

**CH. CHARAN SINGH UNIVERISTY
MEERUT**



**EVALUATION SCHEME & SYLLABUS
First Year
FOR
MASTER OF COMPUTER APPLICATION
(MCA)
(Two Years Course)**

(Effective from the Session: 2020-21)

Department of Computer Application
Ch. Charan Singh University Campus, Meerut

V. S. G.

[Signature]

J.K.
16/10/2020

[Signature]
16-10-2020

MCA (MASTER OF COMPUTER APPLICATION)
MCA FIRST YEAR, 2020-21

SEMESTER-I

S.No.	Subject Code	Subject Name	Hours			Sessional Marks			External Marks	Total Marks	Credit
			L	T	P	CT	TA	Total			
1.	MCA- 111	Fundamental of Computers & Emerging Technologies	4	0	0	18	12	30	70	100	4
2.	MCA- 112	Problem Solving using C	3	1	0	18	12	30	70	100	4
3.	MCA- 113	Principles of Management & Communication	4	0	0	18	12	30	70	100	4
4.	MCA- 114	Discrete Mathematics	4	0	0	18	12	30	70	100	4
5.	MCA- 115	Computer Organization & Architecture	3	1	0	18	12	30	70	100	4
6.	MCA- 151	Problem Solving using C Lab	0	0	4	30	20	50	50	100	2
7.	MCA- 152	Office Automation Lab	0	0	4	30	20	50	50	100	2
8.	MCA- 153	Professional Communication Lab	0	0	4	30	20	50	50	100	2
Total								300	500	800	26

CT: Class Test TA:TeacherAssessmentL/T/P: Lecture/ Tutorial/Practical

SEMESTER-II

S. No.	Subject Code	Subject Name	Hours			Sessional Marks			External Marks	Total Marks	Credit
			L	T	P	CT	TA	Total			
1.	MCA-211	Theory of Automata & Formal Languages	4	0	0	18	12	30	70	100	4
2.	MCA- 212	Object Oriented Programming	3	1	0	18	12	30	70	100	4
3.	MCA- 213	Operating Systems	4	0	0	18	12	30	70	100	4
4.	MCA- 214	Database Management Systems	4	0	0	18	12	30	70	100	4
5.	MCA- 215	Data Structures & Analysis of Algorithms	3	1	0	18	12	30	70	100	4
6.	MCA - 216	Cyber Security* (Qualifying Course)	2	0	0	18	12	*30	*70	*100	0
7.	MCA- 251	Object Oriented Programming Lab	0	0	4	30	20	50	50	100	2
8.	MCA- 252	DBMS Lab	0	0	4	30	20	50	50	100	2
9.	MCA- 253	Data Structures & Analysis of Algorithms Lab	0	0	4	30	20	50	50	100	2
Total								300	500	800	26

CT: Class Test TA:TeacherAssessment

L/T/P: Lecture/ Tutorial/Practical

* Qualifying Non-credit Course

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]
16/10/2020

[Handwritten signature]

Syllabus

MCA 1st Year Semester – Ist

12/4

12/4

12/4

12/4

**MCA (MASTER OF COMPUTER APPLICATION)
FIRST YEAR SYLLABUS
SEMESTER-I**

MCA – III : FUNDAMENTAL OF COMPUTERS & EMERGING TECHNOLOGIESL-T- P : 4-0-0		
Unit	Topic	Proposed Lecture
I	Introduction to Computer: Definition, Computer Hardware & Computer Software Components: Hardware – Introduction, Input devices, Output devices, Central Processing Unit, Memory-Primary and Secondary. Software-Introduction, Types – System and Application. Computer Languages: Introduction, Concept of Compiler, Interpreter & Assembler Problem solving concept: Algorithms – Introduction, Definition, Characteristics, Limitations. Conditions in pseudo-code, Loops in pseudo code.	08
II	Operating system: Definition, Functions, Types, Classification, Elements of command based and GUI based operating system. Computer Network: Overview, Types (LAN, WAN and MAN), Data communication, topologies.	08
III	Internet : Overview, Architecture, Functioning, Basic services like WWW, FTP, Telnet, Gopher etc., Search engines, E-mail, Web Browsers. Internet of Things (IoT): Definition, Sensors, their types and features, Smart Cities, Industrial Internet of Things.	08
IV	Block chain: Introduction, overview, features, limitations and application areas fundamentals of Block Chain. Crypto currencies: Introduction , Applications and use cases Cloud Computing: It nature and benefits, AWS, Google, Microsoft & IBM Services	08
V	Emerging Technologies: Introduction, overview, features, limitations and application areas of Augmented Reality , Virtual Reality, Grid computing, Green computing, Big data analytics, Quantum Computing and Brain Computer Interface	08
Suggested Readings: 1. Rajaraman V., “Fundamentals of Computers”, Prentice-Hall of India, 6 th Edition Dec 2014. 2. Norton P., “Introduction to Computers”, McGraw Hill Education, 7 th Edition July 2017 3. Goel A., “Computer Fundamentals”, Pearson, Nov 2017 4. Balagurusamy E., “ Fundamentals of Computers”, McGraw Hill, second reprint 2010 5. Thareja R., “Fundamentals of Computers”, Oxford University Press 2016		

