DEPARTMENT OF COMPUTER SCIENCE

M.C.A. (COMPUTER APPLICATIONS)

(Students admitted during 2019-2020 Onwards)

(Under CBCS with Outcome Based Education (OBE) Pattern)

SYLLABUS

I & II SEMESTER

GOBI ARTS & SCIENCE COLLEGE

(Govt. Aided Autonomous Co-educational Institution, Affiliated to
Bharathiar University, Coimbatore, Re-accredited with 'A' Grade by NAAC (3rd cycle)
and Nationally Ranked by NIRF, MHRD, Government of India)

KARATTADIPALAYAM POST,

GOBICHETTIPALAYAM - 638453

ERODE DISTRICT.

GOBI ARTS & SCIENCE COLLEGE (Autonomous)

Vision

Social and Economic upliftment of the people of this area through value based quality Education.

Mission

Committed to serve the society with humility and trust, devoid of exploitation; to impart value based higher education, particularly to the socially and economically deprived sections of this area; to make students of this institution worthy citizens of our glorious motherland.

DEPARTMENT OF COMPUTER SCIENCE

Vision

To inculcate better programming skills among rural area students.

Mission

To impart value based technical education and educate students towards the design and development of software products for the benefit of computer industry and society.

GOBI ARTS & SCIENCE COLLEGE (AUTONOMOUS): GOBICHETTIPALAYAM

SCHEME OF EXAMINATIONS - M.C.A. (COMPUTER APPLICATIONS) (19 BATCH)

No.	Course Code	Course	Total Hours	Hrs/ Exam	Maximum Marks		Total Marks	Credits
					CIA	EOS		
		SEMESTER – I						
1	19P3CA01	PROGRAMMING IN C & C++	60	3	40	60	100	3.5
2	19P3CA02	DATA STRUCTURES	60	3	40	60	100	3.5
3	19P3CA03	NUMERICAL & STATISTICAL METHODS	60	3	40	60	100	3.5
4	19P3CA04	DIGITAL PRINCIPLES & APPLICATIONS	60	3	40	60	100	3.5
5	19P3CA05	OBJECT ORIENTED ANALYSIS & DESIGN	60	3	40	60	100	3.5
6	19P3CAPA	PROGRAMMING LAB - I : (DATA STRUCTURES IN C)	60	3	40	60	100	3.0
7	19P3CAPB	PROGRAMMING LAB - II : (NUMERICAL AND STATISTICAL METHODS IN C++)	60	3	40	60	100	3.0
		SEMESTER – II						
8	19P3CA06	JAVA & JSP	60	3	40	60	100	3.5
9	19P3CA07	RELATIONAL DATABASE MANAGEMENT SYSTEM	60	3	40	60	100	3.5
10	19P3CO51	FINANCIAL AND MANAGEMENT ACCOUNTING	75	3	40	60	100	3.5
11	19P3CA08	MATHEMATICAL FUNDAMENTALS OF COMPUTER SCIENCE	60	3	40	60	100	3.5
12	19P3CA09	ELECTIVE - I : VISUAL PROGRAMMING	60	3	40	60	100	4.0
13	19P3CAPC	PROGRAMMING LAB - III : (JAVA)	60	3	40	60	100	3.0
14	19P3CAPD	PROGRAMMING LAB - IV : (RDBMS)	60	3	40	60	100	3.0
		SEMESTER – III						
15	19P3CA10	OPEN SOURCE SCRIPTING TOOLS	60	3	40	60	100	3.5
16	19P3CA11	CLIENT/SERVER COMPUTING	60	3	40	60	100	3.5
17	19P3CA12	DESIGN AND ANALYSIS OF ALGORITHMS	60	3	40	60	100	3.5
18	19P3CA13	ELECTIVE - II : OPERATING SYSTEMS	60	3	40	60	100	4.0
19	19P3CAPE	PROGRAMMING LAB - V : (PERL & PYTHON)	60	3	40	60	100	3.0
20	19P3CAPF	PROGRAMMING LAB - VI : (CLIENT/SERVER)	60	3	40	60	100	3.0
21	19P3CAV1	MINI PROJECT - I			40	60	100	2.5
22		SUPPORTIVE PAPER :	90	3	40	60	100	4.0

		SEMESTER – IV						
23	19P3CA14	.NET PROGRAMMING	60	3	40	60	100	3.5
24	19P3CA15	GRAPHICS & MULTIMEDIA	60	3	40	60	100	3.5
25	19P3CA16	MICROPROCESSORS AND ASSEMBLY LANGUAGE PROGRAMMING	60	3	40	60	100	3.5
26	19P3CA17	SOFTWARE ENGINEERING AND QUALITY ASSURANCE	60	3	40	60	100	3.5
27	19P3CA18	ELECTIVE - III : PRINCIPLES OF COMPILER DESIGN	60	3	40	60	100	4.0
28	19P3CAPG	PROGRAMMING LAB - VII : (.NET)	60	3	40	60	100	3.0
29	19P3CAPH	PROGRAMMING LAB - VIII : (GRAPHICS)	60	3	40	60	100	3.0
		SEMESTER – V						
30	19P3CA19	SOFTWARE PROJECT MANAGEMENT & TESTING	60	3	40	60	100	3.5
31	19P3CA20	DATA ANALYTICS WITH R	60	3	40	60	100	3.5
32	19P3CA21	ANDROID	60	3	40	60	100	3.5
33	19P3CA22	DATA WAREHOUSING & MINING	60	3	40	60	100	3.5
34	19P3CA23	ELECTIVE - IV : TCP/IP PROTOCOL SUITE	60	3	40	60	100	4.0
35	19P3CAPI	PROGRAMMING LAB - IX : (SOFTWARE TESTING & ANDROID)	60	3	40	60	100	3.0
36	19P3CAPJ	PROGRAMMING LAB - X : (DATA ANALYTICS)		3	40	60	100	3.0
37	19P3CAV2	MINI PROJECT - II			40	60	100	2.5
		SEMESTER – VI						
38	19P3CAV3	PROJECT REPORT & VIVA - VOCE			40	60	100	15.0

