

DEPARTMENT OF COMPUTER SCIENCE

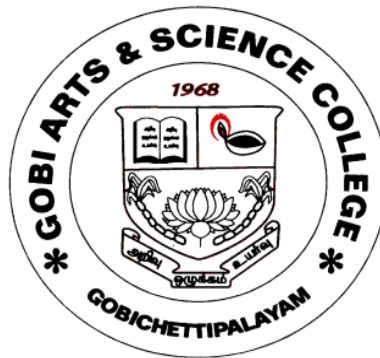
M.C.A. (COMPUTER APPLICATIONS)

(Students admitted during 2020-2021 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, Accredited with 'A' Grade by NAAC (4th cycle)
and Recognised as a STAR College by DBT, 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) (20 BATCH)

No.	Course Code	Course	Total Hours	Hrs/ Exam	Maximum Marks		Total Marks	Credits
					CIA	EOS		
SEMESTER - I								
1	20P3CA01	OPEN SOURCE SCRIPTING TOOLS	60	3	40	60	100	3.5
2	20P3CA02	JAVA & JSP	60	3	40	60	100	3.5
3	20P3CA03	DESIGN AND ANALYSIS OF ALGORITHMS	60	3	40	60	100	4.0
4	20P3CA04	OPERATING SYSTEMS	60	3	40	60	100	4.0
5	20P3CA05	ELECTIVE - I : OBJECT ORIENTED ANALYSIS & DESIGN	60	3	40	60	100	4.0
6	20P3CAPA	PROGRAMMING LAB - I : (PERL & PYTHON)	60	3	40	60	100	3.0
7	20P3CAPB	PROGRAMMING LAB - II : (JAVA & JSP)	60	3	40	60	100	3.0
SEMESTER - II								
8	20P3CA06	.NET PROGRAMMING	60	3	40	60	100	3.5
9	20P3CA07	RELATIONAL DATABASE MANAGEMENT SYSTEM	60	3	40	60	100	3.5
10	20P3CA08	SOFTWARE PROJECT MANAGEMENT & TESTING	60	3	40	60	100	4.0
11	20P3CA09	TCP/IP PROTOCOL SUITE & CYBER SECURITY	60	3	40	60	100	4.0
12	20P3CA10	ELECTIVE - II : PRINCIPLES OF COMPILER DESIGN	60	3	40	60	100	4.0
13	20P3CAPC	PROGRAMMING LAB - III : (.NET)	60	3	40	60	100	3.0
14	20P3CAPD	PROGRAMMING LAB - IV : (CLIENT/SERVER)	60	3	40	60	100	3.0
SEMESTER - III								
15	20P3CA11	INTERNET OF THINGS	60	3	40	60	100	3.5
16	20P3CA12	DATA ANALYTICS	60	3	40	60	100	3.5
17	20P3CA13	DATA WAREHOUSING & MINING	60	3	40	60	100	4.0
18	20P3CA14	ELECTIVE - III : MACHINE LEARNING	60	3	40	60	100	4.0
19	20P3CAPE	PROGRAMMING LAB - V : (IoT)	60	3	40	60	100	3.0
20	20P3CAPF	PROGRAMMING LAB - VI : (DATA ANALYTICS)	60	3	40	60	100	3.0
21		SUPPORTIVE PAPER :	60	3	40	60	100	4.0
SEMESTER - IV								
22	20P3CAV1	PROJECT REPORT & VIVA - VOCE			40	60	100	15.0

TOTAL CREDITS: 90

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)	$10 \times 1 = 10$	MCQ	60
K2	B (Either or Pattern)	$5 \times 4 = 20$	Short answers	
K3 & K4	C (Answer 3 out of 5)	$3 \times 10 = 30$	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)	$10 \times 1 = 10$	MCQ	30
K2	B (Answer 2 out of 3)	$2 \times 5 = 10$	Short answers	
K3 & K4	C (Answer 1 out of 2)	$1 \times 10 = 10$	Descriptive/Detailed	