veeg
A

JMK
16/10/2020

h.p
16-10-2020

MCA - 112 :PROBLEM SOLVING USING C		
L-T-P :3-1-0		External Max. Marks : 70
Unit	Topic	Proposed Lecture
I	<p>Basics of programming: Approaches to problem solving, Use of high level programming language for systematic development of programs, Concept of algorithm and flowchart, Concept and role of structured programming.</p> <p>Basics of C: History of C, Salient features of C, Structure of C Program, Compiling C Program, Link and Run C Program, Character set, Tokens, Keywords, Identifiers, Constants, Variables, Instructions, Data types, Standard Input/Output, Operators and expressions.</p>	08
II	<p>Conditional Program Execution: if, if-else, and nested if-else statements, Switch statements, Restrictions on switch values, Use of break and default with switch, Comparison of switch and if-else.</p> <p>Loops and Iteration: for, while and do-while loops, Multiple loop variables, Nested loops, Assignment operators, break and continue statement.</p> <p>Functions: Introduction, Types, Declaration of a Function, Function calls, Defining functions, Function Prototypes, Passing arguments to a function Return values and their types, Writing multifunction program, Calling function by value, Recursive functions.</p>	08
III	<p>Arrays: Array notation and representation, Declaring one-dimensional array, Initializing arrays, Accessing array elements, Manipulating array elements, Arrays of unknown or varying size, Two-dimensional arrays, Multidimensional arrays.</p> <p>Pointers: Introduction, Characteristics, * and & operators, Pointer type declaration and assignment, Pointer arithmetic, Call by reference, Passing pointers to functions, array of pointers, Pointers to functions, Pointer to pointer, Array of pointers.</p> <p>Strings: Introduction, Initializing strings, Accessing string elements, Array of strings, Passing strings to functions, String functions.</p>	08

yes

✓

JK
7/1/20
 76-10-2020

IV	<p>Structure: Introduction, Initializing, defining and declaring structure, Accessing members, Operations on individual members, Operations on structures, Structure within structure, Array of structure, Pointers to structure.</p> <p>Union: Introduction, Declaring union, Usage of unions, Operations on union. Enumerated data types</p> <p>Storage classes: Introduction, Types- automatic, register, static and external.</p>	08
V	<p>Dynamic Memory Allocation: Introduction, Library functions – malloc, calloc, realloc and free.</p> <p>File Handling: Basics, File types, File operations, File pointer, File opening modes, File handling functions, File handling through command line argument, Record I/O in files.</p> <p>Graphics: Introduction, Constant, Data types and global variables used in graphics, Library functions used in drawing, Drawing and filling images, GUI interaction within the program.</p>	08

Suggested Readings:

1. Kanetkar Y., "Let Us C", BPB Publications. Revised and Updated 2017 edition.
2. Hanly J. R. and Koffman E. B., "Problem Solving and Program Design in C", Pearson Education. 5th Edition, 2008
3. Schildt H., "C- The Complete Reference", McGraw-Hill. 4th Edition (December 10, 2002)
4. Goyal K. K. and Pandey H.M., "Trouble Free C", University Science Press, 2017
5. Gottfried B., "Schaum's Outlines- Programming in C", McGraw-Hill Publications.
6. Kochan S.G., "Programming in C", Addison-Wesley. 4th Edition, 2015
7. Dey P. and Ghosh M., "Computer Fundamentals and Programming in C", Oxford University Press. Second Edition, July 2013

