. Cloud Computing 3. Machine Learning and Deep Learning	70	30	100	4	-	4
23MCAT306	Elective-III 1. Business Intelligence and Visualization 2. Robotics 3. Foundations of Data Science	70	30	100	4	-	4
23MCAP307	Web Technologies and Object Oriented Software Engineering Lab	50	50	100	-	3	2
23MCAP308	Big Data Analytics lab	50	50	100	-	3	2
23MCAP309	Innovation, Entrepreneurship and Intellectual Property Rights		50	50	2	-	0
23MCAP310	Summer Internship	50	50	100	-	-	2
	Total Credits						30

Note: Summer Internship 2 Months (Mandatory) after First Year (to be evaluated during IIIrd semester).

23MCAT301 INFORMATION SECURITY AND CRYPTOGRAPHY

Instruction: 4 Periods/week	**Time: 3 Hours**	**Credits:4**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT-I

Introduction: The need for security-security approaches-principles of security-Plain Text and Cipher Text-substitution and Transposition Techniques-Encryption and Decryption-Symmetric and Asymmetric Cryptography-Stenography-key range and key size-types of attacks.

UNIT - II

Number Theory: Introduction to number theory- Modular Arithmetic, Euclidean algorithm, Euler theorem, Fermat Theorem, Totient Function, Multiplicative and Additive Inverse.

UNIT - III

Symmetric Key Cryptographic Algorithms: Algorithm types and modes-overview of symmetric key cryptography – DES –Block Cipher Design Principles - IDEA – Blowfish – AES-Differential and Linear Cryptanalysis. Triple DES, Block Cipher Modes of Operation.

Asymmetric Key Cryptographic Algorithms: Overview of asymmetric key cryptography-RSA algorithm-Diffie Hellman Key Exchange Algorithm – Key Management-symmetric and asymmetric key cryptography together-digital signatures.

UNIT - IV

User Authentication Mechanisms: Introduction-Authentication basics – passwords-authentication tokens-certificate based authentication-biometrics authentication-Hash functions-SHA1.

System Security: Intruders, Viruses, Related Threats, Trusted Systems.

UNIT -V

Internet Security Protocols: Basic concepts-SSL-SHTTP-TSP-SET-SSL versus SET- 3D secure protocol-Electronic money-Email security-WAP security-security in GSM.

Network Security: Brief Introduction to TCP/IP -Firewalls -IP security-Virtual Private Networks.

Text Books:

1. Cryptography and Network security, AtulKahate, Tata McGraw-Hill Pub company Ltd., NewDelhi
2. Network Security Essentials Applications and Standards, William Stallings, Pearson Education, New Delhi

Reference Books:

1. Network Security Private Communication in a public world, Charlie Kaufman, Radia Perlman & Mike Speciner, Prentice Hall of India Private Ltd., NewDelhi
2. Network Security: The Complete Reference by Roberta Bragg, Mark Phodes - Ousley, Keith Strass berg TataMcGraw-Hill.

23MCAT302 BIG DATA ANALYTICS

Instruction: 4 Periods/week	**Time: 3 Hours**	**Credits: 4**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I

Introduction to Big Data: Big Data-definition, Characteristics of Big Data (Volume, Variety, Velocity, Veracity, Validity), Importance of Big Data , Patterns for Big Data Development, Data in the Warehouse and Data in Hadoop.

Introduction to Hadoop: Hadoop- definition, Understanding distributed systems and Hadoop, Comparing SQL databases and Hadoop.

UNIT II

Starting Hadoop – **Understanding MapReduce**-The building blocks of Hadoop, Name Node, Data Node, Secondary Name Node, Job Tracker and Task Tracker.

Real Time Analytics- Examples, What is Apache Spark, Why Spark when Hadoop is there, Spark Features, Getting started with Spark, Spark Eco System, Architecture and its working, Data Structures of Spark, Spark components, Using Spark with Hadoop, Usecase.

UNIT III

HDFS: Components of Hadoop-Working with files in HDFS.

Map Reduce Programming: Writing basic Map Reduce programs - Getting the patent data set, constructing the basic template of a Map Reduce program.

Streaming in Spark, Streaming features, Streaming Fundamentals. Use case on streaming. Machine Learning, Spark MLlib Overview, Tools, Algorithms-Classification, Regression, Clustering, Dimensionality Reduction, Feature Extraction.