TOTAL CREDITS: 140

BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

K1-Remember; **K2**- Understanding; **K3**- Apply; **K4**-Analyze; **K5**- Evaluate

I. END OF SEMESTER (EOS) EXAMINATIONS:

1. Theory: 60 Marks

Knowledge Level	Section	Marks	Description	Total
K1	A (Answer All)	10 × 1 = 10	MCQ	60
K2	B (Either or Pattern)	5 × 4 = 20	Short answers	
K3 & K4	C (Answer 3 out of 5)	3 × 10 = 30	Descriptive/Detailed	

2. Practical Examinations: 60 Marks

Knowledge Level	Section		Total
	Practical	Record work	
K3	50	10	60
K4			
K5			

II. CONTINUOUS INTERNAL ASSESSMENT (CIA):

1. Test – I & II: 30 Marks (Theory)

Knowledge Level	Section	Marks	Description	Total
K1	A (Answer All)	10 × 1 = 10	MCQ	30
K2	B (Answer 2 out of 3)	2 × 5 = 10	Short answers	
K3 & K4	C (Answer 1 out of 2)	1 × 10 = 10	Descriptive/Detailed	

2. Test –III: (Model Exam)

Knowledge Level	Section	Marks	Description	Total
K1	A (Answer All)	10 × 1 = 10	MCQ	60 Marks converted to 40 Marks
K2	B (Either or Pattern)	5 × 4 = 20	Short answers	
K3 & K4	C (Answer 3 out of 5)	3 × 10 = 30	Descriptive/Detailed	

3. Practical Internal Assessment: 40 Marks

Knowledge Level	Components		Calculation	Lab Performance	Total
K3, K4, K5	Test 1	30	$\frac{\text{Test 1 + Test 2}}{2}$	10	40
	Test 2	30			

Components of Continuous Internal Assessment (CIA)

Components		Calculation	CIA Total
Test 1 & Test 2	30	$30 + 40 + 30 = \frac{100 \times 40}{100} = 40$	40
Test 3	40		
Assignment+ Seminar+ Quiz / GD / Poster Presentation / Book Review / Field Visit Report	10+10+10 = 30		

PROGRAMME SPECIFIC OBJECTIVES

The students will be able to do, on successful completion of programme,

1. Acquire strong fundamentals of computer architecture, theory, open source programming languages and analytical ability to meet the given set of computing requirements.
2. Gain sufficient depth of knowledge related to computer domains, possess technical skills and apply the knowledge effectively in teamwork.
3. Exhibit effective communication, apply the legal and social aspects of modern computing technologies and practice the profession with high regard to ethical responsibilities.
4. Adapt new computing technologies, design and develop software based solutions for real-world problems, catering to the requirements of the enterprises and society.
5. Pursue life-long learning habits in the broad context of technological changes and become leaders in the chosen field.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1: Acquire sound knowledge in the basic concepts of Computer Science including theory and programming acquainting with contemporary trends in computer science domains.

PSO2: Analyze user needs and formulate solutions relating algorithmic principles and programming techniques in par with industry standard.

PSO3: Identify relevant software and tools essential for IT based solutions for a career in information technology oriented concerns and demonstrate an appropriate level of expertise and be prepared.

PSO4: Design and develop applications to provide ethical, legal and social acceptable solutions for computer based technical problems and communicate effectively on teams to manage a project.

PSO5: Possess professional skills in advanced computer science concepts and software development process using broad range of open source programming languages to withstand technological change.

Programme Code:	MCA	**Programme Title:**	Computer Applications	
Course Code:	19P3CA01	**Course Title:**	**Batch:**	2019
Total Hours:	60	Programming in C & C++	**Semester:**	I
			Credits:	3.5

Course Objective

The course aims

- To understand the basics of C language and simple programming statements.
- To learn Programming Technique using different data structure.
- To understand the concept of pointer and its application and importance of file management.
- To understand the basic concept of OOPS and supporting statements in c++ for OOPs.
- To learn programming technique using inheritance and polymorphism.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1,K2	**CO1**	Understand the strength of C language and supporting statements for simple programs
K2,K3	**CO2**	Understand different data structure and implements program using data structure
K3,K4	**CO3**	Understand the application area of pointers for file management
K1,K2, K3	**CO4**	Understand the basic concept of OOPs and familiarize to write simple c++ programme
K4,K5	**CO5**	Using OOPs concept namely Inheritance and Polymorphism applied to design c++ program

K1 – Remember; K**2** – Understanding; K**3** – Apply; **K4** – Analyze; **K5** - Evaluate

SYLLABUS		
Unit	**Content**	**No. Of Hours**
I	**Introduction:** Overview of C - Constants, Variables & Data types – Operators & Expressions - Managing input and output operations - Decision Making & Branching - Decision making & Looping - Arrays - Simple Programs.	**12**
II	Characters Arrays & Strings - User defined functions - Structures & Unions - Programs.	**12**
III	Pointers - File Management in C - The Preprocessor - Programs.	**12**
IV	Basic concepts of OOP - Benefits of OOP - Applications of OOP – **Class**	**12**

	and Objects: Specifying a Class - defining member functions - Nesting of member functions - Private member functions - Arrays within a class - Static member functions - Array of objects - object as function arguments - returning objects - **Constructors and Destructors**: Introduction - Constructors- Constructors - Dynamic Constructor - Destructors.	
V	**Operator Overloading:** Overloading Unary, Binary operators - Rules for overloading operators - Inheritance - Virtual functions & Polymorphism- Managing console I/O Operations - Exception handling.	**12**

Text Books:

1. *Balagurusamy.E, "Programming in ANSIC"*, Third Edition, Tata McGraw Hill Publications. (UNITS I.II.III)
2. Balagurusamy.E, *"Object Oriented Programming with C++"*, Fourth Edition, Tata McGraw Hill companies. (UNITS IV, V)

Reference Books:

1. Kernighan, B.W & Ritchie, "*The C Programming Language*", D.M.Prentice Hall of India.
2. K.R.Venugopal, Rajkumar, T.Ravishankar, "*Mastering C++"*, Tata McGraw Hill Publishing company ltd.