Handwritten signature

Handwritten signature

Handwritten signature

Handwritten signature
16-10-2020

MCA - 113 : PRINCIPLES OF MANAGEMENT & COMMUNICATION		
L-T-P : 4-0-0		External Max. Marks : 70
Unit	Topic	Proposed Lecture
I	Management: Need, Scope, Meaning and Definition. The process of Management, Development of Management thought F.W. Taylor and Henry Fayol, Horothorne Studies, Qualities of an Efficient Management.	08
II	Planning & Organising: Need, Scope and Importance of Planning, Steps in planning, Decision making model. Organising need and Importance, Organisational Design, Organisational structure, centralisation and Decentralisation, Delegation.	08
III	Directing & Controlling: Motivation—Meaning, Importance, need. Theories of Motivation, Leadership—meaning, need and importance, leadership style, Qualities of effective leader, principles of directing, Basic control process, Different control Techniques.	08
IV	Introduction to Communication: What is Communication, Levels of communication, Barriers to communication, Process of Communication, Non-verbal Communication, The flow of Communication: Downward, Upward, Lateral or Horizontal (Peer group) Communication, Technology Enabled communication, Impact of Technology, Selection of appropriate communication Technology, Importance of Technical communication.	08
V	Business letters: Sales & Credit letters; Claim and Adjustment Letters; Job application and Resumes. Reports: Types; Structure, Style & Writing of Reports. Technical Proposal: Parts; Types; Writing of Proposal; Significance. Nuances of Delivery; Body Language; Dimensions of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice; Communication skills, Presentation strategies, Group Discussion; Interview skills; Workshop; Conference; Seminars.	08
Suggested Readings: <ol style="list-style-type: none"> 1. P.C. Tripathi, P.N. Reddy, "Principles of Management", McGraw Hill Education 6th Edition 2017. 2. C.B. Gupta, "Management Principles and Practice", Sultan Chand & Sons 3rd edition 2012. 3. T.N. Chhabra, "Business Communication", Sun India Publication. 4. V.N. Arora and Laxmi Chandra, "Improve Your Writing", Oxford Univ. Press, 2001, New Delhi. 5. Madhu Rani and Seema Verma, "Technical Communication: A Practical Approach", Acme Learning, New Delhi-2011. 6. Meenakshi Raman & Sangeeta Sharma, "Technical Communication- Principles and Practices", Oxford Univ. Press, 2007, New Delhi. 7. Koontz Harold & Weihrich Heinz, "Essentials of Management", McGraw Hill 5th Edition 2008. 8. Robbins and Coulter, "Management", Prentice Hall of India, 8th Edition (January 14, 2004). 9. James A. F., Stoner, "Management", Pearson Education Delhi. Seventh Edition, 2009. 10. P.D. Chaturvedi, "Business Communication", Pearson Education. 2011 		







MCA - 114 : DISCRETE MATHEMATICS		
L-T-P : 4-0-0		External Max. Marks : 70
Unit	Topic	Proposed Lecture
I	Set Theory: Introduction, Size of sets and Cardinals, Venn diagrams, Combination of sets, Multisets, Ordered pairs and Set identities. Relation: Definition, Operations on relations, Composite relations, Properties of relations, Equality of relations, Partial order relation. Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions.	08
II	Posets, Hasse Diagram and Lattices: Introduction, Partial ordered sets, Combination of Partial ordered sets, Hasse diagram, Introduction of lattices, Properties of lattices – Bounded, Complemented, Modular and Complete lattice. Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra, Boolean functions. Simplification of Boolean functions, Karnaugh maps, Logic gates.	08
III	Propositional: Propositions, Truth tables, Tautology, Contradiction, Algebra of Propositions, Theory of Inference and Natural Detection. Predicate Logic: Theory of Predicates, First order predicate, Predicate formulas, Quantifiers, Inference theory of predicate logic.	08
IV	Algebraic Structures: Introduction to algebraic Structures and properties. Types of algebraic structures: Semi group, Monoid, Group, Abelian group and Properties of group. Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism and Isomorphism of groups. Rings and Fields: Definition and elementary properties of Rings and Fields.	08
V	Natural Numbers: Introduction, Peano's axioms, Mathematical Induction, Strong Induction and Induction with Nonzero Base cases. Recurrence Relation & Generating functions: Introduction and properties of Generating Functions. Simple Recurrence relation with constant coefficients and Linear recurrence relation without constant coefficients. Methods of solving recurrences. Combinatorics: Introduction, Counting techniques and Pigeonhole principle, Polya's Counting theorem.	08
Suggested Readings: <ol style="list-style-type: none"> 1. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", McGraw Hill, 2006. 2. B. Kolman, R. C. Busby and S. Cross, "Discrete Mathematics Structures", Prentice Hall, 2004. 3. R. P. Grimaldi, "Discrete and Combinatorial Mathematics", Addison Wesley, 2004. 4. Y. N. Singh, "Discrete Mathematical Structures", Wiley-India, First edition, 2010. 5. Swapankumar Sarkar, "A Textbook of Discrete Mathematics", S. Chand & Company PVT. LTD. V. 6. Krishnamurthy, "Combinatorics Theory & Application", East-West Press Pvt. Ltd., New Delhi. 7. Lipschutz, Seymour, "Discrete Mathematics", McGraw Hill. 8. J. P. Trembely & R. Manohar, "Discrete Mathematical Structure with application to Computer Science", McGraw Hill. 		

Yes

A

MM

16-10-2020

MCA - I15 : COMPUTER ORGANIZATION & ARCHITECTURE L-T-P :
3-1-0 External Max. Marks : 70

Unit	Topic	Proposed Lecture
I	Introduction: Functional units of digital system and their interconnections, buses, bus architecture, types of buses and bus arbitration. Register, bus and memory transfer. Processor organization: general registers organization, stack organization and addressing modes.	08
II	Arithmetic and logic unit: Look ahead carries adders. Multiplication: Signed operand multiplication, Booths algorithm and array multiplier. Division and logic operations. Floating point arithmetic operation, Arithmetic & logic unit design. IEEE Standard for Floating Point Numbers.	08
III	Control Unit: Instruction types, formats, instruction cycles and sub cycles (fetch and execute etc), micro operations, execution of a complete instruction. Program Control, Reduced Instruction Set Computer, Pipelining. Hardwire and micro programmed control: micro-program sequencing, concept of horizontal and vertical microprogramming.	08
IV	Memory: Basic concept and hierarchy, semiconductor RAM memories, 2D & 2 1/2 D memory organization. ROM memories. Cache memories: concept and design issues & performance, address mapping and replacement Auxiliary memories: magnetic disk, magnetic tape and optical disks Virtual memory: concept implementation.	08
V	Input / Output: Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions. Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access., I/O channels and processors. Serial Communication: Synchronous & asynchronous communication, standard communication interfaces.	08