2. Test –III: (Model Exam)

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

3. Practical Internal Assessment: 40 Marks

Knowledge Level	Components		Calculation	Lab Performance	Total
K3, K4, K5	Test 1	30	$\frac{\text{Test 1} + \text{Test 2}}{2}$	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:	20P3CA01	Course Title:	Batch:	2020
Total Hours:	60	Open Source Scripting Tools	Semester:	I
			Credits:	3.5

Course Objective

The course aims

- To understand the fundamentals of Python programming, Classes and objects and Database connectivity.
- To know the basic Perl programming to write simple scripts.

Course Outcomes (CO)

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

Knowledge Level	CO Number	Course Outcome
K1, K2	CO1	Realize and comprehend the basic concepts of Python.
K1, K2, K3	CO2	Define and demonstrate the use of Classes and Objects and write OOPS based Python programs.
K1, K2, K3, K4, K5	CO3	Make database connectivity in Python programming language.
K1, K2, K3	CO4	Utilize and implement Perl Script with modules, arrays and hash functions.
K1, K2, K3, K4, K5	CO5	Deploy the operators, control structures, regular expressions and files in Perl and write Perl programs.

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

SYLLABUS

Unit	Content	No. Of Hours
I	Introduction to Python: Variables, Names and Objects, Numbers, Strings. Lists, Tuples, Dictionaries and Sets: Lists, Tuples, Dictionaries, Sets.	12
II	Text Strings: Format, Regular Expressions. Functions, Arguments, Anonymous Functions, Generators, Decorators, Namespaces and Scope. Objects and Classes: Class, Inheritance, *Override a Method, Add a Method, Self, Attributes. <i>*Self Study</i>	12
III	Relational Databases: SQL, DB-API, SQLite, MySQL, PostgreSQL, SQLAlchemy. NoSQL Data Stores: The dbm Family, Memcached, Redis, Other NoSQL. Full-Text Databases.	12
IV	PERL: Introduction, Perl Scripts - The Script, Getting a Handle on Printing-The Print, Printf Function, NAME: Perl variables, Scalars, Arrays, Hashes, ARRAY Functions, HASH Functions.	12
V	OPERATORS: Types, CONTROL STRUCTURES: Decision making, Repetition with loops, REGULAR EXPRESSIONS: Modifiers, operators, GETTING A HANDLE ON FILES: User defined handles, Passing Arguments, SUBROUTINES: Calling function, Passing Arguments, Call by reference.	12

Text Books:

1. Bill Lubanovic, “*Introducing Python*”, O’Reilly, 2015, Unit (I,II,III).
2. Ellie Quigley, “*Perl*”, Fourth Edition, Dorling Kindersley Publishers, Pearson Education, 2009 (UNIT - IV, V).

Reference Books:

1. Mike McGrath, “*Python – in easy steps*”, McGraw Hill Education (India) Private Limited, 2013.
2. Wesley J. Chun, “*Core Python Programming*”, Second Edition, Pearson Education, Inc, 2010.
3. Martin C. Brown, “*The Complete Reference – Perl*”, Second Edition, Tata McGraw Hill Edition, 2006.
4. Clinton Pierce, “*Perl – In 24 Hours*”, SAMS Techmedia, 2006.