UNIT IV

Map Reduce Advanced Programming- Chaining Map Reduce jobs. Joining Data from different sources. Usecase.

Graph Representation in Map Reduce: Modeling data and solving problems with graphs, Shortest Path Algorithm, Friends-of-Friends Algorithm, Page Rank Algorithm, Bloom Filters. Graph Analytics in Spark, Spark GraphX, GraphX features, GraphX Examples, Use case.

UNIT V

Programming with RDDs-Baiscs, Creating RDDs, Operations, Passing Functions to Spark, Common Transformations and Actions, Persistence, Adding Schemas to RDDs, RDDs as Relations, Creating Pairs in RDDs, Transformations and actions on RDDs.

Spark SQL, Overview, Libraries, Features, Querying using Spark SQL.

TEXT BOOKS:

1. Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data by Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch, 1st Edition, TMH,2012.
2. Learning Spark: Learning Big Data Analysis: Karauetc.,O'reillyPublications.Hadoopin Action by Chuck Lam, MANNING Publishers.
3. Hadoop in Practice by Alex Holmes, MANNING Publishers

REFERENCE BOOKS:

1. Hadoop: The Definitive Guide by Tom White, 3rd Edition,O'reilly
2. Big Java Fourth Edition Cay Horstmann Wiley, John Wiley &Sons
3. Mining of massive datasets, Anand Rajaraman, Jeffrey D Ullman, Wiley Publications.

23MCAT303 OBJECT ORIENTED SOFTWARE ENGINEERING

Instruction:4Periods/week **Time: 3Hours** **Credits:4**
Internal:25Marks **External:75Marks** **Total: 100Marks**

UNIT I

Introduction to Object Oriented Software Engineering: Nature of the Software, Types of Software, Software Engineering Activities, Software Quality.

Introduction to Object Orientation: Data Abstraction, Inheritance & Polymorphism, Reusability in Software Engineering. The Object Client–Server Framework (OCSF)

UNIT II

Requirements Engineering: Domain Analysis, Problem Definition and Scope, Types of Requirements, Techniques for Gathering and Analyzing Requirements, Requirement Documents, Reviewing Requirements, Case Studies: GPS based Automobile Navigation System.

Unified Modeling Language & Use Case Modeling: Introduction to UML, Modeling Concepts, Types of UML Diagrams with Examples; User-Centered Design, Characteristics of Users, Developing Use Case Models of Systems, Use Case Diagram, Use Case Descriptions, The Basics of User Interface Design, Usability Principles, Implementing a simple GUI in Java

UNIT III

Class Design and Class Diagrams: Essentials of UML Class Diagrams, Associations and Multiplicity, Generalization, Instance Diagrams, Advanced Features of Class Diagrams, Process of Developing Class Diagrams, Interaction and Behavioral Diagrams: Interaction Diagrams, State Diagrams, Activity Diagrams, Component and Deployment Diagrams.

Software Design and Architecture: Design Process, Principles Leading to Good Design, Techniques for Making Good Design Decisions, Good Design Document, Software Architecture, Architectural Patterns: The Multilayer, Client-Server, Broker, Transaction Processing, Pipe & Filter And MVC Architectural Patterns.

UNIT IV

Design Patterns: Abstraction-Occurrence, General Hierarchical, Play-Role, Observer, Delegation, Adaptor, Façade, Immutable and Proxy Patterns.

Software Testing: Effective and Efficient Testing, Defects in Ordinary Algorithms, Numerical Algorithms, Timing and Co-ordination, Stress and Unusual Situations, Testing Strategies for Large Systems.

UNIT V

Software Project Management: Introduction to Software Project Management, Activities of Software Project Management, Software Engineering Teams, Software Cost Estimation, Project Scheduling, Tracking and Monitoring, Risk management in all software engineering activities.

Software Process Models: Waterfall Model, The Phased Released Model, The Spiral Model, Evolutionary Model, The Concurrent Engineering Model, Rational Unified Process.