Suggested Readings:

9. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", McGraw Hill, 2006.
10. B. Kolman, R. C. Busby and S. C. Cross, "Discrete Mathematics Structures", Prentice Hall, 2004.
11. R. P. Giribaldi, "Discrete and Combinatorial Mathematics", Addison Wesley, 2004.
12. Y. N. Singh, "Discrete Mathematical Structures", Wiley-India, First edition, 2010.
13. Swapankumar Sarkar, "A Textbook of Discrete Mathematics", S. Chand & Company PVT. LTD. 5 edition 2009.
14. Krishnamurthy, "Combinatorics Theory & Application", East-West Press Pvt. Ltd., New Delhi.
15. Liptschutz, Seymour, "Discrete Mathematics", McGraw Hill. Third edition, 2009
16. J. P. Trembely & R. Manohar, "Discrete Mathematical Structure with application to Computer Science", McGraw Hill. 30th Reprint (2007)

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]
16-10-2020


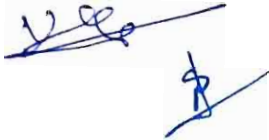
MCA - 151: PROBLEM SOLVING USING C LAB

L-T-P :0-0-4

External Max. Marks : 50

1. Program to implement conditional statements in C language.
2. Program to implement switch-case statement in C language
3. Program to implement looping constructs in C language.
4. Program to perform basic input-output operations in C language.
5. Program to implement user defined functions in C language.
6. Program to implement recursive functions in C language.
7. Program to implement one-dimensional arrays in C language.
8. Program to implement two-dimensional arrays in C language.
9. Program to perform various operations on two-dimensional arrays in C language.
10. Program to implement multi-dimensional arrays in C language.
11. Program to implement string manipulation functions in C language.
12. Program to implement structure in C language.
13. Program to implement union in C language.
14. Program to perform file handling operations in C language.
15. Program to perform graphical operations in C language.

Note: The Instructor may add/delete/modify experiments, wherever he/she feels in a justified manner.



16-10-2020

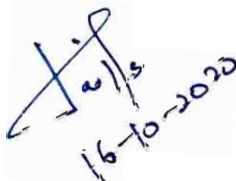
MCA - 152 Office Automation LAB

L-T-P :0-0-4

External Max. Marks : 50

1. Basic operating system windows working environment. Working on various office advance component available in MS-Office/ Open-Office for Documents, Excel and Power point (*Minimum Ten Labs*).
2. Introduction to HTML Language and its basic tags to make static pages as form, table, and simple text data formatted (*Minimum Two Labs*).
3. Install and configure Python on system and know how to execute basic programs for condition and loop structures (*Minimum Two Labs*).
4. Write a Report with standard format and styles using MS-Office/ Open-Office (*Minimum Two Labs*).
5. Write a Research paper with standard format and styles using MS-Office/ Open-Office. (*Minimum Two Labs*).
6. Prepare Make a Mark-Sheet/ Balance-Sheet in excel with all formatting and styles (*Minimum One Lab*).
7. Prepare a presentation in Power Point on any one topic from current semester subjects (*Minimum One Lab*).

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.



16-10-2020

MCA - 153 : PROFESSIONAL COMMUNICATION LAB


L-T-P : 0-0-4 External Max. Marks : 50

1. Group Discussion: participating in group discussions- understanding group dynamics.
2. GD strategies-activities to improve GD skills. Practical based on Accurate and Current Grammatical Patterns.
3. Interview Etiquette-dress code, body language attending job interview – Telephone/Skype interview one to one interview & Panel interview.
4. Communication Skills for Seminars/Conferences/Workshops with emphasis on Paralinguistic/ Kinesics, practicing word stress, rhythm in sentences, weak forms, intonation.
5. Oral Presentation Skills for Technical Paper/Project Reports/ Professional Reports based on proper Stress and Intonation Mechanics voice modulation ,Audience Awareness, Presentation plan visual aids.
6. Speaking:-Fluency & Accuracy in speech- positive thinking, Improving Self expression Developing persuasive speaking skills, pronunciation practice (for accept neutralization) particularly of problem sounds, in isolated words as well as sentences.
7. Individual Speech Delivery/Conferences with skills to defend Interjections/Quizzes.
8. Argumentative Skills/Role Play Presentation with Stress and Intonation.
9. Comprehension Skills based on Reading and Listening Practical's on a model Audio-Visual Usage.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.