E-references:

1. https://www.tutorialspoint.com/python/python_basic_operators.htm
2. https://www.tutorialspoint.com/python/python_database_access.htm
3. <https://www.tutorialspoint.com/perl/>
4. <http://sandbox.mc.edu/~bennet/perl/leccode/index.html>

Mapping with Programme Specific Outcomes

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

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

Programme Code:	MCA	Programme Title:	Computer Applications	
Course Code:	20P3CA02	Course Title:	Batch:	2020
Total Hours:	60	JAVA & JSP	Semester:	I
			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, servlet 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; **K2** – Understanding; **K3** – 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, 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 APPLLET CLASS: Applet Basics, The HTML Applet Tag, Passing Parameters to Applets.	12

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, Scriptlet, 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

CO \ PSO	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:	20P3CA03	Course Title:	Batch:	2020
Total Hours:	60	Design and Analysis of Algorithms	Semester:	I
			Credits:	4.0

Course Objective

The course aims

- To solve a given problem using an algorithm.
- To understand various algorithm design and implementation.
- To analyze the efficiency of algorithm and apply in real time 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	Get knowledge about algorithms and determines their time complexity. Demonstrate specific search and sort algorithms using divide and conquer technique.
K2, K3, K4	CO2	Gain good understanding of Greedy method and its algorithm.
K3, K4	CO3	Able to describe about graphs using dynamic programming technique.
K2, K3, K4	CO4	Explore the traversal and searching technique and apply it for trees and graphs.
K2, K3, K4	CO5	Demonstrate the concept of backtracking & branch and bound technique.

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

SYLLABUS

Unit	Content	No. of Hours
I	Introduction: What is an algorithm?, Algorithm specification, performance analysis - Divide and Conquer: General method, Binary search, Finding the maximum and minimum, Merge sort, Quick sort, Strassen's matrix multiplication.	12
II	The Greedy method: The General method, Knapsack problem, Job sequencing with deadlines, Minimum cost spanning tree: Prim's algorithm, Kruskal's algorithms. Optimal storage on tapes, Single source shortest paths.	12
III	Dynamic programming: The general method, Multistage graphs, All Pairs shortest paths, 0/1 Knapsack, Reliability Design, The Traveling Sales Person problem, Flow shop scheduling.	12
IV	Basic Traversal and search Techniques: Techniques for binary trees, Techniques for graphs, Connected components and Spanning trees, Biconnected components and DFS.	12
V	Backtracking: The general method, The 8 Queen problem, Sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack problem - Branch and Bound: 0/1 Knapsack problem, Traveling salesperson problem.	12

Text Book:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, *“Fundamentals of computer algorithms”*, Galgotia publications Pvt. Ltd, (UNIT - I to V)

Reference Books:

1. Anany Levitin, *“Introduction to the Design And Analysis Of Algorithms”*, Pearson Education Pvt Ltd, 2013.
2. Kaushal Kishor Rastogi, *“Design And Analysis Of Algorithms”*, First Edition, Global Academic Publishers.
3. R Manjula Devi, R Devi Priya, R C Suganthe, *“Design And Analysis Of Algorithms”*, Charulatha publishers.

E-references:

1. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/
2. http://ignou.ac.in/userfiles/SandeepFINAL_Unit1_Intro_21-03-2013.pdf
3. <https://www2.cs.duke.edu/courses/fall08/cps230/Book.pdf0>

Mapping with Programme Specific Outcomes

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

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

Programme Code:	MCA	Programme Title:	Computer Applications	
Course Code:	20P3CA04	Course Title:	Batch:	2020
Total Hours:	60	Operating Systems	Semester:	I
			Credits:	4.0

Course Objective

The course aims

- To study the basic concepts and functions of operating systems. Understand the structure and functions of OS. Learn about Processes, Threads and Scheduling algorithms. Understand the principles of concurrency and Deadlocks.
- To introduce mobile application development for android platform.
- To learn skills for creating and deploying android applications.

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 fundamental components, concepts, history and system calls of operating system.
K2, K3, K4	CO2	Understand various process states in an operating system and its implementation using mutual exclusion primitives.
K1, K2, K4, K5	CO3	Understand the problems of deadlock and analyze deadlock prevention and recovery techniques along with the design of real storage management strategies.
K1, K3, K4, K5	CO4	Describe Android platform, Architecture and features.
K1, K2, K4	CO5	Design User Interface and develop activity for Android Application. Working with image views, clock views and graphics.

