

Samrat Ashok Technological Institute Vidisha (M.P.)
M.C.A. Two Year Programme

S. No	Subject Code	Subject Name	Periods Per Week			Maximum Marks (Theory)			Maximum Marks (Practical)		Total Marks	Credits
			L	T	P	End sem. Exam.	Mid Sem.	Assignments/Quiz	End Sem. Practical Viva	Practical records/Assignments/Seminar		
1	MCA-201	Data Structures	3	1	-	60	20	20	-	-	100	4

Course Description	This course is a study of dealing with various data structures and their operations for efficient access of data.
Prerequisite Knowledge	Basic knowledge of programming.
Course Objectives	<ol style="list-style-type: none"> 1. To understand the concepts of ADTs. 2. To Learn linear data structures – lists, stacks, and queues. 3. To understand sorting, searching and hashing algorithms. 4. To apply Tree and Graph structures.
Course Outcomes	<p>This course is to develop student's abilities to:</p> <ol style="list-style-type: none"> 1. Learn the basic types for data structure, implementation and application. 2. Know the strength and weakness of different data structures. 3. Use the appropriate data structure in context of solution of given problem. 4. Develop programming skills which require to solve given problem.

UNIT-I: Abstract Data Types (ADTs) – List ADT array-based implementation, **linked list implementation**, singly linked lists, circularly linked lists, doubly-linked lists, applications of lists, Polynomial Manipulation, All operations (Insertion, Deletion, Merge, Traversal)

UNIT-II: Stack– Operations, Applications, Evaluating arithmetic expressions, Conversion of Infix to postfix expression, Queue Operations, Circular Queue, Priority Queue, dequeue, applications of queues

UNIT-III: Tree– tree traversals, Binary Tree, expression trees, applications of trees, binary search tree, Threaded Binary Trees, AVL Trees, B-Tree, B+ Tree, **Heap** – Applications of heap

UNIT-IV: Definition, Representation of Graph – Types of graph, Breadth-first traversal, Depth-first traversal, Topological Sort, Bi connectivity, Cut vertex, Euler circuits, Applications of graphs

UNIT-V: Searching- Linear Search, Binary Search. Sorting – Bubble sort, Selection sort, Insertion sort, Shell sort, Radix sort. **Hashing**- Hash Functions, Separate Chaining, Open Addressing, Rehashing, Extendible Hashing

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Recommended Books: -

1. "Data structure Using C & C++ " by Tenenbaum A. M, Langsam, & Augenstein, 2nd Edition ,Pearson 2015
2. "Fundamental of Data structure in C" by Horowitz, Sahani & Anderson, 2nd Edition, Orient Blackswan, 2008
3. "Data Structures Using C" by Reema Thareja, 2nd Edition, Oxford University Press, 2011

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2	MCA-202	Software Engineering	3	1	-	60	20	20	-	-	100	4

Course Description	This course is a study of development of systems using various models such as water fall, spiral etc. where students are able to perform, analyze, design, coding, testing and maintenance of systems.
Prerequisite Knowledge	Fundamental knowledge of system, analysis and design
Course Objectives	<ol style="list-style-type: none"> 1. To provide a brief, hands-on overview of software development life cycle. 2. To understand and apply the various phases of software development like information gathering, feasibility, Process model, analysis, design, Estimations, quality, risk, maintenance, reengineering.
Course Outcomes	<p>This course is to develop student's abilities to:</p> <ol style="list-style-type: none"> 1. Understand the basic concept of software development. 2. Acquire the basic concepts of software process model to identify state & behavior of real world software projects. 3. Learn risk management of software projects. 4. Understand the concepts of software reengineering and computer aided software engineering 5. Implement the software development methodologies and choose the appropriate one for solving the problem with the help of various case studies.