E-references:

1. https://www.tutorialspoint.com/cprogramming/
2. https://www.w3schools.in/c-tutorial/
3. https://www.tutorialspoint.com/cplusplus/

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	M
CO2	S	S	M	S	M
CO3	S	S	S	M	M
CO4	S	S	M	S	S
CO5	S	M	S	M	S

S-Strong; **H**-High; **M**- Medium; **L**-Low

Programme Code:	MCA	**Programme Title:**	Computer Applications	
Course Code:	19P3CA02	**Course Title:**	**Batch:**	2019
Total Hours:	60	Data Structures	**Semester:**	I
			Credits:	3.5

Course Objective

The course aims

- To facilitate the students to understand the various data structures, their organization and operations
- To assesses the applicability of different data structures and associated algorithms to real world problems

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	**CO Number**	**Course Outcome**
K1, K2, K3	Capa **CO1**	Able to understand about algorithms and determines their time complexity. Demonstrate specific search and sort algorithms using data structures given specific user requirements.
K1, K3	**CO2**	Design a linked list and illustrate the operations of linked list.
K1, K2, K3, K5	**CO3**	Describe the representation of stack and queues and to assess them with real time applications.
K1, K2	**CO4**	Define and identify suitable algorithms for the operations of binary tree.
K1, K2, K3	**CO5**	Construct a graph and employ its application.

K1 – Remember; K**2** – Understanding; K**3** – Apply; **K4** – Analyze; K5 – Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Introduction:** Basic Terminology; Elementary Data Organization, Data Structures, Data Structure Operations, Algorithms: Complexity, Time - Space Trade off- **Linear Arrays**: Representation of Linear Arrays, Traversing Linear Arrays, Inserting and Deleting, Sorting; Bubble Sort, Searching; Linear Search, Binary Search, Multidimensional Arrays, Sparse Matrices.	**12**
II	**Linked lists:** Introduction, Linked Lists, Representation of Linked lists in Memory, Traversing a Linked list, Searching a Linked list, Memory Allocation; Garbage Collection, Insertion into a Linked list, Deletion from a Linked list, Header Linked lists, Two Way Lists.	**12**
III	**Stacks and Queues:** Introduction, Stacks, Array Representation of Stacks, Linked Representation of Stacks, Arithmetic Expressions; Polish Notation,	**12**

	Quick Sort, an Application of Stacks, Queues, Linked Representation Of Queues, Deques, Priority Queues.	
IV	**Trees:** Introduction, Binary Trees, Representing Binary Trees In Memory, Traversing Binary Trees, Traversal Algorithms using Stacks, Header Nodes; Threads, Binary Search Trees, Searching and Inserting in Binary Search Trees, Deleting In a Binary Search Tree, B Trees.	**12**
V	**Graphs and their Applications:** Introduction, Graph Theory Terminology, Sequential Representation of Graphs; Adjacency Matrix; Path Matrix, Warshall's Algorithm; Shortest Paths, Linked Representation of a Graph, Operations on Graphs, Traversing a Graph.	**12**

Text Book:

Seymour Lipschutz, G A Vijayalakshmi Pai, *"Data Structures"*, McGraw- Hill Publishing Company Limited, New Delhi, Third Edition, 2007 (UNIT - I to V).

Reference Books:

1. Ellis Horowitz, Sartaj Sahni, *"Fundamentals Of Data Structures"*, Galgotia Book Source.
2. Edward M Reingold, Wilfred J. Hansen, *"Data Structures"*, CBS Publishers, First Edition.
3. A Chitra, P T Rajan, *"Data Structures"*, Vijay Micole Imprints Pvt Limited, Chennai.

E-references:

1. https://www.tutorialspoint.com/data_structures_algorithms/data_structures_algorithms_tutorial.pdf
2. http://www.darshan.ac.in/Upload/DIET/Documents/CE/2130702_DS_2015_24112015_025019AM.pdf

Mapping with Programme Specific Outcomes

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	H	H	M
CO2	S	M	H	M	M
CO3	S	M	M	M	M
CO4	S	M	H	M	S
CO5	S	M	M	M	S

S-Strong; **H**-High; M-Medium; **L**-Low

Programme Code:	MCA	**Programme Title:**	Computer Applications	
Course Code:	19P3CA03	**Course Title:**	**Batch:**	2019
Total Hours:	60	Numerical & Statistical Methods	**Semester:**	I
			Credits:	3.5

Course Objective

The course aims

- To improve numerical ability.
- To improve logical ability by applying various Numerical formula.
- To understand the various types of measures and statistical methods**.**

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1, K3	**CO1**	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions
K3, K5	**CO2**	Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear equations.
K2, K3	**CO3**	Using appropriate numerical methods, determine the Numerical Solution of Ordinary Differential Equations
K4, K5	**CO4**	Independently calculate basic statistical parameters (mean, measures of dispersion, correlation coefficient, indexes)
K4, K5	**CO5**	Evaluate based on the acquired knowledge to interpret the meaning of the calculated statistical indicators

K1 – Remember; K**2** – Understanding; K**3** – Apply; K4 – Analyze; K5 - Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Algebraic And Transcendental Equations:** Bisection, False Position, Newton Raphson methods – Polynomial equation, Solving Polynomial equation – Solutions of Simultaneous Linear Equations; Gauss Elimination method, Gauss Jogobi method - Gauss Seidal Method.	**12**
II	**Numerical Integration:** Trapezoidal Rule - Simpson's rules – Boole's and Weddle's Rules – Romberg Integration - Euler-Maclaurin Formula.	**12**
III	**Numerical Solution of Ordinary Differential Equations:** Taylor's Series – Picard's method - Euler's method – Runge -Kutta methods second and fourth order – Adam's Predictor Corrector method – Milne's Predictor Corrector method.	**12**
IV	**Statistics:** Definition - **Measures of Central Values:** Mean – Median – Mode - Their Relationship – Geometric mean – Harmonic mean – Problems.	**12**

