

**Government College of Engineering, Karad**

**First Year (Sem – I) Master of Computer Applications**

**MC3101:Data Structure**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
		ISE	20
Total Credits	03	ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO)**

- To understand basic data structures such as array, linked lists, stacks & queues.
- Ability to choose data structures to represent data items in real world.
- Implement & know the applications of algorithms for specific problems like sorting, searching etc.

**Course Contents**

		CO	Hrs
<b>Unit 1</b>	<b>Basic Concepts:</b> Data, Data representation and types, Notation of Data Structure, Linear, and Non-linear Types data structure operations, Array, Records, Pointers.	<b>1</b>	<b>(5)</b>
<b>Unit 2</b>	<b>Linked Lists:</b> Linked Representation in memory, traversing and searching a linked list, insertion and deletion from a linked list, singly and doubly linked list.	<b>1,2</b>	<b>(7)</b>
<b>Unit 3</b>	<b>Stacks and Queues:</b> Definitions, array representation of stacks, arithmetic expression: polish notation, application of stack, queues, DE queues, priority queues.	<b>2</b>	<b>(6)</b>
<b>Unit 4</b>	<b>Trees:</b> Binary trees, representing binary trees in memories, traversing binary trees, binary search trees, searching and inserting in binary trees, deleting in a binary search tree, path lengths, Huffman's algorithm, general trees	<b>2,3</b>	<b>(10)</b>
<b>Unit 5</b>	<b>Graphs:</b> Graph theory terminology, sequential representation of graphs, adjacency matrix, path matrix, Wars hall's algorithm for shortest path, Link representation of graphs, operation on graphs, traversing a graph	<b>2,3</b>	<b>(6)</b>
<b>Unit 6</b>	<b>Searching and sorting:</b> Searching techniques, sorting-insertion, selection, merge, radix sort, searching and data modification.	<b>2,3</b>	<b>(7)</b>

**Text Books**

- Data structure by Lipschutz, MGH
- Data and file structure by A. Tanenbaum by PHI

**Reference Books**

- Data structure using C++ by Tremblay
- Data structure and algorithm using C++ M.T Goodrich-Wiley India Education ISBN: 9788126512607

**Useful Links**

- <http://www.nptel.ac.in>
- [www.ocw.mit.edu](http://www.ocw.mit.edu)

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	1	0	0	0	0	0	0	0	0	0	2	0	0
CO 2	3	1	2	0	0	0	0	0	0	0	0	0	1	2	0
CO 3	1	2	3	0	0	0	0	0	0	0	0	0	1	2	0

**Assessment Pattern (with revised Bloom's Taxonomy)**

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	4	4	12
Apply	4	4	12
Analyse	4	4	12
Evaluate	4	4	12
Create	-	-	-
<b>TOTAL</b>	<b>20</b>	<b>20</b>	<b>60</b>

**Government College of Engineering, Karad**

**First Year (Sem – I) Master of Computer Applications**

**MC 3102 : Mathematical Foundations of Computer Science**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
Tutorials	00 Hrs/week	ISE	20
Total Credits	03	ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Student Should Aware of Understanding fundamental mathematical concepts and terminologies such as sets, Relations, functions
2. Student Should Apply graph theory and binary tree models of data structures and state machines to solve problems of connectivity and constraints satisfaction and Interpret the problems that can be formulated with it.
3. Student Should Understand techniques for constructing mathematical proofs illustrated by discrete mathematical Examples