UNIT-I: Introduction-The system concept, characteristics of system, elements of system, Types of information system, The System Development Life Cycle, Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models

UNIT-II: Software Requirement Specifications (SRS)-Software Requirement Specifications (SRS) Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility

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Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model

UNIT-III: Software Project Planning, Design Methodologies and Software Metrics, Software Project Planning: Project planning objectives, Decomposition Techniques, Empirical estimation models, Software Project Estimation Models, CPM/PERT. Design concept: Design Principles, Abstractions, refinement modularity, effective modular design, Cohesion & Coupling, Design notation, and specification, structure design methodologies, & design methods. Software Measurement and Metrics: Various Size Oriented Measures: Halstead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs

UNIT-IV: Software Testing, Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards

UNIT-V: Software Maintenance and Software Reengineering, Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Reengineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools

Recommended Books:

1. "Software Engineering: A Practitioners Approach" by R. S. Pressman, 8th Edition, McGraw Hill, 2014
2. "Software Engineering" by . K. K. Aggarwal and Yogesh Singh, 3rd Edition, New Age International Publishers,2007
3. "Software Engineering: A Practice Approach" by Pankaj Jalote, Wiley 2010




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3	MCA-203	Object Oriented programming in C++	3	1	-	60	20	20	-	-	100	4

Course Description	This course is a study of the basic features of object-oriented programming like object, data abstraction, data hiding, inheritance, operator overloading and polymorphism and their implementation in C++ language.
Prerequisite Knowledge	Programming Concept using C language.
Course Objectives	<ol style="list-style-type: none"> 1. To understand the basic features like object, data abstraction, data hiding, inheritance, operator overloading and polymorphism of object-oriented approach 2. To implement real world problems using the features of oops in c++ language. 3. To handle exceptions. 4. To work with files.
Course Outcomes	<p>This course is to develop student's abilities to:</p> <ol style="list-style-type: none"> 1. Understand and implement the basic features of object-oriented programming. 2. Solve real world problems using object-oriented approach.

UNIT-I: What is object-oriented programming and why we need it, features of oops, comparison of c and c++, output using cout, input using cin, setw manipulator, overloaded function, inline function, default arguments, static function, Structure of c++ program **UNIT-II:** Object & classes-Making sense of object concept, implementation of classes in c++, access specifiers, creation of objects, constructor and its types, destructor, objects as function arguments, returning objects from the function, structure and classes **UNIT-III:** Inheritance and operator overloading- overview of inheritance, types of inheritance, base class and derived class, derivation using public, protected and private access specifiers, implementation of inheritance in c++, concept of abstract class, concept of operator overloading, unary and binary operator overloading, overloading using friend functions, Overloading different operators **UNIT-IV:** Polymorphism- Compile Time and Runtime Polymorphism,

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Pointers to Objects, This pointer, Compatibility of Derived and base class pointers, Virtual functions, Virtual destructors, Pure virtual functions, Implementation of polymorphism in c++ **UNIT-V:** Need for streams, The C++ Predefined streams, Creating our own manipulator, Opening and closing files, Dealing with text files and binary files. Need for Exception handling, Components of exception handling mechanism, the exception Class

Recommended Books: -

1. "Object Oriented Programming in C++" by Lafore R. 4th Edition, CourseSams Publishing, 2001
2. "C++ the complete reference" by Schildt 4th Edition McGraw Hills, 2017
3. "Program Development and Design Using C++" by G. J. Bronson, 3rd Edition, Brooks/COLE Thomson Learning, 2006

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4	MCA-204	Fundamentals of Data Science	3	1	-	60	20	20	-	-	100	4

Course Description	This course is a study of fundamental concepts of data science and analytic techniques.
Prerequisite Knowledge	Knowledge of Database and statistical techniques.
Course Objectives	To impart knowledge about data analytics techniques, handling of big data and machine learning concept used in data science.
Course Outcomes	This course is to develop student's abilities to: <ul style="list-style-type: none"> 1. Understand the fundamental concept of Data Science. 2. Apply data analysis techniques for large data. 3. Demonstrate the various machine learning algorithms used in data science process.