	Measures of Dispersion: Range – Mean Deviation – Standard Deviation – Problems. **Skewness, Moments and Kurtosis:** Introduction - Measures of Skewness, Moments and Kurtosis – Problems.	
V	**Correlation:** Types – Methods – Karl Pearson's coefficient of correlation – Rank correlation – Spearman's correlation coefficient – Problems. **Regression:** Uses – Difference between Correlation and Regression – Regression lines – Regression equations – Problems.	**12**

Text Books:

1. S.S.Sastry, *"**Introductory Methods Of Numerical Analysis**"*, Fourth Edition, Prentice Hall of India, 2005. **(UNIT I - III)**
2. S.P. Gupta, "***Statistical Methods***", S.Chand & Sons (P) Ltd, New Delhi, 2011. **(UNIT IV & V)**

Reference Books:

1. Dr.M.K.Venkatraman, ***"Numerical methods in science & engineering"***, The National Public Company, 2005, Chennai.
2. T.Veerarajan & T.Ramachandran, *"**Numerical methods with programming in c**"*, Second Edition, TMH, 2007, New Delhi.
3. R.S.N.Pillai & Bagavathi, *"**Statistics**"*, Seventh Edition, S.Chand & company, 2008, New Delhi.

E-references:

1. https://onlinecourses.nptel.ac.in/noc17_ma14/preview
2. https://en.wikibooks.org/wiki/Numerical_Methods/Equation_Solving
3. https://en.wikipedia.org/wiki/Numerical_methods_for_ordinary_differential_equations
4. https://statistics.laerd.com/statistical-guides/measures-central-tendency-mean-mode-median.php
5. http://sphweb.bumc.bu.edu/otlt/mph-modules/bs/bs704_multivariable/bs704_multivariable5.html

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	M	S	S
CO2	H	H	S	S	H
CO3	H	S	H	S	S
CO4	M	M	H	M	S
CO5	S	H	M	M	H

S-Strong; **H**-High; M- Medium; **L**-Low

Programme Code:	MCA	**Programme Title:**	Computer Applications	
Course Code:	19P3CA04	**Course Title:**	**Batch:**	2019
Total Hours:	60	Digital Principles & Applications	**Semester:**	I
			Credits:	3.5

Course Objective

The course aims

- To teach students the theory of digital electronics, the logic and the implementation of digital systems.
- To discuss the industry specifications for the digital integrated circuits and using it for building digital systems.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1	**CO1**	Able to learn various digital techniques to solve Boolean expression, combinational circuits and analyze sequential digital circuits
K2	**CO2**	Master the binary and hexadecimal number systems including computer arithmetic and the functionality of logic gates.
K3	**CO3**	Able to design sequential circuits and analyze sequential digital circuits like flip- flops, registers, counters.
K4	**CO4**	To Construct, analyze and troubleshoot any synchronous and asynchronous sequential circuit.
K5	**CO5**	To design different types of D/A converter circuit, A/D convreter, Memory and describe their operation.

K1 – Remember; **K2** – Understanding; **K3** – Apply; **K4** – Analyze; **K5** - Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Combinational Logic Circuits**: Boolean laws & theorems, Sum of products method, truth table to K- map, pairs, quads & octets, Karnaugh simplification, Don't care, Quine -McClusky method. **Data processing circuits:** Multiplexers, Demultiplexers, 1 to 16 decoders, BCD to decimal decoder, seven segment decoders, encoders.	**12**
II	**Data processing circuits:** XOR Gates, parity generators and checkers, Magnitude comparator, ROM, Programmable array logic, Programmable Logic arrays. **Arithmetic Circuits**: Binary addition, Binary Subtraction, Unsigned Binary Numbers, Sign - magnitude numbers, 2's complement representation and arithmetic, Arithmetic Building Blocks, Adder - subtractor, Fast adder, ALU, Binary Multiplication & division.	**12**
III	**Clocks & Timing Circuits:** Clock waveform, TTL clock **FLIP - FLOPS:** RS flip	**12**

	flops, gated flip flops, Edge triggered Rs flip flops, Edge triggered D flip flops, Edge triggered JK flip flop, JK master Slave flip flops. **Registers:** Types of registers, SISO, SIPO, PISO, PIPO, Universal Shift register, Ring Counter.	
IV	**Design of synchronous sequential circuits:** Model selection, state transition diagram, state synthesis table, Design equation & Circuit Diagram, Implementation using ROM. **Asynchronous Sequential Circuit:** Analysis of asynchronous sequential circuit, problem with asynchronous sequential circuits, Design of asynchronous sequential circuits.	**12**
V	**D/A & A/D conversion:** Variable resistor networks, Binary ladders, D/A converters, D/A accuracy & resolution. **A/D Converter:** Simultaneous Conversion, Counter method, Continuous A/D Conversion, A/D techniques, Dual slope A/D conversion, Accuracy & resolution. **Memory:** Magnetic Memory, Optical Memory, Memory Addressing, ROM, PROM, EPROM, RAM, Sequential Programmable logic device, content addressable Memory	**12**

Text Book:

Donald P.Leach, Albert Paul Malvino & Goutam saha, "*Digital principles & Applications"*, Seventh Edition, McGraw Hill, 2011.

Reference Books:

1. Morris Mano, "*Computer system Architecture*", PHI, 2010.
2. Arun kumar singh, Manish Tiwari, "Digital Principles-Foundation of Circuit Design and Application", Second Edition, New Age International Publishers.
3. Rajaramam .V, Radhakrishnan.T, "An Introduction to Digital Computer Design", Fifth Edition, PHI.

