Syllabus

MCA 1st Year Ist Semester

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

KCA101: FUNDAMENTAL OF COMPUTERS & EMERGING TECHNOLOGIES

Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to		
CO 1	Demonstrate the knowledge of the basic structure, components, features and generations of computers.	K_1, K_2
CO 2	Describe the concept of computer languages, language translators and construct algorithms to solve problems using programming concepts.	K_2, K_3
CO 3	Compare and contrast features, functioning & types of operating system and computer networks.	K_4
CO 4	Demonstrate architecture, functioning & services of the Internet and basics of multimedia.	K_2
CO 5	Illustrate the emerging trends and technologies in the field of Information Technology.	K_1, K_2
DETAILED SYLLABUS		3-0-0
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.
2. Norton P., "Introduction to Computers", McGraw Hill Education.
3. Goel A., "Computer Fundamentals", Pearson.
4. Balagurusamy E., " Fundamentals of Computers", McGraw Hill
5. Thareja R., "Fundamentals of Computers", Oxford University Press.
6. Bindra J., "The Tech Whisperer- on Digital Transformation and the Technologies that Enable it ", Penguin

KCA102 :PROBLEM SOLVING USING C		
Course Outcome (CO)		**Bloom's Knowledge Level (KL)**
At the end of course , the student will be able to		
CO 1	Describe the functional components and fundamental concepts of a digital computer system including number systems.	K_1, K_2
CO 2	Construct flowchart and write algorithms for solving basic problems.	K_2, K_3
CO 3	Write 'C' programs that incorporate use of variables, operators and expressions along with data types.	K_2, K_3
CO 4	Write simple programs using the basic elements like control statements, functions, arrays and strings.	K_2, K_3
CO 5	Write advanced programs using the concepts of pointers, structures, unions and enumerated data types.	K_2, K_3
CO 6	Apply pre-processor directives and basic file handling and graphics operations in advanced programming.	K_2, K_3
DETAILED SYLLABUS		**3-1-0**
Unit	**Topic**	**Proposed Lecture**
I	**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. **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.	**08**
II	**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. **Loops and Iteration:** for, while and do-while loops, Multiple loop variables, Nested loops, Assignment operators, break and continue statement. **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.	**08**
III	**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. **Pointers:** Introduction, Characteristics, * and & operators, Pointer type declaration and assignment, Pointer arithmetic, Call by reference, Passing pointers to functions, arrayof pointers, Pointers to functions, Pointer to pointer, Array of pointers. **Strings:** Introduction, Initializing strings, Accessing string elements, Array of strings, Passing strings to functions, String functions.	**08**

IV	**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. **Union:** Introduction, Declaring union, Usage of unions, Operations on union. Enumerated data types **Storage classes**: Introduction, Types- automatic, register, static and external.	**08**
V	**Dynamic Memory Allocation**: Introduction, Library functions – malloc, calloc, realloc and free. **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. **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.	**08**

Suggested Readings:

1. Kanetkar Y., "Let Us C", BPB Publications.
2. Hanly J. R. and Koffman E. B.,"Problem Solving and Program Design in C", Pearson Education.
3. Schildt H., "C- The Complete Reference", McGraw-Hill.
4. Goyal K. K. and Pandey H.M., Trouble Free C", University Science Press
5. Gottfried B., "Schaum's Outlines- Programming in C", McGraw-Hill Publications.
6. Kochan S.G., "Programming in C", Addison-Wesley.
7. Dey P. and Ghosh M., "Computer Fundamentals and Programming in C", Oxford University Press.
8. Goyal K. K., Sharma M. K. and Thapliyal M. P. "Concept of Computer and C Programming", University Science Press.

KCA103 : Principles of Management & Communication		
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**	
At the end of course , the student will be able to		
CO 1	Describe primary features, processes and principles of management.	K_1, K_2
CO 2	Explain functions of management in terms of planning, decision making and organizing.	K_3, K_4
CO 3	Illustrate key factors of leadership skill in directing and controlling business resources and processes.	K_5, K_6
CO 4	Exhibit adequate verbal and non-verbal communication skills	K_1, K_3
CO 5	Demonstrate effective discussion, presentation and writing skills.	K_3, K_5
DETAILED SYLLABUS		**3-0-0**
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, Deligation.	**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:

1. P.C. Tripathi, P.N. Reddy, "Principles of Management", McGraw Hill Education 6th Edition.
2. C. B. Gupta, "Management Principles and Practice", Sultan Chand & Sons 3rd edition.
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 SeemaVerma, "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 5thEdition 2008.
8. Robbins and Coulter, "Management", Prentice Hall of India, 9th edition.
9. James A. F., Stoner, "Management", Pearson Education Delhi.
10. P.D.Chaturvedi, "Business Communication", Pearson Education.