Text Book:

1. Object Oriented Software Engineering: Practical Software Development using UML and Java. Timothy C Lethbridge & Robert, Langaneire, Mc Graw Hill

Reference Books:

1. The Unified Modeling Language User Guide. Grady Booch, JamesRumbaugh and Ivar Jacobson.Addison-Wesley.
2. Software Engineering; A Practitioner's Approach. Roger SPressman.
3. Object-Oriented Software Engineering: Using UML, Patterns and Java, Bernd Bruegge and Allen H. Dutoit, 2nd Edition, Pearson Education.

23MCAT304 WEB TECHNOLOGIES

Instruction: 4 Periods/week **Time: 3 Hours** **Credits: 4**
Internal: 25 Marks **External: 75 Marks** **Total: 100 Marks**

UNIT I

Networking Protocols and OSI Model: Protocols in Computer Communications, the OSI Model, OSI Layer Functions.

Internetworking Concepts, Devices, Basics, History and Architecture: Internetworking, Problems in Internetworking, A Virtual Network, Internetworking Devices, Repeaters, Bridges, Routers, Gateways, A Brief History of the Internet, Growth of the Internet, Internet topology, Internal Architecture of an ISP

UNIT II

TCP/IP Part I (Introduction to TCP/IP, IP, ARP, RARP, ICMP):TCP/IP Basics, Logical Addresses, the Concept of IP Address, Address Resolution Protocol (ARP), Reverse ARP, Internet Control Message Protocol (ICMP), Datagram, Fragmentation and Reassembly.

TCP/IP Part II (TCP, UDP): Basics of TCP, Features of TCP, Relationship between TCP and IP, Ports and Sockets, TCP connections, TCP Packet Format, Persistent TCP Connections, User Datagram Protocol , UDP Packet, Difference between UDP and TCP

TCP/IP Part III (DNS, Email, FTP, TFTP): Domain Name System (DNS), Electronic Mail (Email), File Transfer Protocol (FTP)**,** Trivial File Transfer Protocol (TFTP)

UNIT III

TCP/IP Part IV (WWW, HTTP, TELNET): A Brief History of WWW, Basics of WWW and Browsing, Locating Information on the Internet, HTML, Web Browser Architecture, Web Pages and Multimedia, Remote Login (TELNET).

An Introduction to Electronic Commerce: Aspects of Electronic Commerce, Types of E Commerce, Approaches for Developing E Commerce Solutions, Electronic Procurement, Phases in a Procurement Process, Trading Models, Buyer Side Purchasing, Supply Chain Management (SCM) and Customer Relationship Management (CRM)

Introduction to Web Technology: Features Required for Enabling e-commerce, Web pages-Types and Issues, Tiers, The Concept of a Tier, A Concept of Microsoft and Java Technologies, Web Pages, Static Web Pages, Introduction to Frames and Forms.

UNIT IV

Dynamic Web Pages: Need for Dynamic Web Pages, Magic of Dynamic Web Pages, Overview of Dynamic Web Page Technologies, Dynamic HTML (DHTML) with Java Script, Common Gateway Interface (CGI), Microsoft's Active Server Pages (ASP), Basics of ASP Technology, ASP Example, Modern Trends in ASP, Java and the Concept a Virtual Machine, Pages(JSP), Java Servlets, Java Sever pages (JSP).

Active Web Pages: Active Web pages is a Better Solution, Java Applets, Why are Active Web Pages Powerful? When not to use Active Web Pages, Lifecycle of Java Applets, Java Beans, Active X Controls.

Middleware and Component-based E-commerce Architectures: CORBA, Java Remote Method Invocation (RMI), Microsoft's Distributed Component Object Model.

UNIT V

Electronic Data Interchange (EDI): An Overview of EDI, the Origins of EDI, Understanding EDI, Data Exchange Standards, EDI Architecture, Financial EDI, EDI and the Internet.

Extensible Markup Language (XML): Standard Generalized Markup Language (SGML), Basics of XML, XML Schemas , XML parsers.

Wireless Application Protocol (WAP): Limitations of Mobile Devices, The emergence of WAP, WAP Architecture, The WAP Stack, Concerns about WAP and its Future, Alternatives to WAP.

Text Book:

Web Technologies: TCP/IP to Internet Application Architectures-TATA McGraw Hill Publications - Achyut S Godbole, AtulKahate.