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

SYLLABUS

Unit	Content	No. of Hours
I	Computer System Overview-Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor - Multicore Organization - Operating system overview-objectives and functions - Evolution of Operating System - Computer System Organization- Operating System Structure and Operations- System Calls - System Programs Operating System Generation and System Boot.	12
II	Process Concept - Process Scheduling – Operations on Process - Interprocess Communication – Threads Overview - Multicore Programming - Multithreading Models - Windows 7 Thread and SMP Management - Process Synchronization - Critical Section Problem - Mutex Locks – Semaphores – Monitors - CPU Scheduling and Deadlocks.	12
III	Main Memory-Contiguous Memory Allocation – Segmentation – Paging – Virtual MemoryDemand Paging - Page Replacement – Allocation – Thrashing -	12

	Allocating Kernel Memory.	
IV	Introduction to Android Operating System – Java JDK – Android SDK – Android Development Tools – Android Virtual Device – Emulators – Intent – Activity – Activity Life Cycle.	12
V	Designing your user interface with View: TextView – Button – ImageButton – EditText – CheckBox – ToggleButton – RadioButton & RadioGroup – Progress Bar – AutoCompleteTextView – Spinner – ListView – GridView – ImageView – ScrollView – CustomToastAlert.	12

Text Books:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 9th Edition, John Wiley and Sons Inc., 2012. (UNIT I to III)
2. Prasanna Kumar Dixit, “Android”, Vikas Publishing Private Limited, 2014. (UNIT IV,V)

Reference Books:

1. William Stallings, “Operating Systems – Internals and Design Principles”, 7th Edition, Prentice Hall, 2011.
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Addison Wesley, 2001.
3. Pradeep Kothari, “Android Application Development ”, Dreamtech Press, 2016.
4. Reto Meier, “Professional Android 2 Application Development ”, Wiley India Pvt Ltd, 2010.

E-references:

1. <https://www.studytonight.com/operating-system/cpu-scheduling>
2. https://www.tutorialspoint.com/operating_system
3. <https://www.slideshare.net/rajendraprasadalladi/operating-system-overview-concepts-ppt>
4. <https://www.tutorialspoint.com/android/>
5. <https://developer.android.com/guide>

Mapping with Programme Specific Outcomes

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

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

Programme Code:	MCA	Programme Title:	Computer Applications	
Course Code:	20P3CA05	Course Title:	Batch:	2020
Total Hours:	60	Elective - I : Object Oriented Analysis & Design	Semester:	I
			Credits:	4.0

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	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
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, BUILDING BLOCKS OF THE UML: Things, Relationships, Diagrams, Rules and Common Mechanisms in the UML, Systems Architecture, Class Diagrams, Use Case Diagrams.	12

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
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Text Books:

1. James Rumbaugh, Michael Blaha, William Premerlani, Frederick Eddy, William Lorenzen, “*Object-Oriented 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>
3. <https://nptl.ac.in/courses/122105022/28>

Mapping with Programme Specific Outcomes

CO \ PSO	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:	20P3CA06	Course Title:	Batch:	2020
Total Hours:	60	.Net Programming	Semester:	II
			Credits:	3.5

Course Objective

The course aims

- To understand the fundamentals of ASP.NET Framework and C# Programming.
- To learn the concepts of State Management, Validation, ADO.Net and design web pages using data source control.

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 fundamentals of .Net Framework and C# Programming.
K1, K2, K3	CO2	Remember the ASP.Net fundamentals and work with directives and web server controls.
K3, K4, K5	CO3	Acquire knowledge about Validation Controls, Session Management and write appropriate .Net programs.
K2, K3, K4, K5	CO4	Learn how to apply different ADO.Net objects for connecting a back end with asp server controls, write programs and analyze it.
K1, K2, K3, K4, K5	CO5	Design, develop and host web pages applying various data source controls.