**Course Contents**

	Course Contents	CO	Hrs
<b>Unit 1</b>	<b>Relations, Ordered Sets and Lattices:</b> Introduction Set theory Basics, Product Set, Relations, Pictorial Representatives of Relations, Composition of Relations, Types of Relations, Closure Properties, Equivalence Relations, Partial Ordering Relations, n-ARY relations, A Relational Model for databases	<b>1</b>	<b>(5)</b>
<b>Unit 2</b>	<b>Ordered Sets and Lattices</b> Introduction, Ordered Sets, Hasse Diagrams of Partially Ordered Sets, Consistent Enumeration, Supremum and Infimum, Isomorphic (Similar) Ordered Sets, Well-Ordered Sets, Lattices, Bounded Lattices, Distributive Lattices, Complements, Complemented Lattices with Example	<b>1,2</b>	<b>(7)</b>
<b>Unit 3</b>	<b>Graph Theory:</b> Introduction, Data Structures ,Basic Terminology, Simple Graph, Multigraphs and Psuedo Graph, Degree of Vertex, Types of Graphs-Subgraphs Isomorphic, Homeomorphic Graphs, Paths, Connectivity, Traversable and Eulerian Graphs, Labeled and Weighted Graphs ,Complete, Regular, and Bipartite Graphs, Tree Graphs Planar Graphs, Graph Colorings, Reperesentation of Graph Tree and their Properties, Spanning Tree, Binary Tree, Tree Traversal	<b>2</b>	<b>(6)</b>
<b>Unit 4</b>	<b>Boolean and Linear algebra:</b> Introduction to Boolean Algebra Basic Definition ,Unique Features, Basic Operation and Theorems, Boolean Function, Boolean Expression, Principle of Duality SOP and POS Form(CNF and DNF) Minimal Boolean Expression, Prime Implicants, Logic Gates And Circuits Truth Table Boolean Function, Karnaugh Map Method for simplification of Boolean Expression Boolean Algebra : Fields, Vector Space, Matrices and Linear Transformations, Eigenvalues, Egien Vector Orthogonality	<b>2,3</b>	<b>(10)</b>
<b>Unit 5</b>	<b>Probability:</b> Introduction, Random Experiment, Sample Space, Event Probability of Event, Compound Event, Conditinal Probability, Random Variable and Discrete Probability Distribution	<b>2,3</b>	<b>(6)</b>
<b>Unit 6</b>	Theory of Automata & Regular Sets and Regular Automata, Grammars and Languages: Regular languages and finite automata, Context-free languages and pushdown automata, Turing machines, Some other computing models and formalisms, their equivalence with Turing machines, Undesirability.	<b>2,3</b>	<b>(6)</b>

**Text Books**

1. Discrete Mathematics By Seymour Lipschutz and Marc Lars Lipson
2. Theory of Computer Science By K.L.P.Mishra
3. Discrete Mathematics by S.Chand

**Reference Books**

1. Discrete Mathematical Structure By Rosen
2. Discrete Mathematical Structure By Tremblay and Manohar
3. Graph Theory By NarsingDeo
4. Introduction To Computer Theory By Danniell.A.Cohen, John Wiley and Sons
5. W. Feller, An Introduction to Probability Theory and Its Applications, Wiley; vol. 1 & 2, 1971. 6 Jean Gallier, Discrete mathematics, Springer, 2011

**Useful Links**

1. <http://www.nptel.ac.in/Discrete Mathematical Structure>
2. <http://www.ocw.mit.edu/>

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	0	2	3	0	0	0	0	0	3	3	3	1	2
CO 2	3	1	0	2	3	0	0	0	0	0	3	3	3	2	3
CO 3	2	2	1	1	3	0	0	0	0	0	3	3	3	1	3

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	4	4	12
Apply	4	4	12
Analyse	4	4	12
Evaluate	4	4	12
Create	-	-	-
TOTAL	20	20	60

**Government College of Engineering, Karad**

**First Year (Sem – I) Master of Computer Applications**

**MC3103 : Software Engineering And Quality Assurance**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
		ISE	20
Total Credits	03	ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Be able to understand and implement SDLC in their academic projects
2. Be able to implement any Software Process Model for building project
3. Be able to assess the quality of software product and apply the concepts in preparing the quality plan & documents.

