MCA Programme Structure (2019 Batch)

First Semester					
Theory					
Sl. No	**Category**	**Course Code**	**Course Title**	**L-T-P**	**Credit**
1	IT	19MC101	Problem Solving using C	3-0-0	3
2	BM	19MC102	Principles and Practice of Management	3-0-0	3
3	MATH	19MC103	Mathematics - I	3-0-0	3
4	BM	19MC104	Engineering Economics	3-0-0	3
5	BM	19MC105	Green Computing	3-0-0	3
Total Credit (Theory)					15
Practical					
1	LAB	19MC106	Problem Solving using C Lab	0-0-4	2
Total Credit (Practical)					2
Total Semester Credit					17

19MC101	Problem Solving Using C (3-0-0)	3 Credits

Course Objective:
The course aims to provide exposure to problem-solving through programming. It aims to train the student to the basic concepts of the C-programming language. This course involves a lab component which is designed to give the student hands-on experience with the concepts.

Course Outcomes:
Upon the successful completion of the course, students will be able to:

1. Describe the basics of programming language and its syntax and understand the problem solving aspect.
2. Design and develop C program to solve different real life problems efficiently.
3. Analyse and compare different possible solutions.

Module- I: Introduction to Programming (8 Hrs.)
Computers Fundamentals: Recap of Classification of Computers, Application of Computers, Basic organization of computer, Input and Output Devices, Binary Number System, Computer memory, Computer Software, operating system, compilers etc. Idea of Algorithm: Steps to solve logical and numerical problems. Representation of Algorithm: Algorithm /Flowcharts / Pseudocode, Generation of Programming Languages. Introduction to Language: Structure of C Program, Life Cycle of Program from Source code to Executable, Compiling and Executing C Code, Keywords, Identifiers, Primitive Data types in C, variables, constants, input/output statements in C. Operators and Expressions: Expression evaluation: Operator Precedence and Associativity.

Module- II: Control Structure and Array (10 Hrs.)
Conditional Branching: One (simple if), two (if else) and multi way selection(else if ladder and switch and nested selection), Iteration and loops: Iterative statements, nested loops, break and continue statements. Arrays & Strings: One-dimensional, Two-dimensional and Multi-dimensional arrays, operations on array: traversal, insertion, deletion, merging and searching, Character arrays and Strings and String Operations (with and without library functions).

Module- III: Function & Pointer (10 Hrs.)
Function: Declaration, Definition, Call and return, Call by value, Call by reference, showcase stack usage with help of debugger, Scope of variables, Storage classes, Recursive functions, Recursion vs Iteration. Example programs, such as Finding Factorial, Fibonacci series. Pointers: Idea of pointers, Defining pointers, Use of Pointers in Inter-function communication via arrays, matrices. Reading, writing and manipulating Strings, Understanding computer memory, accessing via pointers,

pointers to arrays, dynamic allocation, drawback of pointers. Dynamic memory allocation: Memory Layout Implicit vs. Explicit Allocation; Static vs. Dynamic Allocation; Motivation for Dynamic Allocation.

Module- IV: Structure & File **(8 Hrs.)**

Structure: Structures, Defining structures and Array of Structures, Structure vs Union, self-referential structures, nested structures, notion of linked list (no implementation)

Pre-processor and Storage classes, File handling: ASCII and binary Files, command line arguments.

Module- V: Searching and Sorting **(4 Hrs.)**

Introduction to searching and sorting, Linear search, Binary search, selection sort, Bubble sort.

Text Books:

1. Behrouz A. Forouzan & Richard F. Gilberg, "A structured Programming Approach Using C", 3rd Edition, Cengage Publication, ISBN: 9788131503638, 2007.
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition, Prentice Hall of India, 2015.
3. Byron Gottfried, Schaum's Outline of Programming with C, 3rd Edition, McGraw-HillBook, 1st July 2017.

Suggested MOOC Course (s):

1. https://nptel.ac.in/courses/106105085/4 [Last accessed on: 08/05/2019]

19MC102	Principles and Practices of Management (3-0-0)	3 Credits

Module- I: **(10 Hrs.)**

Nature and functions of Management: What Managers do?, Definition, Management as a Science, Art, Profession, Levels of Managers, Management Process, Skills of Managers, Role of Managers. Scientific Management Theory (Taylo*r)*, Administrative Management Theory (Fayol), Behaviouristics Management (Mayo). Systems Theory, Contingency Management theory.

Module- II: **(10 Hrs.)**

Planning Nature and Purpose of Planning, Planning Process, Principles of Planning, Types of Planning, Advantages and Limitations of Planning and Effective Planning. Organizing: Nature and Purpose of Organizing, Key components of organizing, Bases of Departmentation, Span of Management and

its determinants, Line and Staff Relationship, Line-Staff Conflict, Bases of Delegation, Kinds of Delegation and Decentralization.

Module- III: **(10 Hrs.)**

Staffing: Importance, manpower planning, Recruitment and selection, Training and Development, Performance appraisal. Leadership: Different sources of power, Management and leadership Approaches to leadership and styles.