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

SYLLABUS

Unit	Content	No. of Hours
I	THE .NET FRAME WORK: Languages,CLR, Namespace, Assemblies, ASP.NET: File Types, Stages in ASP.NET request, Code behind, global.asx files, Web.config files, C#.NET Programming: Variables, Data Types, Scope, Conditional Structure, Loop Structure, Functions and Subroutines.	12
II	ASP.NET FUNDAMENTALS: Page Directives, Page Events, Cross Page Posting, ASP.NET SERVER CONTROLS: Types of Server controls, Building, Working and Applying styles to server controls, WEB SERVER CONTROLS: TextBox, Button, HyperLink, ListBox, Radio Button, Calender, Adrotator - Events and methods.	12
III	VALIDATION SERVER CONTROLS: Client side Validation, *Validation controls, Regular Expressions, Programming with Validation, STATE MANAGEMENT: Session states, Understanding session object in ASP.NET, Query strings, Cookies, Hidden Field, ViewState, Programming with state Management. *Self study	12
IV	DATA MANAGEMENT WITH ADO.NET: Common ADO.NET operations, ADO.NET Namespace and Classes, Objects - Connection, Command, Data Reader,	12

	DataSet, Data Tables using parameters, Programming with ADO.NET.	
V	DATA BINDING: Data Source controls – Sql Data source control, DATA SOURCE CONTROL CATCHING: Storing Connection, USING BOUND LIST CONTROLS WITH DATA SOURCE CONTROL: Grid View- Templates, Paging, Using Template field columns, Editing, Deleting, List view binding, Form view binding , Programs for binding.	12

Text Books:

1. THE COMPLETE REFERENCE ASP.NET, MATHEW MAC DONALD, Tata McGraw Hill Publishing, Edition, 2002 (UNIT-I).
2. PROFESSIONAL ASP.NET 4 IN C# AND VB, BILL EVJEN, SCOTT HANSELMAN & DEVIN RADER, Wiley Publishing, Reprint- 2011 (UNIT II-V).

E-references:

1. <https://www.tutorialspoint.com/asp.net>
2. <https://www.w3schools.com/asp.net>

Mapping with Programme Specific Outcomes

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

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

Programme Code:	MCA	Programme Title :	Computer Applications	
Course Code:	20P3CA07	Course Title:	Batch:	2020
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 anomalies 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 retrieval.
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 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.	12
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

CO \ PSO	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:	20P3CA08	Course Title:	Batch:	2020
Total Hours:	60	Software Project Management & Testing	Semester:	II
			Credits:	4.0

Course Objective

The course aims

- To learn about the activities involved in software project management.
- To understand various techniques for effort estimation.
- To learn about Resources and various testing techniques.

Course Outcomes (CO)

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

Knowledge Level	CO Number	Course Outcome
K1, K2	CO1	Learn about Software Project Management Basics, Project planning and various development models.
K1, K2, K3	CO2	Learn about Software Effort Estimation, Activity Planning and Risk Management.
K1, K2, K3	CO3	Understand and identify Resource Allocation, Monitoring and Control, Managing People in Software Environments and Working Team Management.
K1, K2, K3, K4, K5	CO4	Design and conduct Black box, White box and Integration testing Types.
K1, K2, K3, K4, K5	CO5	Know about System and Acceptance Testing, Performance Testing and Regression Testing.