E-references:

1. https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials
2. https://onlinecourses.nptel.ac.in/noc19_ee09
3. https://www.tutorialspoint.com/digital_electronics/index.asp
4. https://lecturenotes.in/notes/5925-notes-for-digital-electronics-circuit-dec
5. https://www.gatevidyalay.com/digital-electronics

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	S	M	H
CO2	S	M	M	H	H
CO3	S	S	M	H	M
CO4	S	M	H	M	H
CO5	S	H	M	S	H

S-Strong; **H**-High; **M**- Medium; **L**-Low

Programme Code:	MCA	**Programme Title:**	Computer Applications	
Course Code:	19P3CA05	**Course Title:**	**Batch:**	2019
Total Hours:	60	Object Oriented Analysis & Design	**Semester:**	I
			Credits:	3.5

Course Objective

The course aims

- To learn the concepts of object-oriented themes and design techniques.
- To understand the various steps performed during analysis and object design process.
- To learn the concepts of modeling and UML.

Course Outcomes (CO)

On the successful completion of the course students will be able to

Knowledge Level	CO Number	Course Outcome
K1	Capa **CO1**	Understand the concept of Object-Oriented development and modeling techniques
K2,K4	**CO2**	Analyze the problem and construct object, dynamic and functional models for applications
K2,K3	**CO3**	Gain knowledge about the various steps performed during object design
K2,K1	**CO4**	Explain the concept of modeling and building blocks of UML
K3, K5	**CO5**	Build models for applications using UML diagrams

K1-Remember; **K2**-Understanding; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**INTRODUCTION** - Meaning of Object-Oriented, Object-Oriented Development, Object-Oriented Themes, **MODELLING AS A DESIGN TECHNIQUE**: Modeling, The Object Modeling Technique, Objects and Classes, Links and Associations, Advanced Link and Association Concepts, Generalization and Inheritance, Grouping Constructs.	**12**
II	**ANALYSIS:** Overview of Analysis, Problem Statement, Automated Teller Machine Example, Object Modeling, Dynamic Modeling, Functional Modeling, Adding Operations, Iterating the Analysis.	**12**
C **III**	**OBJECT DESIGN:** Overview of Object Design, Combining the Three Models, Designing Algorithms, Design Optimization, Implementation of Control, Adjustment of Inheritance, Design of Associations, Object Representation, Physical Packaging, Documenting Design Decisions.	**12**
IV	**INTRODUCTION TO MODELING:** The importance and principles of modeling, Object Oriented Modeling, **INTRODUCTION TO UML:** Brief History of UML, An Overview and a Conceptual Model of the UML,	**12**

	BUILDING BLOCKS OF THE UML: Things, Relationships, Diagrams, Rules and Common Mechanisms in the UML, Systems Architecture, Class Diagrams, Use Case Diagrams.	
V	Object Diagrams, Collaboration Diagrams, Sequence Diagrams, State Chart Diagrams, Activity Diagrams, Component Diagrams and Deployment Diagrams, **CASE STUDY**: Modeling of a building access control application.	**12**

Text Books:

1. James Rumbaugh, Michael Blaha, William Premerlani, Frederick Eddy, William Lorensen**,** "*Object-Oriended Modeling and Design"*, Prentice-Hall of India Pvt. Ltd, 2001 (UNITS I to III).
2. Pieere Alian Muller, **"***Instant UML"*, First Indian Reprint,Shroff Publishers & Distributors, 2000 (UNITS IV & V).
3. Gredy Booch, James Rumbaugh, Ivar Jacobson,*"The Unified Modeling Language User Guide"*, Second Edition Reprint, Addison Wesley Publication, 2000 (UNIT IV).

Reference Books:

1. Sudha Sadasivam.G, **"***Object - Oriented Analysis and Design*", First Edition, Mac Millan Publisher India Ltd, 2010.
2. Michael R. Blaha, James R. Rumbaugh,"*Object-Oriented Modeling and Design with UML*",Second Edition,Pearson Education, 2013.
3. Mahesh P. Matha **,** "*Object-Oriented Analysis and Design Using UML- An Introduction to Unified Process and Design Patterns*",Prentice Hall of India, 2008.
4. Daminni Grover ,"*Object-Oriented Analysis and Design with UML*", I. K. International Publishing House Pvt.Ltd, 2012.

E-references:

1. https://www.tutorialspoint.com/object_oriented_analysis_design/
2. https://nptl.ac.in/courses/122105022/27
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Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	H	M
CO2	H	M	H	S	S
CO3	S	S	H	S	H
CO4	S	S	H	H	M
CO5	S	H	S	H	S

S - Strong; **H** - High; **M** - Medium; **L** - Low

Programme Code:	MCA	**Programme Title:**	Computer Applications	
Course Code:	19P3CA06	**Course Title:**	**Batch:**	2019
Total Hours:	60	JAVA & JSP	**Semester:**	II
			Credits:	3.5

Course Objective

The course aims

- To understand the objectives of JAVA language and key concepts of the JAVA Language.
- To understand the Packages, Thread Modeling and Applet Classes of JAVA and Design Model program based upon the concepts.
- To learn Event Handling and Developing Servlets, Design relevant program to implement the concept.
- To understand the importance of JDBC objects in JAVA and Learn JSP and its implementations.
- To understand the Session and Thread management and implement the concept of these management.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1,K2	**CO1**	Understand the JAVA language and the extended support of JAVA for OOPs
K2,K3,K4	**CO2**	Understand the procedure of designing package, multithreaded model, applet classes and its implementations.
K2,K3,K4	**CO3**	Learn event handling concepts, servelet designing concepts and its implementations.
K1,K3,K4	**CO4**	Familiarise the JDBC object services make use this services for database access. Developing JSP and its features.
K2,K4,K5	**CO5**	Understand Sessions and Thread management, implement the concepts in program.