Module- IV: **(10 Hrs.)**

Controlling: Concept and Process of Control, Control Techniques, Human Aspects of Control, Control as a Feedback System, Feed Forward Control, Preventive Control, Profitand Loss Control, Control Through Return on Investment, The Use of Computer for Controlling and Decision Making, The Challenges Created by IT as a Control Tool. Decision Making Process, Individual Decision Making Models.

Module- V: (as per choice of faculty) **(6 Hrs.)**

Portion covered can be tested through Internal evaluation only not to be included in University examination)

Reference Books:

1. Stephen P. Robbins, David A. Decenzo, Sanghmitra Bhattacharya, Madhushree Nanda Agarwal, Fundamentals of Management, Pearson Education, 2009
2. Kreitner, Management Theory and Applications, Cengage Learning, India, 2009
3. Robbins, Management, 9th edition Pearson Education, 2008,
4. Griffin, Management Principles and Applications, Cengage Learning, India First Edition
5. Harold Koontz, O'Donnell and Heinz Weihrich, Essentials of Management. New Delhi, Tata McGraw Hill, 2006
6. Stoner, Management, PHI Learning, 2008
7. Richard L. Daft, Principles Of Management, CengageLearning,India, 2009
8. Principles of Management, Meenakshi Gupta, PHI
9. Principles of Management, RN Gupta, S.Chand

19MC103	Mathematics - I (3-0-0)	3 Credits

Course Objective:

1. Familiarize with different types of matrices, techniques of matrix algebra.
2. Solve the system of linear equations ,that arise in many problems of physical world by using techniques of matrix algebra.
3. Understand the concept of eigen values, eigen vectors and its applications. Acquire the knowledge of reduction of quadratic to canonical form and its applications
4. Exposed to some foundational ideas in number theory without the technical baggage often associated with a more advanced courses.
5. The course provides students an opportunity to develop an appreciation of pure mathematics while engaged in the study of number theoretic results.
6. The course is also designed to provide students an opportunity to work with conjectures, proofs, and analyzing mathematics.

Module- I:

Types of matrices, Matrix Algebra, Rank-Echelon form, Normal form ,Solution of system of linear equations -Gauss Elimination-Gauss Jordan method, Inverse of matrices (Gauss-Jordan).

Module- II:

Eigen values and eigen vectors-Properties, Caley Hamiltons theorem –inverse and power by using Caley Hamiltons theorem, Orthogonal matrices, Complex matrices, Hermitian and skew matrices, Unitary matrices and similarity of matrices.

Module- III:

Diagonalisation of Matrices, Quadratic forms, Reduction of quadratic forms to canonical form, Rank,index,signature, definiteness of quadratic form.

Module- IV:

Divisibility: ged, lem, prime numbers, fundamental theorem of arithmetic, perfect numbers, floor and ceiling functions. Congruence: properties, complete and reduced residue systems, Fermat's theorem. Euler function.

Module- V:

Indeterminate equations: Linear and second degree Diophantine equations. Congruence in one unknown, Chinese remainder theorem, congruences of higher degree with prime and composite modulo, Wilson's theorem, quadratic residues.

Course Outcomes:

On Completion of this Subject/ Course the students should be able to:

1. Calculate the rank of a matrix, and apply the knowledge to check the

consistency of a linear system of equations, find the solution of a linear system of equations

2. Find eigen values, eigen vectors and diagonalise a matrix. Also explore the idea to reduce a quadratic form to canonical form and find its nature
3. Define and interpret the concepts of divisibility, congruence, greatest common divisor, prime, and prime factorization.
4. Prove statements and solve problems involving divisibility, prime numbers and Euclidean algorithm.
5. Solve various types of congruence problems and use theory of congruences in applications.
6. Apply techniques to solve linear Diophantine equations.
7. Apply properties of multiplicative functions such as Euler's Phi function.

Text Books:

1. Advanced Engineering Mathematics by E. Kreyszig, Tenth Edition, Willey
2. Higher Engineering Mathematics by B.V. Raman, , McGraw Hills Education
3. Theory of Numbers – C.Y.Hsiung, Allied Publishers (World Scientific) New Delhi – 1992 (Module IV & V)

Reference Books

1. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers
2. Introduction to Analytic number theory – Tom M. Apostol, Narosa Publishing House
3. An Introduction to the theory of Numbers – Niven & H. S. Zuckerman 3/e John Wiley & Sons, New York 1992.

19MC104	Engineering Economics (3-0-0)	3 Credits

Module-I: **(8 Hrs.)**

Introduction to Economics: Definition, scope and nature of economics, consumption laws, demand & supply analysis, elasticity of demand& supply, indifference curve analysis.

Module-II: **(10 Hrs.)**

Production : factors of production, production function, law of variable proportion, laws of return to scale, elasticity of factor-substitution, optimal combination of factor-inputs, production efficiency, economies of scales, Cost of Production: types of costs, economic costs: fixed cost and variable costs, short-run and long-run cost functions.