**Course Contents**

		CO	Hrs
<b>Unit 1</b>	<b>Introduction to Software Engineering:</b> The Evolving Role of Software, A Generic View of process-Software Engineering, a process framework, Personal and Team Process Models, Process Technology, Product and Process. <b>Software Process Models:</b> Prescriptive Models, The Waterfall Models, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, Agile View Of Process.	<b>1</b>	<b>(08)</b>
<b>Unit 2</b>	<b>Software Requirement Engineering:</b> A Bridge to Design And Construction, Requirement Engineering Task, Initiating The Requirement Engineering Process, Eliciting Requirement, Developing Use Cases, Building the Analysis Models, Negotiating Requirement, Validating Requirement.	<b>1,2</b>	<b>(06)</b>
<b>Unit 3</b>	<b>Software Design Engineering:</b> Design Process and Design Quality, Design Concepts, The Design Model, Pattern-Based Software Design, Software Architecture, Architectural Design, Mapping Data Flow into Software Architecture. <b>Software Modelling Component-Level Design:</b> What is Component, Designing Class-Based Components, Designing Conventional Components, The Golden Rules, User Interface Analysis and Design	<b>1,2</b>	<b>(08)</b>
<b>Unit 4</b>	<b>Software Testing:</b> Testing as an Engineering Activity, Software Testing Principles, Tester Role in Software Development, Artefacts of testing (Faults, errors, and Failures), Limitations of Testing, Challenges in Software Testing, White Box And Black Box Testing.	<b>2,3</b>	<b>(06)</b>
<b>Unit 5</b>	<b>Software Quality:</b> Software Quality, Software Control, Quality Assurance, Quality Assurance Analyst, Quality Factor, Quality Management, Methods of Quality Management, Core components of Quality, Cost Aspect of Quality.	<b>2,3</b>	<b>(06)</b>
<b>Unit 6</b>	<b>Quality Assurance:</b> Quality Planning, Quality plan objectives, Planning process overview, Business Plan and Quality Plan, TQM (Total Quality Management), TQM concepts, Zero defect movement <b>Quality Standards:</b> Quality Models/Standards, Standards and guidelines, Types of Models, ISO Standards, CMM and CMMI, Six Sigma concepts, Quality Challenge, National Quality Awards.	<b>3</b>	<b>(06)</b>

**Text Books**

1. Software Engineering – a practitioner’s approach by Roger S. Pressman, MGH.
2. Yogesh Singh, ”Software Testing”, Cambridge University Press, 2011
3. Sagar Naik, Piyu Tripathy, ” Software Testing and Quality Assurance”, Wiley

**Reference Books**

1. Software Engineering by Shoomar, PHI
2. System Analysis and Design by Award, TMH
3. Effective methods for Software Testing William Perry, Wiley
4. Milind Limaye, ”Software Quality Assurance, McGraw-Hill publication

**Useful Links**

1. <http://www.nptel.ac.in>, Software Engineering,
2. [www.ocw.mit.edu](http://www.ocw.mit.edu)

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	0	2	3	0	0	0	0	0	3	3	3	1	2
CO 2	3	1	0	2	3	0	0	0	0	0	3	3	3	2	3
CO 3	2	2	1	1	3	0	0	0	0	0	3	3	3	1	3

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	3	3	9
Apply	3	3	9
Analyse	3	3	9
Evaluate	4	4	12
Create	3	3	9
TOTAL	20	20	60

**Government College of Engineering, Karad**

**First Year (Sem – I) Master of Computer Applications**

**MC3104: Python Programming**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
		ISE	20
Total Credits	03	ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Able to apply the principles python programming.
2. Write clear and effective python code.
3. Create applications using python programming

Course Contents		CO	Hrs
<b>Unit 1</b>	<b>Introduction to Python Programming Language:</b> Introduction to Python Language, StrengthsandWeaknesses, IDLE,DynamicTypes, NamingConventions, StringValues, StringOperations, StringSlices, StringOperators, NumericDataTypes, Conversions, BuiltInFunctions	1	(06)
<b>Unit 2</b>	<b>Data Collections and Language Component:</b> Introduction, Control Flow and Syntax, Indenting, The if Statement, Relational Operators, Logical, Operators, True or False, Bit Wise Operators, The while Loop, break and continue, The for Loop, Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections.	1,2	(08)
<b>Unit 3</b>	<b>Object and Classes:</b> Classes in Python, Principles of Object Orientation, Creating Classes, Instance Methods, File Organization, Special Methods, Class Variables, Inheritance, Polymorphism, Type Identification, Custom Exception Classes	1,2	(08)
<b>Unit 4</b>	<b>Functions:</b> Introduction, Defining Your Own Functions, Parameters, Function Documentation, Keyword and Optional Parameters, Passing Collections to a Function, Variable Number of Arguments, Scope, Functions - "First Class Citizens", Passing Functions to a Function, Mapping Functions in a Dictionary, Lambda,	2,3	(06)
<b>Unit 5</b>	<b>Modules:</b> Introduction, Standard Modules – sys, Standard Modules – math, Standard Modules – time, The dir Function	2,3	(06)
<b>Unit 6</b>	<b>I/O and Error Handling In Python:</b> Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data From a File, Additional File Methods, Using Pipes as Data Streams, Handling IO Exceptions, Working with Directories, Metadata, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions	2,3	(06)
<b>Reference Books</b>	1. DiveintoPython,Mike 2. LearningPython,4 <sup>th</sup> EditionbyMarkLutz 3. ProgrammingPython,4 <sup>th</sup> EditionbyMarkLutz		