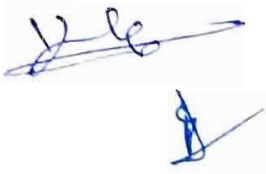







16-10-2020

Syllabus

MCA 1st Year Semester - IInd

Handwritten signature in blue ink, consisting of a stylized 'S' followed by a horizontal line and a vertical stroke.Handwritten signature in blue ink, consisting of a stylized 'S' followed by a horizontal line and a vertical stroke.Handwritten signature in blue ink, with the date '16-10-2020' written below it.

MCA (MASTER OF COMPUTER APPLICATION)
FIRST YEAR SYLLABUS
SEMESTER-II

MCA - 211: THEORY OF AUTOMATA & FORMAL LANGUAGES		
L-T-P : 4-0-0		External Max. Marks : 70
Unit	Topic	Proposed Lecture
I	Basic Concepts and Automata Theory: Introduction to Theory of Computation- Automata, Computability and Complexity, Alphabet, Symbol, String, Formal Languages, Deterministic Finite Automaton (DFA)- Definition, Representation, Acceptability of a String and Language, Non Deterministic Finite Automaton (NFA), Equivalence of DFA and NFA, NFA with ϵ -Transition, Equivalence of NFA's with and without ϵ -Transition, Finite Automata with output- Moore machine, Mealy Machine, Equivalence of Moore and Mealy Machine, Minimization of Finite Automata, Myhill-Nerode Theorem, Simulation of DFA and NFA.	08
II	Regular Expressions and Languages: Regular Expressions, Transition Graph, Kleen's Theorem, Finite Automata and Regular Expression- Arden's theorem, Algebraic Method Using Arden's Theorem, Regular and Non-Regular Languages- Closure properties of Regular Languages, Pigeonhole Principle, Pumping Lemma, Application of Pumping Lemma, Decidability- Decision properties, Finite Automata and Regular Languages, Regular Languages and Computers, Simulation of Transition Graph and Regular language.	08
III	Regular and Non-Regular Grammars: Context Free Grammar(CFG)-Definition, Derivations, Languages, Derivation Trees and Ambiguity, Regular Grammars-Right Linear and Left Linear grammars, Conversion of FA into CFG and Regular grammar into FA, Simplification of CFG, Normal Forms- Chomsky Normal Form(CNF), Greibach Normal Form(GNF), Chomsky Hierarchy, Programming problems based on the properties of CFGs.	08
IV	Push Down Automata and Properties of Context Free Languages: Nondeterministic Pushdown Automata (NPDA)- Definition, Moves, A Language Accepted by NPDA, Deterministic Pushdown Automata(DPDA) and Deterministic Context free Languages(DCFL),	08

Wef
J

JK

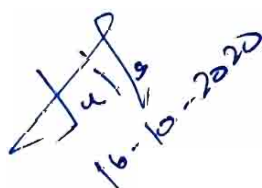
16-10-2020

	Pushdown Automata for Context Free Languages, Context Free grammars for Pushdown Automata, Two stack Pushdown Automata, Pumping Lemma for CFL, Closure properties of CFL, Decision Problems of CFL, Programming problems based on the properties of CFLs.	
V	Turing Machines and Recursive Function Theory : Basic Turing Machine Model, Representation of Turing Machines, Language Acceptability of Turing Machines, Techniques for Turing Machine Construction, Modifications of Turing Machine, Turing Machine as Computer of Integer Functions, Universal Turing machine, Linear Bounded Automata, Church's Thesis, Recursive and Recursively Enumerable language, Halting Problem, Post Correspondence Problem, Introduction to Recursive Function Theory.	08
Suggested Readings: <ol style="list-style-type: none"> 1. J.E. Hopcraft, R. Motwani, and Ullman, "Introduction to Automata theory, Languages and Computation", Pearson Education Asia, 3rd Edition, 2006. 2. J. Martin. "Introduction to languages and the theory of computation", McGraw Hill, 4th Edition 2010. 3. C. Papadimitrou and C. L. Lewis, "Elements and Theory of Computation", PHI. 4. K.L.P. Mishra and N. Chandrasekaran, "Theory of Computer Science Automata Languages and Computation", PHI. 3rd Edition, 2006 		