K1 – Remember; K**2** – Understanding; K**3** – Apply; **K4** – Analyze; **K5** - Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**AN OVERVIEW OF JAVA:** Object oriented programming, class Fundamentals, Methods, Constructors, this Keyword, Overloading Methods, Overloading Constructors, Using Object as Parameters, Returning objects, **INHERITANCE:** Inheritance Basics, Using Super, Creating a Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes.	**12**
II	**PACKAGES AND INTERFACES:** Packages, Access Protection, Interfaces, Exception Handling, Exception Types, Uncaught Exceptions, Using try and Catch,	**12**

	Multiple Catch Clauses, Nested try Statements, throw, throws, finally, Multithreaded Programming, The Java Thread Model, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, **THE APPLET CLASS:** Applet Basics, The HTML Applet Tag, Passing Parameters to Applets.	
III	**EVENT HANDLING:** Event classes, Event Listener Interfaces, Handling Mouse Events, Handling Keyboard Events, Adapter Classes, **DEVELOPING SERVLETS:** The Architecture of Java Servlet, The Basics Servlet Architecture, Generic servlet and Httpservlet, The Life Cycle of a Servlet, Building a Basic Servlet.	**12**
IV	**OVERVIEW OF JDBC:** Basic JDBC operations, Essential Classes, Jdbc Drivers, **STATEMENT INTERFACES:** Connection, Statement Objects, ExecuteQuery, Execute Update methods, Prepared Statements, Callable Statements, Resultsets, Programs with Resultset objects, **JSP OVERVIEW:** How JSP works, JSP syntax and semantics, JSP Development Model, Components of JSP, Developing JSP pages, JSP Actions, JSP Expression, Scriplet, Implicit Object Declaration.	**12**
V	**REQUEST DISPATCHING:** Anatomy of Request Processing, JSP Include Actions, Passing Parameters, Forwarding Requests, **SESSION AND THREAD MANAGEMENT:** Hidden Fields, URL Rewriting, Cookies, Manipulating Sessions, Programming with session management. Passing Arguments, **SUBROUTINES:** Calling function, Passing Arguments, Call by reference.	**12**

Text Books:

1. HERBERT SCHILDT , "*JAVA2, THE COMPLETE REFERENCE*", Tata McGraw Hill Publishing, 2002 (UNITS I-III)
2. PHIL HANNA , "*THE COMPLETE REFERENCE JSP 2.0*", Tata Mcgraw Hill Publishing, Edition 2003 (Units IV, V)

Reference Book:

1. Herbret Schild, "Java: A Beginner's Guide", Sixth Edition, Tata McGraw Hill Publishing, 2014.

E-references:

1. https://www.tutorialspoint.com/java/
2. https://www.guru99.com/java-tutorial.html
3. https://beginnersbook.com/java-tutorial-for-beginners-with-examples/

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	H	M	M
CO2	S	H	H	S	M
CO3	S	H	H	S	M
CO4	S	H	H	S	M
CO5	S	S	S	M	M

S-Strong; **H**-High; **M**- Medium; **L**-Low

Programme Code:	MCA	**Programme Title :**	Computer Applications	
Course Code:	19P3CA07	**Course Title:**	**Batch:**	2019
Total Hours:	60	Relational Database Management System	**Semester:**	II
			Credits:	3.5

Course Objective

The course aims

- To learn the concepts of database systems and relational model.
- To practice conceptual data model using ER diagrams for database design.
- To learn SQL and use normal forms to reduce anamolies in relations.
- To understand the concept of database security and transaction processing.

Course Outcomes (CO)

On the successful completion of the course students will be able to

Knowledge Level	CO Number	Course Outcome
K1	**CO1**	Understand and describe the concepts of database system and relational model
K2,K3	**CO2**	Construct ER diagrams for database applications
K3	**CO3**	Write advanced SQL queries for data retrivel
K2, K4	**CO4**	Gain knowledge about normalization techniques and use normal forms to design a relational database system effectively
K2,K5	**CO5**	Explain the concept of database security and transaction processing. Develop application programs using RDBMS to maintain data

K1-Remember; **K2**-Understanding; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Introduction to Databases** - Introduction, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantages of Using the DBMS Approach, A Brief History of Database Applications – **Overview Of Database Languages and Architectures** – Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client/Server Architectures for DBMSs, Classification of Database Management Systems.	**12**
II	**Conceptual Data Modeling Using Entities and Relationships** – Using High Level Conceptual Data Models for Database Design, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles and	**12**

	Structural Constraints, Weak Entity Types, ER Diagrams Naming Conventions, and Design Issues, Relationship Types of Degree Higher than Two – **Basic Relation Model** – Relation Model Concepts, Relational Model Constraints and Relational Database Schemas.	
III	**SQL: Data Definition, Constraints, and Basic Queries and Updates** – SQL Data Definition and Data Types, Specifying Constraints in SQL, Basic Retrieval Queries in SQL, INSERT, DELETE, and UPDATE Statements in SQL – **SQL Advanced Queries** – Complex SQL Retrieval Queries, View(Virtual Tables) in SQL.	**12**
IV	**Introduction to Normalization Using Functional and Multivalued Dependencies** – Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form.	**12**
V	**Introduction to Database Security** – Introduction to Database Security Issues, Discretionary Access Control Based On Granting and Revoking Privileges, Mandatory Access Control and Role-Based Access Control for Multilevel Security, SQL Injection. –**Foundations of Database Transaction processing** – Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Transaction Support in SQL.	**12**

Text Book:

1. Ramez Elmarsi, Shamkant B. Navathe ,"*Database Systems Models, Languages, Design and Application Programming*", Sixth Edition, Pearson Education,2013 (Units I to V).

Reference Books:

1. Raghu Ramakrishnan, Johannes Gehrke,"*Database Management Systems*",Second Edition,McGraw Hill,2000.
2. Shio Kumar Singh, "*Database Systems, Concepts, Designs and Application*",Second Edition,Pearson Education,2013.
3. C. J. Date, A. Kannan, S. Swamynathan,"*An Introduction to Database Systems*",Eighth Edition, Pearson Education, 2013.
4. Thomas M. Connolly, Carolyn E. Begg, "*Database Systems, A Practical Approach to Design, Implementation and Management*", Fourth Edition, Pearson Education, 2012.