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	1	2	0	1	0	0	0	0	0	0	1	2	1	0
CO 2	2	1	2	0	1	0	0	0	0	0	0	0	2	1	0
CO 3	2	1	1	0	0	0	0	0	0	0	0	0	2	1	0

**Assessment Pattern (with revised Bloom’s Taxonomy)**

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	3	3	9
Apply	3	3	9
Analyse	3	3	9
Evaluate	4	4	12
Create	3	3	9
TOTAL	20	20	60

**Government College of Engineering, Karad**

**First Year (Sem – I) Master of Computer Applications**

**MC3105 : Computer Networks**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
		ISE	20
Total Credits	03	ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- Students will come to know about various protocols, models in Networks
- Students will be aware of Network hardware, Media Types (cables , Wireless)
- Students will be able to design, implement and analyze simple computer networks.

Course Contents		CO	Hrs
<b>Unit 1</b>	<b>Introduction: Computer Network:</b> Overview of Computer Network, Network hardware and software, Reference model- OSI and TCP/IP and their comparison Network layer-network layer design issues, various routing Algorithms and congestion control algorithms, Networking layer in the internet.	<b>1</b>	<b>(08)</b>
<b>Unit 2</b>	<b>Transport layer:</b> The transport services, elements of transport protocols, internet transport protocols, ATM – AAL layer protocols, Performance issues.	<b>1,2</b>	<b>(08)</b>
<b>Unit 3</b>	<b>TCP/IP:</b> TCP/IP architecture, the internet protocols, IPv4 , Ipv6, DHCP and Mobile IP , internet routing protocols , multicast routing ,The network layer in ATM networks	<b>1,2</b>	<b>(08)</b>
<b>Unit 4</b>	<b>The Application layer:</b> Network security – principle of cryptography, secret key and public key algorithm, digital scanners, Domain name system-The DNS name space, resource records, name server, simple network management Protocol.	<b>2,3</b>	<b>(08)</b>
<b>Unit 5</b>	<b>SNMP model:</b> SNMP model, Electronic mail- architecture and services, Message formats and message transfer, email privacy Usenet news- user view of Usenet and Usenet implementation.	<b>2,3</b>	<b>(04)</b>
<b>Unit 6</b>	<b>Multimedia Information and Networking:</b> Lossless data compression, Video on Demand, Transmission in ATM network, Communication satellites. Additional issues related to security	<b>2,3</b>	<b>(04)</b>

**Text Books**

- Andrew. S. Tanenbaum, “Computer Networks”, PHI
- Alberto,Leon –Garcia and Indrawidjaja, “Communication Networks- Fundamental concepts and key architectures”, Tata Mc-Graw Hill

**Reference Books**

- Behrouz A. Forouzan “Data Communications and Networking ”, Tata McGraw Hill
- AchyutGodbole, “Data Communications and Networks”, Tata McGraw Hill
- Craig Zacker, “Complete Reference Networking”, Tata McGraw Hill

**Useful Links**

- <http://www.nptel.ac.in>

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2	1	0	0	0	0	0	0	0	0	0	2	0	0
CO 2	3	2	2	0	0	0	0	0	0	0	0	0	2	2	0
CO 3	3	2	2	0	0	0	0	0	0	0	0	0	1	2	0

### Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	3	3	9
Apply	3	3	9
Analyse	3	3	9
Evaluate	4	4	12
Create	3	3	9
TOTAL	20	20	60



**Government College of Engineering, Karad**

**First Year (Sem – I) Master of Computer Applications**

**MC 3106:Data Structure Lab**

Laboratory Scheme		Examination Scheme	
Practical	02 Hrs/week	ISE	50
Total Credits	01		

**Course Outcomes (CO)**

1. Implement the advance C programming concepts and searching, sorting methods
2. Implement sequential and linked representation of linear data structure.
3. Implement nonlinear data structure like tress and graph.