16-10-2020

Unit	Topic	Proposed Lecture
I	Introduction: Object Oriented Programming: objects, classes, Abstraction, Encapsulation, Inheritance, Polymorphism, OOP in Java, Characteristics of Java, The Java Environment, Java Source File Structure, and Compilation. Fundamental Programming Structures in Java: Defining classes in Java, constructors, methods, access specifiers, static members, Comments, Data Types, Variables, Operators, Control Flow, Arrays.	08
II	Inheritance, Interfaces, and Packages: Inheritance: Super classes, sub classes, Protected members, constructors in sub classes, Object class, abstract classes and methods. Interfaces: defining an interface, implementing interface, differences between classes and interfaces and extending interfaces, Object cloning, inner classes. Packages: Defining Package, CLASSPATH Setting for Packages, Making JAR Files for Library Packages, Import and Static Import Naming Convention For Packages, Networking java.net package.	08
III	Exception Handling, I/O: Exceptions: exception hierarchy, throwing and catching exceptions, built-in exceptions, creating own exceptions, StackTraceElements. Input/Output Basics: Byte streams and Character streams, Reading and Writing, Console Reading and Writing Files.	08
IV	Multithreading and Generic Programming: Differences between multi-threading and multitasking, thread lifecycle, creating threads, synchronizing threads, Inter-thread communication, daemon threads, thread groups. Generic Programming: Generic classes, generic methods, Bounded Types: Restrictions and Limitations.	08
V	Event Driven Programming: Graphics programming: Frame, Components, working with 2D shapes, Using colors, fonts, and images. Basics of event handling: event handlers, adapter classes, actions, mouse events, AWT event hierarchy. Introduction to Swing: layout management, Swing Components: Text Fields, Text Areas, Buttons, Check Boxes, Radio Buttons, Lists, choices, Scrollbars, Windows Menus and Dialog Boxes.	08

Suggested Readings:

1. Herbert Schildt, "Java The complete reference", McGrawHill Education, 8th Edition, 2011.
2. Cay S. Horstmann, Gary Cornell, "Core Java Volume -I Fundamentals", Prentice Hall, 9th Edition, 2013.
3. Steven Holzner, "Java Black Book", Dreamtech, 2005
4. Balagurusamy E, "Programming in Java", McGrawHill 4th Edition 2009
5. Naughton, Schildt, "The Complete reference java 2", McGrawHill Seventh Edition, 2007

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]
16/10/2020

Unit	Topic	Proposed Lecture
I	Introduction: Operating System Structure- Layered structure, System Components, Operating system functions, Classification of Operating systems- Batch, Interactive, Time sharing, Real Time System, Multiprocessor Systems, Multiuser Systems, Multi processSystems, Multithreaded Systems, Operating System services, Reentrant Kernels, Monolithic and Microkernel Systems.	08
II	Concurrent Processes: Process Concept, Principle of Concurrency, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores, Test and Set operation, Classical Problem in Concurrency- Dining Philosopher Problem, Sleeping Barber Problem, Inter Process Communication models and Schemes, Process generation.	08
III	CPU Scheduling: Scheduling Concepts, Performance Criteria, Process States, Process Transition Diagram, Schedulers, Process Control Block (PCB), Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Multiprocessor Scheduling. Deadlock: System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock.	08
IV	Memory Management: Basic bare machine, Resident monitor, Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference.	08
V	I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File system protection and security.	08

Suggested Readings:

1. Silberschatz, Galvin and Gagne, "Operating Systems Concepts", Wiley Publication. Seventh Edition 2004
2. Sibsankar Halder and Alex A Arvind, "Operating Systems", Pearson Education. 2nd Edition 2014
3. Harvey M Dietel, "An Introduction to Operating System", Pearson Education.
4. William Stallings, "Operating Systems: Internals and Design Principles", 6th Edition, Pearson Education 2010.
5. Harris, Schaum's Outline Of Operating Systems, McGrawHill First Edition 2001

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]
16-10-2020

MCA - 214 : DATABASE MANAGEMENT SYSTEMS

L-T-P : 4-0-0

External Max. Marks : 70

Unit	Topic	Proposed Lecture
I	Introduction: Overview, Database System vs File System, Database System Concept and Architecture, Data Model Schema and Instances, Data Independence and Database Language and Interfaces. Data Definition Language, DDL, Overall Database Structure. Data Modeling Using the Entity Relationship Model: ER Model Concepts, Notation for ER Diagram, Mapping Constraints, Keys, Concepts of SuperKey, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of an ER Diagrams to Tables, Extended ER Model, Relationship of Higher Degree.	08
II	Relational data Model and Language: Relational Data Model Concepts, Integrity Constraints, Entity Integrity, Referential Integrity, Keys Constraints, Domain Constraints, Relational Algebra, Relational Calculus, Tuple and Domain Calculus. Introduction to SQL: Characteristics of SQL, Advantage of SQL, SQL Data Type and Literals, Types of SQL Commands, SQL Operators and their Procedure, Tables, Views and Indexes, Queries and Subqueries, Aggregate Functions, Insert, Update and Delete Operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL PL SQL	08
III	Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependence, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design	08
IV	Transaction Processing Concept: Transaction System, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock Handling. Distributed Database: Distributed Data Storage, Concurrency Control, Directory System	08
V	Concurrency Control Techniques: Concurrency Control, Locking Techniques for Concurrency Control, Time Stamping Protocols for Concurrency Control, Validation Based Protocol, Multiple Granularity, Multi Version Schemes, Recovery with Concurrent Transaction, Case Study of Oracle.	08

Suggested Readings:

1. Korth, Silbertz, Sudarshan, "Database Concepts", McGrawHill. Seventh Edition 2019
2. Date C J, "An Introduction to Database Systems", Addison Wesley. 3rd Edition 2018
3. Elmasri, Navathe, "Fundamentals of Database Systems", Addison Wesley. 7th Edition 2016
4. O'Neil, "Databases", Elsevier Pub. 1st Edition 2016
5. Ramakrishnan, "Database Management Systems", McGrawHill. 3rd Edition 2002
6. Leon & Leon, "Database Management Systems", Vikas Publishing House.
7. Bipin C. Desai, "An Introduction to Database Systems", Gargotia Publications. 4th Edition, 2005