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

SYLLABUS

Unit	Content	No. of Hours
I	<p>Introduction to Software Project Management: Introduction - Why is Software Project Management Important? - What is a Project? - Software Projects versus Other Types of Project - Contract Management and Technical Project Management - Activities Covered by Software Project Management - Plans, Methods and Methodologies - Some Ways of Categorizing Software Projects - Stakeholders - Setting Objectives - The Business Case - Project Success and Failure - What is Management? - Management Control - Traditional versus Modern Project Management Practices - An Overview of</p> <p>Project Planning: - Selection of an Appropriate Project Approach: Introduction - Build or Buy? - Choosing Methodologies and Technologies - Software Processes and Process Models - Choose of Process Models - Structure versus Speed of Delivery - The Waterfall Model - Spiral Model - Software Prototyping - Other Ways of Categorizing Prototypes - Incremental Delivery – Dynamic Systems Development Method - Rapid Application Development - Agile Methods - Extreme Programming (XP) - Scrum - Managing Iterative Processes -Selecting the Most Appropriate Process Model.</p>	12

II	<p>Software Effort Estimation: Introduction - Where are Estimates Done? - Problems with Over - and Under-Estimates - The Basis for Software Estimating - Software Effort Estimation Techniques - Bottom-up Estimating - The Top-down Approach and Parametric Models - Expert Judgment - Estimating by Analogy - Albrecht Function Point Analysis - Function Points Mark II - COSMIC Full Function Points - COCOMO II:A Parametric Productivity Model - Cost Estimation - Staffing Pattern - Effort of Schedule Compression - Activity Planning: Introduction - The Objective of Activity Planning - When to Plan - Project Schedules - Projects and Activities - Sequencing and Scheduling Activities - Network Planning Models - Formulating a Network Model - Adding the Time Dimension - The Forward Pass - The Backward Pass - Identifying the Critical Path - Activity Float - Shortening the Project Duration - Identifying Critical Activities - Activity-on-Arrow Networks -Risk Management: Introduction - Risk - Categories of Risk - A Framework for Dealing with Risk - Risk Identification - Risk Assessment - Risk Planning - Risk Management - Evaluating Risk to the Schedule - Applying the PERT Technique - Monte Carlo Simulation - Critical Chain Concepts.</p>	12
III	<p>Resource Allocation: Introduction - The Nature of Resources - Identifying Resources Requirements - Scheduling Resources - Creating Critical Paths - Counting the Cost - Being Specific - Publishing the Resource Schedule - Cost Schedules - The Schedule Sequence - Monitoring and Control: Introduction - Creating the Framework - Collecting the Data - Review - Project Termination Review - Visualizing Progress - Cost Monitoring - Earned Value Analysis - Prioritizing Monitoring - Getting the Project Back to Target - Change Control - Software Configuration Management (SCM) - Managing People in Software Environments: Introduction - Understanding Behavior - Organizational Behaviour: A Background - Selecting the Right Person for the Job - Instruction in the Best Methods - Motivation - The Oldham-Hackman Job Characteristics Model - Stress - Health and Safety - Working in Team: Introduction - Becoming a Team - Decision Making - Organization and Team Structure - Coordination Dependencies - Dispersed and Virtual Teams - Communication Genres - Communication Plans - Leadership.</p>	12
IV	<p>White Box Testing: What is White Box Testing? - Static Testing - Structural Testing - Challenges in White Box Testing -Black Box Testing: What is Black Box Testing? - Why Black Box Testing? - When to do Black Box Testing? - How to do Black Box Testing? - Integration Testing: What is Integration Testing? -Integration Testing as a Type of Testing - Integration Testing as a Phase of Testing - Scenario Testing - Defect Bash.</p>	12
V	<p>System and Acceptance Testing: System Testing Overview - Why is System Testing Done? - Functional Versus Non-Functional Testing - Functional System Testing - Non-Functional Testing - Acceptance Testing - Performance Testing: Introduction - Factors Governing Performance Testing - Methodology for Performance Testing - Tools for Performance Testing - Process for Performance Testing - Regression Testing: What is Regression Testing? - Types of Regression Testing - When to do Regression Testing? - How to do Regression Testing? - Best Practices in Regression Testing.</p>	12

Text Books:

1. Bob Hughes And Mike Cotterell And Rajib Mall, “*Software Project Management*”, Tata McGraw Hill - Fifth Edition Tenth reprint 2014 [For Unit I - Unit III].
2. Srinivasan Desikan & Gopalaswamy Ramesh, “*Software Testing Principle and Practices*”, Pearson Education, 2006 [For Unit IV - and Unit V].