**List of Experiments**

		CO
Experiment 1	Program to implement array operations (Insert, Delete, Display)	1
Experiment 2	Program to sort an array using bubble sort.	1
Experiment 3	Program to search an element in array in array using linear & binary search.	1,2
Experiment 4	Program to implement linked list & its operations (Insert, Delete, Display).	1,2
Experiment 5	Program to search an element from linked list.	2
Experiment 6	Program to implement stack operation (PUSH, POP & Show).	2
Experiment 7	Program for conversion of infix expression to postfix expression.	2
Experiment 8	Program to evaluate postfix expression.	2
Experiment 9	Program to sort an array using quick sort method.	2
Experiment 10	Program to implement queue.	2,3
Experiment 11	Program for traversing of a binary tree (Preorder, Inorder, Postorder).	2,3
Experiment 12	Program to implement binary search tree.	2,3
Experiment 13	Program to sort an array using merge sort.	2,3
Experiment 14	Program to sort an array using insertion & selection sort.	2,3
Experiment 15	Program to sort an array using radix sort method.	2,3

**List of Submission**

1. Total number of experiment based on syllabus: 10

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	1	2	0	1	0	0	0	0	0	0	1	2	1	0
CO 2	2	1	2	0	1	0	0	0	0	0	0	0	2	1	0
CO 3	2	1	1	0	0	0	0	0	0	0	0	0	2	1	0

**Assessment Pattern (with revised Bloom's Taxonomy)**

Knowledge Level	ISE	ESE
Remember	8	
Understand	10	
Apply	8	
Analyse	6	
Evaluate	10	
Create	8	
TOTAL	50	

**Government College of Engineering, Karad**

**First Year (Sem – I) Master of Computer Applications**

**MC3107: Python Programming Lab**

Laboratory Scheme		Examination Scheme	
Practical	02 Hrs/week	ISE	25
		ESE	50
Total Credits	01		

**Course Outcomes (CO)**

1. Able to apply the principles python programming.
2. Write clear and effective python code.
3. Create applications using python programming

List of Experiments		CO
		<b>1</b>
Experiment 1	Introduction to python programming and python data types.	<b>1</b>
Experiment 2	Conditional statements (if, if-else,if-elif-else, nested if, match-case)	<b>1</b>
Experiment 3	Loops (while loop, for loop, nested loop)	<b>1</b>
Experiment 4	Collections (List, Tuple, Set and Dictionary)	<b>2</b>
Experiment 5	Functions	<b>2</b>
Experiment 6	Modules/Libraries (numpy, pandas etc)	<b>2</b>
Experiment 7	Input/Output	<b>2</b>
Experiment 8	File Handling	<b>2</b>
Experiment 9	Exception Handling	<b>2,3</b>
Experiment 10	Class and object	<b>2,3</b>
Experiment 11	Inheritance	<b>2,3</b>
Experiment 12	Overloading, Overriding	<b>2,3</b>

**List of Submission**

Total number of experiment based on syllabus: 10

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	1	2	0	1	0	0	0	0	0	0	1	2	1	0
CO 2	2	1	2	0	1	0	0	0	0	0	0	0	2	1	0
CO 3	2	1	1	0	0	0	0	0	0	0	0	0	2	1	0

**Assessment Pattern (with revised Bloom's Taxonomy)**

Knowledge Level	ISE	ESE
Remember	4	8
Understand	5	10
Apply	4	8
Analyse	3	6
Evaluate	5	10
Create	4	8
TOTAL	25	50