UNIT-I: Data Science-What is Data Science, Need for Data Science, Difference between Data Science & Business Intelligence, Data Science Components, Tools for Data Science, Data Science Life cycle, Applications of Data Science, Data Science Ethics. Representation of Data- Types of data, primary, secondary, quantitative and qualitative data. Types of Measurements, nominal, ordinal, discrete and continuous data. Presentation of data by tables, construction of frequency distributions for discrete and continuous data, Graphical representation of a frequency distribution by histogram and frequency polygon, cumulative frequency distributions

UNIT-II: Data Preprocessing- Knowing Data, Data Cleaning, Data Integration, Data Selection, Data Transformation

UNIT-III: Descriptive Statistics-Arithmetic mean, Median, Mode, Geometric mean, Harmonic mean. Partition values: Quartiles, Deciles and percentiles. Measures of dispersion: Mean deviation, Quartile deviation, Standard deviation, Coefficient of variation. Moments: measures of skewness, Kurtosis

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UNIT-IV: Correlation-Scatter plot, Karl Pearson coefficient of correlation, Spearman's rank correlation coefficient, multiple and partial correlations. Regression: Concept of errors, Principles of Least Square, Simple linear regression and its properties. Types of Regressions

UNIT-V: Basics of Big Data, Problem handling large data, general techniques for handling large data, Basic concept of Machine Learning , Training model, validating model, supervised & unsupervised learning

Recommended Books: -

1. "Introducing Data Science" by Davy Cielen, Arno D. B. Meysman, Mohamed Ali, 1st Edition, Manning Publications Co., 2016
2. "An Introduction to Probability and Statistics" by Rohatgi V.K and Saleh E, 3rd Edition, John Wiley & Sons Inc., New Jersey, 2015
3. "Data Mining Concept & Techniques" by Han & Kember, 3rd Edition, The Morgan Kaufmann, 2011

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4	MCA-205 Elective 1(a)	Computer Graphics	3	1	-	60	20	20	-	-	100	4

Prerequisites: Basic Knowledge of Matrix, 2-dimensional & 3-dimensional concepts.

Course Objectives: Throughout the course, students will be expected to demonstrate their understanding in Computer Graphics by being able to:

- A) Understand the basic concepts of computer graphics and its applications.
- B) Apply and analyze the algorithms to draw graphics output primitives.
- C) Apply and create 2-D & 3-D transformation on various objects.

COURSE CONTENTS

UNIT I:

Basic of Computer Graphics, Applications of computer graphics, Display devices, Cathode Ray Tube, quality of phosphors, CRTs for color display, beam penetration CRT, The Shadow - Mask CRT, Direct View Storage Tube, LED and LCD. Graphics input devices, Graphics software and standards, Output primitives, attributes of output primitives, point and line style, color and intensity, Area filling algorithms, Scan line algorithm, boundary fill & flood fill algorithm, Antialiasing techniques.

UNIT II :

Line drawing- various algorithms and their comparison, circle generation - Bresenham's midpoint circle drawing algorithm, 2D transformation- Basic Transformations, Matrix Representation and Homogeneous Coordinates, translation, scaling, rotation, reflection, sheering, composite transformation, Window to view port transformation, line clipping algorithm; Cohen Sutherland, polygon clipping; Sutherland hodgman algorithm.

UNIT III:

Need for 3-Dimensional imaging, techniques for 3-Dimensional displaying, 3D transformation, projection and its types, Curve- parametric and non parametric functions, Bezier (Bernstein Polynomials) Curves, Cubic-Splines, B-Splines, Need for hidden surface removal, Back face detection, Z-buffer method, Painter's algorithm.

UNIT IV:

Shading Algorithms-Phong's shading model, Gouraud shading, Shadows and background, illumination, light sources, illumination methods (ambient, diffuse reflection, specular reflection), Color models: properties of light, XYZ, RGB, YIQ and CMY color models

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UNIT V: Multimedia systems-An introduction, multimedia hardware and architecture, Data and file format standard i.e. RTF, TIFF, MIDI, JPEG, MPEG, Video- AVI, 3GP, MOV, MPEG, Compression standards, Multimedia Authoring.