Module- III: **(10 Hrs.)**

Market Structure: pure competition, perfect competition, imperfect market, monopoly and oligopoly. Indian Banking System, Functions and Roles of Commercial Banks and Reserve Bank of India.

Module- IV: **(12 Hrs.)**

Time value of money and interest formulae, Nominal and effective rate of interest, Present, Annual and Future worth analysis, Rate of Return Analysis, Cost-Benefit analysis in Public sector projects.

Module- V: (as per choice of faculty) **(8 Hrs.)**

Portion covered can be tested through Internal evaluation only not to be included in University examination.

References:

1. Koutsoyiannis, A., 'Modern Microeconomics', English Language Book Society, Macmillan.
2. Pindyck, R S, Rubinfeld, D L &Mehta , 'Microeconomics', 6 th Edition, Pearson Education India.
3. Varian, H R, 'Intermediate Microeconomics', 7th edition, East West Press India.
4. Samuelson, Paul A, 'Economics', 5th edition, McGraw Hill New York.
5. Basics of Engineering Economy; Leland Blank and Anthony Tarquin, TMH
6. Contemporary Engineering Economics, Chan. S Park, Pearson
7. Engineering Economics, Paneerselvam, PHI
8. Engineering Economics; Sasmita Mishra, P

19MC105	Green Computing (3-0-0)	3 Credits

Course Objective:

1. To understand about different environmental issues, pollutions, it's effect and prevention measure.
2. To understand green computing and how it can help improve environmental sustainability.
3. To acquire knowledge to adopt green computing practices.
4. To understand how storage systems, data centers and networks can be made greener.

Module- I: **(9 Hrs.)**

Scope and importance of environmental studies, environment and its components, ecosystem, environmental pollution; Air, water, soil, Thermal, nuclear and solid waste management, e-waste management.

Module- II: **(9 Hrs.)**

Green IT Fundamentals, Winning with Green IT- Basic Green Concepts, Green and IT, IT Ecosystem, Why Green IT now, Do's and Don't of Green IT, Making business case for Green IT, Policies for change, balancing carbon Foot print, Standards and Metrics.

Module- III: **(9 Hrs.)**

Emerging standards with IT practices, reviewing Established and emerging Standards Assessing organization's current energy and needs, Understanding energy terms and terminology, Building Audit for energy requirement, policy based management, Efficiency factors, Carbon reduction options, putting a master plan for go green. Green Information system, Managing Information cycle, Optimizing Storage.

Module- IV: **(9 Hrs.)**

Greening the data center, foundation for Green data management, formalizing best practices for Green IT, Information life cycle management, Tired storage architecture, Going greener with Hosted Data Center Services, maximizing data center efficiency- proper site selection, consolidating physical infrastructure, usage of green servers, managing servers for energy efficiency, planning data center cooling factors- basics of cooling system, bench marking cooling system's efficiency , managing the storage system from green perspective, managing the network to become green.

Module- V: **(9 Hrs.)**

Virtualization, understanding virtualization, building virtual infrastructure, enabling virtual, using energy efficient machines, desktop virtualization, usage of thin client, collaboration tools – text, voice, video, Video conference, Tele Presence, Paperless office, changing printing habits, using digital documents, evaluating green gadgetry, powering gadgets intelligently, greening the facility, lighting for less, landscaping in a sustainable way, Improving the indoor environment.

Course Outcomes:

1. Explore about green computing initiative taken by industry (like IBM).
2. Understand energy generation and delivery in an organization, will be able to investigate different green computing approaches.
3. Promote green agenda and green initiatives in their working place.

Suggested Books:

1. Green IT For Dummies; Carol Baroudi; Jeffrey Hill; Arnold Reinhold; Jhana Senxian
2. Publisher: For Dummies.
3. Environmental Studies, Basak, Pearson.
4. Bhuvan Unhelkar, ―Green IT Strategies and Applications-Using Environmental Intelligence‖, CRC Press, June 2011
5. Woody Leonhard, Katherrine Murray, ―Green Home computing for dummies, August 2009.

19MC106	Problem Solving using C Lab (0-0-4)	2 Credits

Course Objective:
This course is aimed at concepts of programming and software code development of moderate complexity using C programming language within the framework of structural and procedural programming paradigms.

Course Outcomes:
Upon the successful completion of the sessional course, students will be able to:

1. Understand problem solving approach of moderate complexity in Linux environment.
2. Design and develop C program to solve different real life problems efficiently.
3. Analyse and compare different possible solutions.

List of Suggested Programs

1. Familiarity with basic LINUX command, vi editor.
2. Programs on arithmetic expressions, data type limits, operators and precedence.
3. Programs on Conditional Branching.
4. Programs on Loops.
5. Programs on single dimensional array.
6. Programs on two-dimensional array.
7. Programs on String operations (with and without library functions)
8. Programs on Functions (searching and sorting).
9. Programs on Recursive Functions.
10. Programs on Pointers.
11. Programs on Dynamic Memory Allocation.
12. Programs on Structure & Union.
13. Programs on File Handling.