<b>Government College of Engineering, Karad</b>					
<b>First Year (Sem – I) Master of Computer Applications</b>					
<b>MC3108 : Web Programming &amp; Scripting Lab</b>					
<b>Teaching Scheme</b>		<b>Examination Scheme</b>			
Practical	02 Hrs/week		ISE	25	
			ESE	50	
Total Credits	01				
<b>Course Outcomes (CO)</b>					
1. Understand and use of HTML tags.					
2. Implement client side scripting languages such as JavaScript and JQuery.					
3. Implement server side scripting language such as Php.					
<b>Course Contents</b>				<b>CO</b>	<b>Hrs</b>
<b>Unit 1</b>	<b>Overview of Internet Technology:</b> Internet, web site, www, server, client, IP address, tcp/ip protocol. <b>Detail Study of HTML:</b> What is HTML, History, creating, installing, viewing, and checking web pages, TAGS, core HTML elements. <b>HTML links and addressing:</b> What are URL's, linking in HTML, Anchor attributes, Image maps. <b>Presentation and layout:</b> Image preliminaries, HTML image basics, maps and buttons, Text colors and background: Fonts colors in HTML, color attributes for bod, background images. Forms posting methods (get, post)			<b>1</b>	<b>(06)</b>
<b>Unit 2</b>	<b>Introduction to Scripting Languages:</b> Scripting Languages, Similarities and difference between Scripting Languages and Programming Languages, Advantages and Disadvantages of Scripting Languages, Use of Scripting Languages. <b>JavaScript:</b> Introduction to JavaScript, Variables, Arrays, Loops, Conditional Statements, Functions, Cookies, DOM, Events, Object Oriented JavaScript, Internal & External JavaScript.			<b>2</b>	<b>(08)</b>
<b>Unit 3</b>	<b>JQuery:</b> Introduction, Data Types, Objects, Arrays, Functions, Arguments, Scope, Built-in Functions, Selectors, use of Selectors, DOM Attributes, DOM Traversing, CSS Methods, DOM Manipulation Methods, Effects			<b>2</b>	<b>(06)</b>
<b>Unit 4</b>	<b>AJAX:</b> Ajax Basics, Ajax Components, DOM, Passing Data, Server Side Code, API, Ajax Applications, Ajax/Javascript Frameworks, Ajax Applications Client side validations, multi device compatibility, cross browser compatibility			<b>2</b>	<b>(06)</b>
<b>Unit 5</b>	<b>.PHP:</b> PHP Basics syntax, PHP data Types, PHP Variables, PHP Constants, PHP Expressions, PHP Operators, PHP Control Structures, PHP Loops, PHP Enumerated Arrays, PHP Associative Arrays, Array Iteration, PHP Multi-Dimensional Arrays, Array			<b>3</b>	<b>(10)</b>
<b>Unit 6</b>	<b>PHP Advanced:</b> Functions, PHP Functions, Syntax, Arguments, Variables, References, Pass by Value & Pass by references, Return Values, Variable Scope, PHP include(), PHP require(), PHP Form handling, PHP GET, PHP POST, PHP Form Validation, PHP Form Sanitization, PHP Cookie handling, PHP Session Handling, PHP Login Session, Managing user ACL, Strings and Patterns, Matching, Extracting, Searching Replacing, Formatting. (react/Angular)			<b>3</b>	<b>(10)</b>
<b>Tutorials</b>					
A set of Tutorial/ problems based on above syllabus is to be submitted					
<b>Sample List of Experiments:</b>				<b>CO</b>	
<b>Experiment 1</b>	To create a web page using basic HTML tags.			<b>1</b>	
<b>Experiment 2</b>	To create a web page using link, button & map tags.			<b>1</b>	
<b>Experiment 3</b>	To create a web page using table & multimedia tags.			<b>1</b>	
<b>Experiment 4</b>	To create a web page using css.			<b>1</b>	
<b>Experiment 5</b>	Create a form, put validation checks on values entered by the user using JavaScript (such as age should be a value between 1 and 150, Mandatory fields, Input Numbers only).			<b>2</b>	
<b>Experiment 6</b>	To create a text box and submit button of event handling submitform () using AJAX.			<b>2</b>	
<b>Experiment 7</b>	Develop a dynamic webpage demonstrating the use of AJAX and APIs.			<b>2</b>	
<b>Experiment 8</b>	Program to PHP Enumerated Arrays, PHP Associative Arrays, Array Iteration, PHP Multi-Dimensional Arrays, Array Functions.			<b>2</b>	
<b>Experiment 9</b>	String Handling in PHP.			<b>2</b>	
<b>Experiment 10</b>	Program to PHP Form handling, PHP GET, PHP POST, PHP Form Validation, PHP Form Sanitization.			<b>2,3</b>	
<b>List of Submission:</b>					
Minimum 10 experiments to be performed and evaluated Journal.					
<b>Text Books</b>					