Reference Books:

1. Milind Limaye, “*Software Quality Assurance*”, Tata Mc Graw Hill, Edition, 2011, ISBN (13) : 978-0-07-107252-6.
2. Daniel Galin, “*Software Quality Assurance*”, Pearson Education Edition, 2009, ISBN 978-81-317-2395-1.
3. Kamna Malik, Praveen Choudhary, “*Software Quality*”, Tata Mc Graw Hill Edition, 2010, ISBN-13-978-0-07-024873-1.
4. Ron Patton, “*Software Testing*”, 2nd Edition, Sams Publishing, 2005.
5. Glenford J. Myers, Corey Sandler, Tom Badgett, “*The Art of Software Testing*”, 3rd Edition, John Wiley & Sons, Inc., Hoboken, New Jersey, 1979.

E-references:

1. <https://en.wikipedia.org/wiki/software-engineering/>
2. <https://www.computerscience.org/software-quality-assurance/>
3. <https://www.predictiveanalyticstoday.com/quality-control/>
4. http://barbie.uta.edu/~mehra/Book1_The Art of Software Testing.pdf
5. <https://www.softwaretestinghelp.com/practical-software-testing-new-free-ebook-download/>

Mapping with Programme Specific Outcomes

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

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

Programme Code:	MCA	Programme Title :	Computer Applications	
Course Code:	20P3CA09	Course Title:	Batch:	2020
Total Hours:	60	TCP/IP Protocol Suite & Cyber Security	Semester:	II
			Credits:	4.0

Course Objective

The course aims

- To help the students to understand the concepts of networking.
- To enable the students to learn the technologies behind internet.
- To help the students to understand the protocols used in internet.
- To help the students to learn about network security.

Course Outcomes (CO)

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

Knowledge Level	CO Number	Course Outcome
K1, K2, K3	CO1	Understand the networking topology.
K2, K3, K4, K5	CO2	Understand the switching technologies and IP addresses.
K2, K3, K4, K5	CO3	Evaluate the various protocols for network layer data transfer.
K2, K3, K4, K5	CO4	Comprehend the transport layer session.
K2, K3, K4, K5	CO5	Understand the use of Crypto security.

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

SYLLABUS

Unit	Content	No. of Hours
I	OSI Model & TCP/IP protocol suite: OSI model; TCP/IP protocol suite, addressing, Wired LAN, Wireless LAN, Point to point WAN, Switched WAN, Connecting devices.	12
II	Network Layer: Packet switching at network layer, Network layer services, IPv4 addressing: Classful addressing, Classless addressing, Special addresses, NAT. Forwarding of IP Packets, Delivery, Forwarding, Structure of a router.	12
III	IPv4: Datagrams, Fragmentation, Options, Checksum. ARP: Address mapping, ARP protocol, ARP package. ICMPv4: Messages, Debugging tools, ICMP package. Unicast Routing Protocols: Intra and inter domain routing, Distance vector routing, RIP, Link state routing, OSPF, Path vector routing: BGP.	12
IV	Transport Layer: Transport layer services, Transport layer protocols, UDP: User datagram, UDP services, UDP applications, UDP package. TCP: TCP services, TCP features, Segment, A TCP connection, TCP features, Segment, TCP connection, State transition diagram, Windows in TCP, Flow control, Error control, Congestion control, TCP timers, Options. <i>Self study: TCP Options</i>	12

V	Cryptography & Network Security: Introduction – Traditional ciphers – Modern ciphers – Asymmetric key ciphers – Message integrity – Message authentication – Digital signature – Entity authentication & Key management.	12
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Text Book:

1. Behrouz A. Forouzan, TCP/IP protocol suite, Tata Mc Graw Hill Education Pvt. Ltd, Fourth Edition, 2010.

Reference Books:

1. Craig Hunt, “TCP/IP Network Administration”, O’Reilly, Third Edition, 2002.
2. Charles M. Kozierok, “The TCP/IP Guide: A Comprehensive, Illustrated Internet Protocols Reference”, No Starch Press, 2005.
3. Douglas E Comer, “Internet Working with TCP/IP”, PHI, Fourth Edition, 1998.
4. Karanjit S. Siyan, “TCP/IP Unleashed”, Sams, Third Edition, 2002.

E-references:

1. <https://www.redbooks.ibm.com/redbooks/pdfs/gg243376.pdf>
2. http://xahlee.info/linux/tcp_ip_tutorial.html
3. <http://www.steves-internet-guide.com/internet-protocol-suite-explained/>

Mapping with Programme Specific Outcomes

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

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

Programme Code:	MCA	Programme Title :	Computer Applications	
Course Code:	20P3CA10	Course Title:	Batch:	2020
Total Hours:	60	Elective - II : Principles of Compiler Design	Semester:	II
			Credits:	4.0

Course Objective

The course aims

- To learn the basic structure of a Compiler.
- To understand the concepts of different types of Grammers and Parsers.
- To learn how to perform code optimization and code generation.

Course Outcomes (CO)

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

Knowledge Level	CO Number	Course Outcome
K1, K2, K3	CO1	Describe the concept of the various phases of compiler and design of lexical analyser.
K2, K3, K4	CO2	Explain the concept of Different types of grammars and parsers.
K2, K3, K4, K5	CO3	Understand the concept of LR parsers, Parsing Tables and Symbol Tables.
K2, K3, K4, K5	CO4	Acquire the knowledge of syntax-directed translation schemes and Three Address Code.
K2, K3, K4, K5	CO5	Gain knowledge about Code optimization and design code generator.

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

SYLLABUS		
Unit	Content	No. of Hours
I	Introduction - The Structure of a Compiler - Compiler writing tools - The Lexical and Syntactic Structure of a language - The role of the Lexical Analyzer - Design of Lexical Analyzers - Regular Expression - Finite automata.	12
II	Context - Free Grammars - Derivations and parse tree - Capabilities of Context - free Grammars - Parsers - Shift - reduce parsing - Operators - Precedence Parsing - Top - down parsing - predictive parsers.	12
III	LR parsers - The Canonical collection of LR (0) items - Constructing SLR parsing Tables – Symbol Tables - Data Structure for Symbol Tables.	12
IV	Syntax - directed translation Schemes - Implementation of Syntax - directed translators - Intermediate Code - postfix notation – Parse tree & Syntax trees – Three address code – Translation of assignment statements – Boolean expression.	12
V	The Principal source of optimization - Loop optimization - DAG representation of basic blocks – problems in code generation – A simple code generator.	12

Text Book:

1. Alfred V. Aho & Jeffrey D. Ullman, “Principles of Compiler Design”, Narosa Publishing House (Units I to V).

Reference Books:

1. Alfred V. Aho, Monica, S. Lam, Ravi Sethi and Jeffrey D. Ullman, “Compilers: Principles, Techniques and Tools”, 2nd Edition.
2. Randy Allen, Ken Kennedy, “Optimizing Compilers for Modern Architectures: A Dependence-based Approach”, Morgan Kaufmann Publishers, 2002.
3. Steven S. Muchnick, “Advanced Compiler Design and Implementation”, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.
4. Charles N. Fischer, Richard. J. LeBlanc, “Crafting a Compiler with C”, Pearson Education, 2008.

E-references:

1. https://www.tutorialspoint.com/compiler_design/compiler_design_useful_resources.htm
2. <https://www.geeksforgeeks.org/compiler-design-tutorials/>

Mapping with Programme Specific Outcomes

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