Reference Books:-

1. Computer Graphics C Version, Donald Hearn & M. Pauline Baker , Pearson Education, New Delhi, 2004 (Chapters 1 to 12 except 10-9 to 10-22)
2. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics- Principles and practice, Second Edition in C, Pearson Education, 2007. 3. OpenGL ES 3.0 Programming Guide 2nd Edition (English, Paperback, Budi Rijanto Purnomo, Dan Ginsburg), PEARSON.
4. Rogers, "Procedural elements of Computer Graphics", Tata McGraw Hill. 5. Parekh, "Principles if multimedia", Tata McGraw Hill.

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5	MCA-205 (Elective-I(b))	Web Application Development	3	1	-	60	20	20	-	-	100	4

Course Description	This course is a study of development of static and dynamic web pages using various web development technologies.
Prerequisite Knowledge	Basic Knowledge of Internet Concepts.
Course Objectives	To impart knowledge about web application development.
Course Outcomes	This course is to develop student's abilities to: <ul style="list-style-type: none"> 1. Understand the concept of web technologies. 2. Create web pages. 3. Development of website.

UNIT-I: BASICS OF HTML: Html tags, entities, links, frames, Text Alignment and Lists, Text Formatting, Fonts Control, head, meta, Email Links and link within a Page, creating a Table, rules of web designing, Creating HTML Forms. page design, home page layout, Design concepts, create a Web page with Graphics, Custom Backgrounds and Colors, Creating Animated Graphics, scripts, attributes, events, URL encode

UNIT-II: CASCADING STYLE SHEET: CSS, Defining Style with HTML Tags, Features of Style Sheet, Style Properties, Style Classes, External Style Sheet, Creating Style Sheet, working with block elements and objects, working with list and table, CSS advance **UNIT-III: JAVASCRIPT:** Introduction to JavaScript: Writing First JavaScript, External JavaScript, Variables: Rules for variable names, Declaring the variable, Assign a value to a variable, Scope of variable, Arrays, Using Operators, Control Statements, JavaScript loops, JavaScript Functions: Defining a Function, Returning value from function, User define function, Dialog Box

UNIT-IV: JAVASCRIPT DOM: Introduction Object in HTML, Event Handling, Window Object, Document Object, Browser Object, Form Object, Navigator Object, Screen Object, Built in Object, User defined Objects, Cookies

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UNIT-V: PHP BASICS: Origin and Uses of PHP, Overview of PHP, General Syntactic Characteristics, Primitives, Operators and Expressions, Output Statement, Control Statements, Arrays, Built-in Functions, User-defined Functions, Regular Expression, Validating Data Entry, Form Handling, Cookies, Session Tracking

Recommended Books:

1. "HTML & CSS: The complete reference" by Thomas A. Powell, 5th Edition, McGraw Hill, 2017
2. "JavaScript Bible" by Danny Goodman, 7th Edition, Wiley, 2010.
3. "Beginning PHP 5" by Dave W & others, Wiley-dreamtech, Edition 2004

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5	MCA-205 Elective-1(c)	Compiler Design	3	1	-	60	20	20	-	-	100	4

Prerequisites: Basic knowledge in Theory of Computations. Experience with programming languages such as C/C++.

Course Objectives: The purpose of the course is to give the participants knowledge of concepts and techniques required to implement and understand different phases of compiler design

COURSE CONTENTS

UNIT I:

Introduction to Compiler and Lexical Analysis: Introduction to Compiler, single and multi-pass compilers, Major data Structure in compiler, Overview and use of linker and loader, Interpreter and assembler, Bootstrapping, Role of Lexical Analyzer, Various Phases of Compiler, Input buffering, Regular expression, Finite automata, Specification and Recognition of tokens, LEX.

UNIT II:

Syntax Analysis And Parsing Techniques: Syntactic specification of programming languages: Context free grammars, derivation and parse trees, Ambiguous grammar, Introduction to Parsing and its techniques, Top-Down Parsing, Bottom Up Parsing, LR parsers(SLR, LALR, LR), Operator precedence parsing, Error Handling.