1.	Web Design with HTML, CSS, JavaScript and jQuery Set by Jon Duckett
2.	Head First PHP and MySQL by Lynn Beighley and Michael Morrison
3.	Python Crash Course by Eric Matthews
<b>Reference Books</b>	
1.	HTML5BlackBook(CoversCSS3,JavaScript,XML,XHTML,AJAX,PHP,jQuery)2Ed.ByDTEditorial Services
2.	The Joy ofPHP: A Beginner’s Guide by Alan Forbes
<b>Useful Links</b>	
1.	<a href="https://nptel.ac.in/courses/106105084/25">https://nptel.ac.in/courses/106105084/25</a>
2.	<a href="https://nptel.ac.in/courses/106105084/13">https://nptel.ac.in/courses/106105084/13</a>
3.	<a href="https://nptel.ac.in/courses/117106113/34">https://nptel.ac.in/courses/117106113/34</a>

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	0	2	3	0	0	0	0	0	3	3	3	1	2
CO 2	3	1	0	2	3	0	0	0	0	0	3	3	3	2	3
CO 3	2	2	1	1	3	0	0	0	0	0	3	3	3	1	3
CO 4	1	2	1	2	3	0	0	0	0	0	3	3	3	2	3

**Assessment Pattern (with revised Bloom’s Taxonomy)**

Knowledge Level	ISE	ESE
Remember	4	8
Understand	4	8
Apply	5	10
Analyse	4	8
Evaluate	4	8
Create	4	8
TOTAL	25	50

**Government College of Engineering, Karad**

**First Year (Sem – I) Master of Computer Applications**

**MC3109 : Seminar**

Teaching Scheme		Examination Scheme	
Tutorials	02 Hrs/week	ISE	50
Total Credits	02		

**Course Outcomes (CO)**

- To develop and support a relevant and informed thesis, or point of view, that is appropriate for its audience, purpose, discipline, and theme.
- To demonstrate effective writing skills and processes by employing the rhetorical techniques of academic writing, including invention, research, critical analysis and evaluation, and revision.
- To incorporate and document appropriate sources in accordance with the formatting style proper for the discipline and effectively utilize the conventions of standard written English.

**Course Contents**

**CO**

The aim of the seminar is to make the students study something extra other than curriculum. They are expected to go through the latest trend pertaining to computer and allied fields and deliver the seminar by preparing report.  
The other important aim of the seminar is to encourage and develop the faculties of personality, aptitude and knowledge of the students.

**1,2,3**

**Tutorials**

- Seminar presentation and report writing by individual student.

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	0	0	0	2	3	0	0	0	0	2	3	3	3	1	2
CO 2	0	0	0	2	3	0	0	0	0	2	3	3	3	2	3
CO 3	0	0	0	1	3	0	0	0	0	1	3	3	3	1	3

**Assessment Pattern (with revised Bloom's Taxonomy)**

Knowledge Level	ISE	ESE
Remember	2	
Understand	4	
Apply	6	
Analyse	10	
Evaluate	12	
Create	25	
<b>TOTAL</b>	<b>50</b>	

**Government College of Engineering, Karad****First Year (Sem – I) Master of Computer Applications****MC3110 : Soft Skills & Professional Communication**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	ISE	50
Total Credits	03		

**Course Outcomes (CO)**

1. Learn professional skills to communicate effectively & confidently.
2. Learn to Induce basic mathematical sense to create a sound foundation for cognitive skills.
3. To Develop advanced language skills through an activity based, regularly evaluated and continuously proctored course module.

Course Contents		CO	Hrs
<b>Unit 1</b>	<b>Learning the fundamentals of grammar</b>  Module-I: Phonics & Syllable, Root words, Module-II: Parts of Speech Module-III: Tense	<b>1</b>	<b>(08)</b>
<b>Unit 2</b>	<b>Writing Skills</b>  Module-I: Email Module-II: Passage writing Module-III: Letter Module-IV: Story/Blog	<b>1</b>	<b>(06)</b>
<b>Unit 3</b>	<b>Fill in the blanks</b>  Module-I: Article Based Module-II: Preposition Based Module-III: Vocabulary based Module-IV: Cloze test	<b>1</b>	<b>(08)</b>
<b>Unit 4</b>	<b>Managerial Skill development</b>  Module-I: Basic Employability Skills Module-II: Leadership Development Module-III: Team Management & Team Building Module-IV: Corporate Expectations	<b>2,3</b>	<b>(06)</b>
<b>Unit 5</b>	<b>Speaking</b>  Module-I: Group Discussions Module-II: JAM / Role Play Module-III: Debate	<b>2,3</b>	<b>(06)</b>
<b>Unit 6</b>	<b>Logical Reasoning</b>  Module-I: Logical Revision-1- Blood Relation, Direction Sense, Number-Letter series Module-II: Seating Arrangement Module-III: Complex Arrangement  <b>Quantitative Aptitude</b> Module-I: Revision-1- Percentage, P&L, TRW, Pipes & Cisterns Module-II: Revision-2- STD-I & STD-II Module-III: Ration & Proportion, Mixture & Alligations	<b>2</b>	<b>(06)</b>