E-references:

1. https://nptel.ac.in/courses 106105175/2
2. https://www.tutorialspoint.com/sql/sql-rdbms-concepts.html
3. https://beginnersbook.com/2015/04/rdbms-concepts/
4. https://www.guru99.com/relational-data-model-dbms.html

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	S	H	M
CO2	H	S	H	M	H
CO3	S	M	H	H	S
CO4	H	S	S	H	S

CO5	S	H	S	S	H

S-Strong; **H**-High; **M**-Medium; **L**- Low

Programme Code:	MCA	**Programme Title:**	Computer Applications	
Course Code:	19P3CO51	**Course Title:**	**Batch:**	2019
Total Hours	75	Financial and Management Accounting	**Semester:**	II
			Credits:	3.5

Course Objective

The course aims

- To impart the basic concepts and principles of Financial Accounting.
- To offer techniques to solve the business oriented problems.
- To familiarise the techniques to prepare various budgets.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1	**CO1**	Understand the basic accounting concepts and rules.
K2	**CO2**	Prepare the final accounts of a sole trader themselves to find out results of the business.
K3	**CO3**	Know the principles and importance of management accounting.
K4	**CO4**	Take various managerial decisions by applying Marginal Costing and Budgetary Control.

K1 – Remember; **K2** – Understanding; **K3** – Apply; **K4** – Analyze; **K5** - Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Accounting: Meaning-Concepts-Conventions-***Functions-Objectives****-rules. Double entry system: advantages. Journalising-Posting-Preparation of Trial Balance. Cash Book: Meaning- purposes- preparation of Single column, Double column and Three Column Cash Book.	**15**
II	Final A/Cs of a sole traders: meaning-purposes- preparation of Trading, P/L A/c and B/S with Adjustments like Closing Stock, Outstanding and Prepaid expenses, Pre-received income, Bad Debts, Provision for Bad Debts, Depreciation on Fixed Assets, Interest on Capital and Drawings.	**15**
III	Management Accounting: Meaning- objectives - ***scope -advantages – limitations****-Differences between Management Accounting and Financial Accounting. Accounting Ratios: Meaning-Merits –Demerits-simple problems relating to computation of Gross Profit ratio, Net Profit Ratio, Current Ratio,	**15**

	Liquid Ratio, Stock turnover Ratio and Debtors turnover Ratio.	
IV	Break even analysis: Meaning of Marginal cost and Marginal costing- Merits and Demerits -Computation of Break Even Point-P/V Ratio-Margin of Safety.	**15**
V	Budgetary control: meaning -advantages and disadvantages—types of Budgets-Preparation of Production Budget, Cash Budget and Flexible Budget.	**15**

Note to the Question Paper Setters:
Section B: Out of 5 Questions, atleast 4 shall be Problems.
Section C: Out of 5 Questions, 3 shall be Problems and 2 shall be Theory.

<*-Self Study>

Text Books:

1. T.S.Reddy & A.Murthy, *"Financial Accounting"*, Margham Publications.
2. R.K.Sharma & Gupta, *"Management Accounting"*, Kalyani Publishers.

Reference Books:

1. S.P.Jain and K.L.Narang, *"Advanced Accountancy"*, Kalyani Publishers.
2. R.S.N.Pillai and Bagavathi, *"Management Accounting"*, S.Chand & Company Ltd.

E-references:

1. www.accountingtools.com
2. www.ignou.ac.in

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	H
CO2	S	H	M	H	S
CO3	S	S	H	S	H
CO4	H	S	M	M	M

S-Strong; **H**-High; **M**- Medium; **L**-Low

Programme Code:	MCA	**Programme Title:**	Computer Applications	
Course Code:	19P3CA08	**Course Title:**	**Batch:**	2019
Total Hours:	60	Mathematical Fundamentals of Computer Science	**Semester:**	II
			Credits:	3.5

Course Objective

The course aims

- To provide an introduction to some fundamental concepts in Discrete Mathematics in a precise and readable manner.
- To emphasizes the development of rigorous logical thinking for solving different kinds of problems that occur in computer applications.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1, K3	**CO1**	Understand certain logical symbols with statements and apply rules of valid reference and know about the construction of correct mathematical arguments.
K1, K2, K3, K4	**CO2**	Defined a set as a collection of distinguishable objects and discussed the relations defined on sets and explore the various properties of relations.
K1, K3, K4	**CO3**	Discuss the basic concepts involving functions required in discrete structures.
K1, K2, K3, K4	**CO4**	Familiar with the rules of grammar associated with that language and also introduce the terminology associated with it.
K1, K2, K3, K4	**CO5**	Explore about a graph as an abstract mathematical system and also represent graphs diagrammatically.

K1 – Remember; K2 – Understanding; K**3** – Apply; K4 – Analyze; K5 – Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Mathematical logic:** Propositions, Connectives, Algebra of Propositions, Normal forms, Theory of inference, Predicate Logic.	**12**
II	**Set theory:** Basic concepts and Notations, Set Operations, **Relations:** Types of Relations, Some Operations on Relations, Composition of Relations, Properties of Relations, Partition of a Set, Representation of Relations, Hasse Diagrams.	**12**
III	**Functions:** Representation of a Function, Types of Functions, Classification of Functions**,** Inverse of a Function, Binary and n-ary Operations, Properties of binary operations.	**12**

IV	**Formal languages and Automata theory:** Introduction, Phrase – structure Grammar, Types of Phrase - Structure grammar, Finite state machine, Finite state Automata.	**12**
V	**Graph Theory:** Basic Definitions, Matrix Representation of Graphs, Paths, Cycles, and connectivity, Eulerian and Hamiltonian Graphs, Connectedness in Directed Graphs, Shortest path Algorithms.	**12**

Text Book:

1. T. Veerarajan, *"Discrete Mathematics with Graph Theory and Combinatorics"*, Tata McGraw Hill Publications, Third Edition, 2007 (Unit - I to V)

Reference Books:

1. J P Tremblay, R Manohar, *"Discrete Mathematical Structures With Applications to Computer Science"*, Tata McGraw Hill International Editions.
2. Thomas Koshy, *"Discrete Mathematics With Applications"* Academic Press.
3. N Chandrasekaran, M Umaparvathi, *"Discrete Mathematics"*, Second Edition, PHI Learning Pvt Limited.