W. S.
W. S.

W. S.

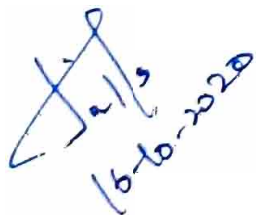

16-10-2020

MCA - 215: DATA STRUCTURES & ANALYSIS OF ALGORITHMS

L-T-P:3-1-0

External Max. Marks : 70

Unit	Topic	Proposed Lecture
I	<p>Introduction to data structure: Data, Entity, Information, Difference between Data and Information, Data type , Build in data type, Abstract data type, Definition of data structures, Types of Data Structures: Linear and Non-Linear Data Structure, Introduction to Algorithms: Definition of Algorithms, Difference between algorithm and programs, properties of algorithm, Algorithm Design Techniques, Performance Analysis of Algorithms, Complexity of various code structures, Order of Growth, Asymptotic Notations, Recurrence Relations .Sparse matrix and their representations</p> <p>Stacks: Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Iteration and Recursion- Principles of recursion, Tail recursion, Removal of recursion Problem solving using iteration and recursion with examples such as binary search, Fibonacci numbers, and Hanoi towers.</p>	08
II	<p>Queues: Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.</p> <p>Linked lists: Array Implementation and Pointer Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition Subtraction & Multiplications of Single variable.</p>	08



16-10-2020

III	<p>Trees: Basic terminology used with Tree, Binary Trees, Binary Tree Representation: Array Representation and Pointer (Linked List) Representation, Binary Search Tree, Complete Binary Tree, A Extended Binary Trees, Tree Traversal algorithms: Inorder, Preorder and Postorder, Constructing Binary Tree from given Tree Traversal, Operation of Insertion, Deletion, Searching & Modification of data in Binary Search Tree. Threaded Binary trees, Huffman coding using Binary Tree, AVL Tree and B Tree.</p> <p>Graphs: Terminology used with Graph, Data Structure for Graph Representations: Adjacency Matrices, Adjacency List, Adjacency. Graph Traversal: Depth First Search and Breadth First Search, Connected Component.</p>	08
IV	<p>Searching: Concept of Searching, Sequential search, Index Sequential Search, Binary Search, Concept of Hashing & Collision resolution Techniques used in Hashing.</p> <p>Sorting: Insertion Sort, Selection Sort, Bubble Sort, Heap Sort, Comparison of Sorting Algorithms, Sorting in Linear Time: Counting Sort and Bucket Sort.</p>	08
V	<p>Divide and Conquer with Examples Such as Merge Sort, Quick Sort, Matrix Multiplication: Strassen's Algorithm</p> <p>Dynamic Programming: Dijkstra Algorithm, Bellman Ford Algorithm, All-pair Shortest Path: Warshal Algorithm, Longest Common Sub-sequence</p> <p>Greedy Programming: Prims and Kruskal algorithm.</p>	08

Suggested Readings:

1. Cormen T. H., Leiserson C. E., Rivest R. L., and Stein C., "Introduction to Algorithms", PHI. 3rd edition
2. Horowitz Ellis, Sahni Sartaj and Rajasekharan S., "Fundamentals of Computer Algorithms", 2nd Edition, Universities Press.
3. Dave P. H., H. B. Dave, "Design and Analysis of Algorithms", 2nd Edition, Pearson Education 2013.
4. Lipschutz S., "Theory and Problems of Data Structures", Schaum's Series. 2nd Edition
5. Goyal K. K., Sharma Sandeep & Gupta Atul, "Data Structures and Analysis of Algorithms", HP Hamilton.
6. Lipschutz, Data Structures With C-SIE-SOS, McGraw Hill 3rd edition
7. Samanta D., "Classic Data Structures", 2nd Edition Prentice Hall India.
8. Goodrich M. T. and Tomassia R., "Algorithm Design: Foundations, Analysis and Internet examples", John Wiley and sons.
9. Sridhar S., "Design and Analysis of Algorithms", Oxford Univ. Press. 3rd edition 2014
10. Aho, Ullman and Hopcroft, "Design and Analysis of algorithms", Pearson Education. 3rd Edition
11. R. Neapolitan and K. Naimipour, "Foundations of Algorithms", 4th edition, Jones and Bartlett Student edition.
12. Reema Thareja, Data Structures using C, Oxford Univ. Press 2nd edition 2014

[Handwritten signatures and dates]

16-10-2020



MCA - 216 : CYBER SECURITY

L-T-P : 2-0-0

(Qualifying Course)