KCA104 : Discrete Mathematics		
Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to		
CO 1	Use mathematical and logical notation to define and formally reason about basic discrete structures such as Sets, Relations and Functions	K_1, K_2
CO 2	Apply mathematical arguments using logical connectives and quantifiers to check the validity of an argument through truth tables and propositional and predicate logic	K_2, K_3
CO 3	Identify and prove properties of Algebraic Structures like Groups, Rings and Fields	K_3, K_4
CO 4	Formulate and solve recurrences and recursive functions	K_3, K_4
CO 5	Apply the concept of combinatorics to solve basic problems in discrete mathematics	K_1, K_3
DETAILED SYLLABUS		3-0-0
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, Piano'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:

1. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", McGraw Hill, 2006.
2. B. Kolman, R.C Busby and S.C Ross, "Discrete Mathematics Structures", Prentice Hall ,2004.
3. R.P Girimaldi, "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. Liptschutz, Seymour, "Discrete Mathematics", McGraw Hill.
8. J.P. Trembely&R.Manohar, "Discrete Mathematical Structure with application to Computer Science", McGraw Hill.

KCA105 : COMPUTER ORGANIZATION & ARCHITECTURE

Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to		
CO 1	Describe functional units of digital system and explain how arithmetic and logical operations are performed by computers	K_2, K_3
CO 2	Describe the operations of control unit and write sequence of instructions for carrying out simple operation using various addressing modes.	K_2, K_4
CO 3	Design various types of memory and its organization.	K_3
CO 4	Describe the various modes in which IO devices communicate with CPU and memory.	K_2, K_3
CO 5	List the criteria for classification of parallel computer and describe various architectural schemes.	K_1, K_2
DETAILED SYLLABUS		**3-1-0**
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 1/2D 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:

1. John P. Hayes, "Computer Architecture and Organization", McGraw Hill.
2. William Stallings, "Computer Organization and Architecture-Designing for Performance", Pearson Education.
3. M. Morris Mano, "Computer System Architecture", PHI.
4. Carl Hamacher, ZvonkoVranesic, SafwatZaky, "Computer Organization", McGraw-Hill.
5. BehroozParahami, "Computer Architecture", Oxford University Press.
6. David A. Patterson and John L. Hennessy, "Computer Architecture-A Quantitative Approach", Elsevier Pub.
7. Tannenbaum, "Structured Computer Organization", PHI.

KCA151: PROBLEM SOLVING USING C LAB	
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**
At the end of course , the student will be able to	
CO1 — Write, compile, debug and execute programs in a C programming environment.	K_3
CO2 — Write programs that incorporate use of variables, operators and expressions along with data types.	K_3
CO3 — Write programs for solving problems involving use of decision control structures and loops.	K_3
CO4 — Write programs that involve the use of arrays, structures and user defined functions.	K_3
CO5 — Write programs using graphics and file handling operations.	K_3

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 inC 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/modifyexperiments, wherever he/she feels in a justified manner.

KCA152: COMPUTER ORGANIZATION & ARCHITECTURE LAB	
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**
At the end of course , the student will be able to	
CO1	Design and verify combinational circuits (adder, code converter, decoder, multiplexer) using basic gates.	K_6
CO2	Design and verify various flip-flops.	K_3
CO3	Design I/O system and ALU.	K_3
CO4	Demonstrate combinational circuit using simulator	K_2

1. Implementing HALF ADDER, FULL ADDER using basic logic gates.
2. Implementing Binary -to -Gray, Gray -to -Binary code conversions.
3. Implementing 3-8 line DECODER. Implementing 4x1 and 8x1 MULTIPLEXERS.
4. Verify the excitation tables of various FLIP-FLOPS.
5. Design of an 8-bit Input/ Output system with four 8-bit Internal Registers.
6. Design of an 8-bit ARITHMETIC LOGIC UNIT.
7. Design the data path of a computer from its register transfer language description.
8. Design the control unit of a computer using either hardwiring or microprogramming based on its register transfer language description.
9. Implement a simple instruction set computer with a control unit and a data path.

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

KCA153 : PROFESSIONAL COMMUNICATION LAB	
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**
At the end of course , the student will be able to	
CO1	Develop the ability to work as a team member as an integral activity in the workplace.	K_3
CO2	Increase confidence in their ability to read, comprehend, organize, and retain written information. Improve reading fluency.	K_4
CO3	Write coherent speech outlines that demonstrate their ability to use organizational formats with a specific purpose; Deliver effective speeches that are consistent with and appropriate for the audience and purpose.	K_5, K_6
CO4	Develop proper listening skills; articulate and enunciate words and sentences clearly and efficiently.	K_3
CO5	Show confidence and clarity in public speaking projects; be schooledin preparation and research skills for oral presentations.	K_5

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.