E-references:

1. https://www.tutorialspoint.com/discrete_mathematics/discrete_mathematics_tutorial.pdf
2. http://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf
3. http://www2.fiit.stuba.sk/~kvasnicka/Mathematics%20for%20Informatics/ Rosen_Discrete_Mathematics_and_Its_Applications_7th_Edition.pdf

Mapping with Programme Specific Outcomes

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	H	M	M
CO2	H	H	H	M	M
CO3	H	H	H	M	H
CO4	H	M	H	M	S
CO5	H	M	H	M	S

S - Strong; **H** - High; M - Medium; **L** - Low

Programme Code:	MCA	**Programme Title:**	Computer Applications	
Course Code:	19P3CA09	**Course Title:**	**Batch:**	2019
Total Hours:	60	Elective - I: Visual Programming	**Semester:**	II
			Credits:	4.0

Course Objective

The course aims

- To use a modern IDE to create programs with GUI's and covers visual programming skills needed for modern software development.
- To acquire knowledge and skills for the event-driven model and its interaction with the multitasking operating system.
- To gain ability to develop applications and projects using Visual Basic work environment.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1	**CO1**	To get familiar with basics of the MDI, IDE and Visual Basic environment.
K1,K2	**CO2**	To explore different controls, displaying formats and control structures used to develop projects.
K2,K3	**CO3**	Understand the usage of memory, Global level declarations and controls used to store large volume of data.
K3,K4	**CO4**	Use ADO for database connectivity with different databases and include the Active X controls and other controls to perform particular task.
K3,K5	**CO5**	Creating ability to develop projects with database using ODBC, DAO and ADO.

K1 – Remember; **K2** – Understanding; **K3** – Apply; **K4** – Analyze; **K5** - Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Getting started - Visual Basic Environment - Initial VB screen – Single Document interface - Toolbars and Custom control components - Use of File, Edit, View, project, Format, Run, Debug, Tools, Window Menu – Properties window - Making a form responsive - Simple event procedures for command buttons - image controls, Text boxes, Labels, Navigating between controls, Message boxes - The grid.	**12**
II	Steps in Programming - The code window - Editing Tools – Statements in VB - Assignment - Property Setting - Data Types - Variables, Strings, Numbers,	**12**

	Constants - input boxes - Displaying information - Controlling program Flow - Repeating Operations - Making Decisions - GOTO - String functions - Date and time functions.	
III	Passing by reference - Passing by value - Lists: One dimensional Arrays- Arrays with more than one dimensions - Using Lists and Arrays with functions and procedures - Control Arrays - Records (user defined types) -WITH Statements - Code modules: Global Procedures and Global Variables -Common Dialog Boxes - MDI forms.	**12**
IV	ODBC and Data Access: ODBC using Data Access Object and Remote Data Objects - Object Linking and Embedding: OLE fundamentals – using OLE container control - using OLE automation objects - OLE drag and drop.	**12**
V	All about ActiveX Controls - ActiveX EXE and ActiveX DLL – ActiveX document fundamentals - Build -in ActiveX controls - Working with ActiveX Data Objects.	**12**

Text Books:

1. Gray Cornell, "*Visual basic 6.0 From the Ground Up*", Tata McGraw Hill Publishing Company Limited, Reprint 2009, (UNIT I, II, III)
2. "*Visual Basic 6.0 Programming*", Content Development Group, TataMcGraw Hill Education Private Limited, 2010(UNIT IV, V)

Reference Books:

1. Mohammed Azam, *"Programming with Visual Basic 6.0"*, Firtst Reprint, Vikas Publication House Pvt.Ltd, 2016.
2. Krishnan .N, Saravanan .N, *"Visual Basic 6.0 in 30 days"*, Scitech Publications (India) Pvt.Ltd, 2012.
3. Ramesh Bangia, *"Power of Visual Basic 6.0"*, Firewall Media, 2009.
4. Murugan .A, Shymala .K & Grasha Jacob, *"Visual Basic Programming: A Step by step Approach"*, Marghan Publications, Reprint 2016.

E-references:

1. http://www.functionx.com/vb/index.htm
2. https://www.freetutes.com/learn-vb6/

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	H	H
CO2	S	S	S	H	M
CO3	S	H	S	H	M
CO4	S	S	H	H	M
CO5	S	S	S	M	S

S-Strong; **H**-High; **M**- Medium; **L**-Low

Question Paper Pattern - P.G. Courses

(Common for Major and Supportive Papers)

For EOS Examinations: 60 Marks

The Question Paper is to be divided into THREE Sections.

Section-A Carries 10 Marks, Section-B Carries 20 Marks and Section-C Carries 30 Marks.

Section-A Contains 10 Multiple Choice Questions. (10 x 1 = 10)

Two Questions from each unit. (Q. No: 1 to 10)

Section-B Contains 5 Either or Choice Questions. (5 x 4 = 20)

Each Question carries 4 Marks. Both (a) and (b) from the same unit.

Q. No.: 11 (a) or (b) to 15(a) or (b)

Section-C Contains 5 Questions, out of which 3 Questions are to be answered. (3 x 10 = 30)

Each Question carries 10 Marks. One Question from each unit. Q. No.: 16 to 20

For CIA Examinations: 40 Marks

CIA Test I and II Question Paper Pattern: (30 Marks)

Section-A: 10 Multiple Choice Questions. (10 x 1 = 10)

Section-B: Two Questions out of Three. (2 x 5 = 10)

Section-C: One Question out of Two. (1 x 10 = 10)

Components of Continuous Internal Assessment (CIA)

Components		Calculation	CIA Total
Test 1 & Test 2	30	$30 + 40 + 30 = \frac{100 \times 40}{100} = 40$	40
Test 3 (Model Exam)	40		
Assignment + Seminar + Quiz / GD / Poster Presentation / Book Review / Field Visit Report	10+10+10 = 30		