23MCAT305: CLOUD COMPUTING (ELECTIVE-II)

Instruction: 4 Periods/week **Time:3Hours** **Credits: 4**
Internal: 30 Marks **External: 70 Marks** **Total: 100 Marks**

UNIT I

Cloud Computing Basics - Cloud Computing Overview, Applications, Intranets and the Cloud, First Movers in the Cloud. The Business Case for Going to the Cloud - Cloud Computing Services, Business Applications, Deleting Your Datacenter, Salesforce.com. Cloud Computing Architecture.

Organization and Cloud Computing - When You Can Use Cloud Computing, Benefits, Limitations, Security Concerns, Regulatory Issues, Cloud Computing with the Titans - Google, EMC, NetApp, Microsoft, Amazon, Salesforce.com.

UNIT II

Hardware and Infrastructure – Clients-Mobile, Thin, Thick, Security- Data Leakage, Offloading Work, Network- Basic Public Internet, The Accelerated Internet, Optimized Internet Overlay, Services- Identity, Integration, Mapping, Payments, Search.

Accessing the Cloud - Platforms, Web Applications, Web APIs, Web Browsers.

UNIT III

Cloud Storage - Overview, Cloud Storage Providers, Standards - Application, Client, Infrastructure, Service.

Software as a Service - Overview, Driving Forces, Company Offerings, Industries. Software Plus Services - Overview, Providers.

UNIT IV

Developing Applications - Google, Microsoft, Intuit QuickBase, Cast Iron Cloud, Bungee Connect, Development.

Local Clouds and Thin Clients - Virtualization in Your Organization, Server Solutions, Thin Clients, Case Study: McNeilus Steel.

UNIT V

Migrating to the Cloud - Cloud Services for Individuals, Cloud Services Aimed at the Mid- Market, Enterprise-Class Cloud Offerings.

Best Practices and the Future of Cloud Computing - Analyze Your Service, Best Practices, How Cloud Computing Might Evolve, Emerging Trends in Cloud Computing.

Text Books:

Cloud Computing-A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter. McGrawHill.

Reference Books:

1. Cloud Computing, Theory and Practice, Dan C Marinescu, MKElsevier.
2. Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press.

23MCAT306 FOUNDATIONS OF DATA SCIENCE (ELECTIVE-III)

Instruction: 4 Periods/week	**Time: 3 Hours**	**Credits: 4**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I

INTRODUCTION TO DATA SCIENCE: Data science process – roles, stages in data science project, setting expectations, Loading data into R – working with data from files, working with relational databases.

Exploring data – Using summary statistics to spot problems, spotting problems using graphics and visualization.

UNIT II

Managing data – cleaning , Data Transformations-Normalization and sampling for modelling and validation.

MODELING METHODS: Choosing and evaluating models – mapping problems to machine learning tasks, evaluating models, validating models – cluster analysis – K means algorithm, Naïve Bayes. **Hierarchical Clustering in R.**

UNIT III

Memorization Methods – KDD and KDD Cup 2009,Building single variable models, building models using multi variable. Linear and logistic regression, unsupervised methods – cluster analysis, association rules.

INTRODUCTION TO R Language: Reading and getting data into R, viewing named objects, Types of Data items, the structure of data items, examining data structure, working with history commands. saving your work in R.

UNIT IV

PROBABILITY DISTRIBUTIONS in R - Binomial, Poisson, Normal distributions. - Manipulating objects -data distribution.

DELIVERING RESULTS: Documentation and deployment–producing effective presentations.

UNIT V

Introduction to graphical analysis – plot()function – displaying multivariate data– matrix plots – multiple plots in one window - exporting graph – using graphics parameters in R Language.

Text Books

1. Nina Zumel, John Mount, “Practical Data Science with R”, Manning Publications,2014.
2. Jure Leskovec, AnandRajaraman, Jeffrey D.Ullman, “Mining of MassiveDatasets”, Cambridge University Press,2014.
3. Mark Gardener, “Beginning R - The Statistical Programming Language”, John Wiley &Sons, Inc.,2012.

Reference Books

1. W. N. Venables, D. M. Smith and the R Core Team, “An Introduction to R”,2013.
2. Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, “PracticalData Science Cookbook”, Packt Publishing Ltd.,2014.
3. Nathan Yau, “Visualize This: The FlowingData Guide to Design, Visualization, andStatistics”, Wiley,2011.
4. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”,Wiley, ISBN: 9788126551071,2015.