External Max. Marks : 70

Unit	Topic	Proposed Lecture
I	Introduction- Introduction to Information Systems, Types of Information Systems, Development of Information Systems, Introduction to Information Security and CIA triad, Need for Information Security, Threats to Information Systems, Information Assurance and Security Risk Analysis, Cyber Security.	08
II	Application Security- (Database, E-mail and Internet), Data Security Considerations-(Backups, Archival Storage and Disposal of Data), Security Technology-(Firewall , VPNs, Intrusion Detection System), Access Control. Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail Viruses, Macro Viruses, Malicious Software, Network and Denial of Services Attack.	08
III	Introduction to E-Commerce , Threats to E-Commerce, Electronic Payment System, e- Cash, Credit/Debit Cards. Digital Signature, Cryptography Developing Secure Information Systems, Application Development Security, Information Security Governance & Risk Management, Security Architecture & Design Security Issues in Hardware, Data Storage & Downloadable Devices. Physical Security of IT Assets - Access Control, CCTV, Backup Security Measures.	08
IV	Security Policies- Why policies should be developed, Policy Review Process, Publication and Notification Requirement of policies, Types of policies – WWW policies, Email Security policies, Corporate Policies, Sample Security Policies. Case Study – Corporate Security	08
V	Information Security Standards- ISO, IT Act, Copyright Act, IPR. Cyber Crimes , Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law, Copy Right Law , Semiconductor Law and Patent Law , Software Piracy and Software License.	08



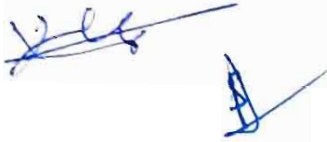
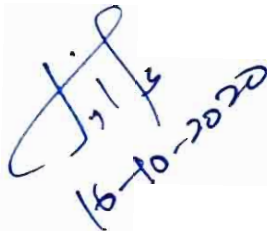
15/10/2020

MCA – 251 : OBJECT ORIENTED PROGRAMMING LAB

L-T-P :0-0-4 External Max. Marks : 50

1. Use Java compiler and eclipse platform to write and execute javaprogram.
2. Creating simple javaprograms,
3. Understand OOP concepts and basics of Javaprogramming.
4. Create Java programs using inheritance andpolymorphism.
5. Implement error-handling techniques using exception handling andmultithreading.
6. Understand the use of javapackages.
7. File handling and establishment of databaseconnection.
8. Develop a calculator application injava.
9. Develop a Client ServerApplication.
10. Develop GUI applications using Swingcomponents.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.

A handwritten signature in blue ink, appearing to be 'VLS', with a horizontal line extending to the right.A handwritten signature in blue ink, appearing to be 'SM', with a horizontal line extending to the right.A handwritten signature in blue ink, appearing to be 'J.P.', with the date '16-10-2020' written below it.

MCA - 252: DATABASE MANAGEMENT SYSTEMS LAB

L-T-P ;0-0-4

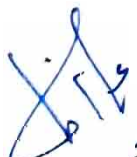
External Max. Marks : 50

1. Installing oracle/MYSQL.
2. Creating Entity-Relationship Diagram using casetools.
3. Writing SQL statements Using ORACLE/MYSQL:
 - a. Writing basic SQL SELECT statements.
 - b. Restricting and sorting data.
 - c. Displaying data from multiple tables.
 - d. Aggregating data using group function.
 - e. Manipulating data.
 - f. Creating and managing tables.
4. Normalization.
5. Creating cursor.
6. Creating procedure and functions.
7. Creating packages and triggers.
8. Design and implementation of payroll processing system.
9. Design and implementation of Library Information System.
10. Design and implementation of Student Information System.
11. Automatic Backup of Files and Recovery of Files.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.







16-10-2020

MCA – 253:DATA STRUCTURES & ANALYSIS OF ALGORITHMS LAB

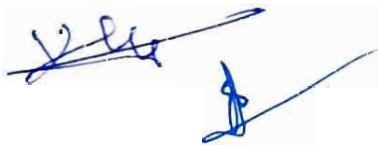
L-T-P :0-0-4

External Max. Marks : 50

Program in C or C++ for following:

1. To implement addition and multiplication of two 2Darrays.
2. To transpose a 2Darray.
3. To implement stack usingarray
4. To implement queue usingarray.
5. To implement circular queue usingarray.
6. To implement stack using linkedlist.
7. To implement queue using linkedlist.
8. To implement BFS using linkedlist.
9. To implement DFS using linkedlist.
10. To implement LinearSearch.
11. 11.To implement BinarySearch.
12. To implement BubbleSorting.
13. To implement SelectionSorting.
14. To implement InsertionSorting.
15. To implement MergeSorting.
16. To implement HeapSorting.
17. To implement Matrix Multiplication by strassen'salgorithm
18. Find Minimum Spanning Tree using Kruskal'sAlgorithm

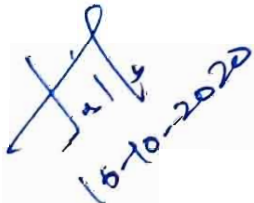
Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.



Handwritten signature and date: 12/11/20



Handwritten signature



Handwritten signature and date: 15-10-2020