UNIT III:

Syntax Directed Translation & Intermediate Code Generation: Syntax-Directed Definitions, Construction of Syntax Trees, Bottom-Up Evaluation of S-Attributed Definitions, L-Attributed Definitions and Implementation of Syntax directed Translators, translation schemes. Intermediate code and translation of assignment statements, Boolean expression and control structures, Postfix notation, Three address codes, quadruples, triples and indirect triples.

UNIT IV:

Run Time Environment and Storage Allocation: Storage organization, activation records, Storage allocation

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strategies, Access to Non local Names, Parameter passing, symbol table, data structure used for symbol table generation, dynamic storage allocation techniques.

UNIT V:

Code Generation and Code Optimization: Global data flow analysis, Basic Block and Flow graphs, Directed Acyclic Graph, DAG representation of Basic Blocks, Back patching, Simple Code Generator, Issues in the design of Code generator, Local optimization, dead code elimination, Loop optimization, Peephole Optimization.

Reference Books:

1. Alfred Aho, Ravi Sethi, V/ Jeffery Ullman D. "Comp[ilers principles, techniques and tools", Addison-Wesley, 1988.
2. Alfred V Aho, Jeffrey D. Ullman, "Principles of Compiler Design", Narosa publication
3. Compiler construction(Theory and Practice), A. Barret William and R. M. Bates, Galgotia.
4. A.C. Holub, "CompilerDesign in C", Prentice-Hall Inc. 1993.
5. Raghavan, "Compiler Design", TMH Pub

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5	MCA- 205 Electi ve- 1(d)	Data Wareho using & Data Mining	3	1	-	60	20	20	-	-	100	4

Unit-I: Introduction to Data Warehousing: An overview and definition of DW, Difference between OLTP & OLAP, Multidimensional data model, Multidimensional cube, Concept hierarchies, Schemas for multidimensional data base, Measures and their categorizations & computations, OLAP operations, OLAP servers, metadata repository. The Design of a Data Warehouse a 3-Tier Data Warehouse Architecture; Enterprise Warehouse, Data mart, Virtual Warehouse

Unit-II: Pre-processing and Data Mining: The need for Pre-processing, Descriptive Data Summarization, Data Cleaning: Missing Values, Noisy Data, Data Cleaning as a Process. Data Integration & Transformation, Data Cube Aggregation: regression, log-linear models, histograms, clustering, sampling. Attribute Subset Selection, Dimensionality Reduction, Numerosity Reduction: Regression & Log-linear Models, Histograms, Clustering, Sampling. Data Discretization, what is Data Mining, KDD, Data Mining Functionalities, are all of the Patterns Interesting, Classification of Data Mining Systems, Integration of a Data Mining System with a Database or Data Warehouse System, Major Issues in Data Mining, DMQL

Unit-III: Mining Frequent Patterns, Associations: Basic Concepts: Market Basket Analysis; Frequent Item sets, Closed Item sets, and Association Rules; Frequent Pattern Mining: A Roadmap, Apriori Algorithm: Finding Frequent Item sets Using Candidate Generation; Generating Association Rules from Frequent Item sets, Improving the Efficiency of Apriori, FP-tree, Mining single dimensional Boolean association rules and multilevel association rules from transaction database, Mining multidimensional association rules from relational database and data warehouse, From association rule mining to correlation analysis, Constraint- based association rule mining

Unit-IV: Classification , Prediction: Introduction to Classification and Prediction; Basics of Supervised & Unsupervised Learning, Preparing the Data for Classification and Prediction, Comparing Classification and Prediction Methods, Classification by Decision Tree Induction, Rule-based Classification: Using IF-THEN Rules for Classification, Rule Extraction from a Decision Trees; Bayesian Classification: Bayes' Theorem, Naïve Bayesian Classification, Bayesian Belief Networks, classification by backpropagation, Classification based on concept from association rule mining, Prediction: Linear Regression, Non-linear Regression, Classifier Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor

Unit-V: Clustering analysis: Introduction, type of data in cluster analysis, categorization of clustering methods, Partitioning methods: k-mean & k-medoids, CLARANS, Hierarchical methods: BIRCH, Density based methods: DBSCAN, Grid based: CLIQUE, Model based: NN approach, statistical approach, Outlier analysis. Data mining applications: Data Mining for Financial Data Analysis and Intrusion detection. Data Mining Systems: How to Choose, Examples of Commercial Data Mining Systems. WEKA, Web mining, sequential pattern mining, temporal mining, spatial mining

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Recommended Books:

1. "Data Mining: Concepts & Techniques" by Jiawei Han & Micheline Kamber, 3rd Edition Morgan Kaufmann Publishers, 2011
2. "Data Warehousing, Data Mining and OLAP" by Alex Berson , Tata McGraw Hill,2004
3. "Data Mining Techniques" by A K Poojari, 3rd Edition, Universities Press, 2013.

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5	MCA- 205 Electi ve- 1(e)	Project Managem ent	3	1	-	60	20	20	-	-	100	4

OBJECTIVES:

- To understand the Software Project Planning and Evaluation techniques.
- To plan and manage projects at each stage of the software development life cycle (SDLC).
- To learn about the activity planning and risk management principles.
- To manage software projects and control software deliverables.
- To develop skills to manage the various phases involved in project management and people management.
- To deliver successful software projects that support organization's strategic goals.

UNIT I PROJECT EVALUATION AND PROJECT PLANNING

Importance of Software Project Management – Activities - Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II PROJECT LIFE CYCLE AND EFFORT ESTIMATION

Software process and Process Models – Choice of Process models - Rapid Application development – Agile methods – Dynamic System Development Method – Extreme Programming– Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II - a Parametric Productivity Model.

UNIT III ACTIVITY PLANNING AND RISK MANAGEMENT

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Formulating Network Model – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Risk Planning – Risk Management – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical paths – Cost schedules.

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UNIT IV PROJECT MANAGEMENT AND CONTROL

Framework for Management and control – Collection of data – Visualizing progress – Cost monitoring – Earned Value Analysis – Prioritizing Monitoring – Project tracking – Change control – Software Configuration Management – Managing contracts – Contract Management.

UNIT V STAFFING IN SOFTWARE PROJECTS

Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham – Hackman job characteristic model – Stress – Health and Safety – Ethical and Professional concerns – Working in teams – Decision making – Organizational structures – Dispersed and Virtual teams – Communications genres – Communication plans – Leadership.

TEXT BOOK:

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCES:

1. Robert K. Wysocki —Effective Software Project ManagementII – Wiley Publication, 2011.
2. Walker Royce: —Software Project ManagementII- Addison-Wesley, 1998.
3. Gopaldaswamy Ramesh, —Managing Global Software ProjectsII – McGraw Hill Education (India), Fourteenth Reprint 2013.

Course Outcomes:

- CO1: Understand Project Management principles while developing software, framework and the process models.
- CO2: Obtain adequate knowledge about software process models and software effort estimation techniques.
- CO3: Estimate the risks involved in various project activities.
- CO4: Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.
- CO5: Learn staff selection process and the issues related to people management

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			L	T	P	End sem. Exam.	Mid Sem.	Assignments/Quiz	End Sem. Practical Viva	Practical records/Assignments/Seminar		
6	MCA-206		-	-	6	-	-	-	100	50	150	6

· Implementation of Various problems using Object Oriented concept in C++

**Samrat Ashok Technological Institute Vidisha (M.P.)
M.C.A. Two Year Programme**

S. No	Subject Code	Subject Name	Periods Per Week			Maximum Marks (Theory)			Maximum Marks (Practical)		Total Marks	Credits
			L	T	P	End sem. Exam.	Mid Sem.	Assignments/Quiz	End Sem. Practical Viva	Practical records/Assignments/Seminar		
7	MCA-207	Programming Lab-III (Data structures, C++)	-	-	4	-	-	-	60	40	100	4

12/11/14
Dr. Kanak Saxena
Dr. Kanak Saxena
Prashant

Sunil
Dr. Kanak Saxena

Kanak Saxena
Dr. Kanak Saxena
Chairperson