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	0	2	3	0	0	0	0	0	3	3	3	1	2
CO 2	3	1	0	2	3	0	0	0	0	0	3	3	3	2	3
CO 3	2	2	1	1	3	0	0	0	0	0	3	3	3	1	3

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	ISE	ESE
Remember	10	
Understand	10	
Apply	10	
Analyse	6	
Evaluate	6	
Create	8	
TOTAL	50	

**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC3201 : Cloud Computing**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
Tutorials	00 Hrs/week	ISE	20
Total Credits	03	ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Distinguish between different types of architectures and services in the cloud Computing.
2. Understand the management in cloud computing.
3. Analyze different security issues and challenges in cloud computing.

**Course Contents**

		CO	Hrs
<b>Unit 1</b>	<b>Basics of Cloud Computing:</b> Overview, Applications, Intranets and the Cloud. Your Organization and Cloud Computing- Benefits, Limitations, Security Concerns. Software as a Service (SaaS)- Understanding the Multitenant Nature Of SaaS Solutions, Understanding SOA. Platform as a Service (PaaS)-IT Evolution Leading to the Cloud, Benefits of PAAS Solutions, Disadvantages of PaaS Solutions. Infrastructure as a Service (IaaS)-Understanding IaaS, Improving Performance through Load Balancing, System and Storage Redundancy, Utilizing Cloud-Based NAS Devices, Advantages, and Server Types.	<b>1</b>	<b>(08)</b>
<b>Unit 2</b>	<b>Data Storage and Security in Cloud:</b> Cloud file systems: GFS and HDFS, Big Table, HBase and Dynamo Cloud data stores: Data store and Simple DB, Cloud Storage-Overview, Cloud Storage Providers. Securing the Cloud-General Security Advantages of Cloud-Based Solutions, Introducing Business Continuity and Disaster Recovery. Disaster Recovery- Understanding the Threats.	<b>3</b>	<b>(08)</b>
<b>Unit 3</b>	<b>Virtualization:</b> Implementation Levels of Virtualization, Virtualization Structures/Tools and Mechanisms, Types of Hypervisors, Virtualization of CPU, Memory, and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Centre Automation. Common Standards: The Open Cloud Consortium, Open Virtualization Format, Standards for Application Developers: Browsers (Ajax), Data (XML, JSON), Solution Stacks (LAMP and LAPP), Syndication (Atom, Atom Publishing Protocol, and RSS), Standards for Security.	<b>2</b>	<b>(06)</b>
<b>Unit 4</b>	<b>Cloud Service Providers:</b> Amazon Web Services-Elastic Compute Cloud (EC2), Simple Storage Service (S3), Simple Queue Service (SQS), Elastic Block Storage (EBS), Elastic Load Balancing (ELB), Simple DB, Relational Database Service (RDS), Virtual Amazon Cloud, Google- AppEngine, Google Storage, Windows Azure, Rackspace Cloud	<b>1</b>	<b>(06)</b>
<b>Unit 5</b>	<b>Cloud Applications:</b> Business and Consumer Applications- CRM & ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming, E-Commerce Applications, , Cloud for e-Governance, Scientific Applications- Healthcare, Biology, Geoscience etc.	<b>2</b>	<b>(06)</b>
<b>Unit 6</b>	<b>Future of Cloud Computing:</b> How the Cloud Will Change Operating Systems, Location-Aware Applications, Intelligent Fabrics, Paints, and More, The Future of Cloud TV, Future of Cloud-Based Smart Devices, Faster Time to Market for Software Applications, Home-Based Cloud Computing, Mobile Cloud, Autonomic Cloud Engine, Multimedia Cloud, Energy Aware Cloud Computing, Jungle Computing, micro services, Future Research Directions and Challenges in Cloud Computing, Case Studies.	<b>3</b>	<b>(06)</b>

**Text Books**

1. Dr. Kris Jamsa, “ Cloud Computing: SaaS, PaaS, IaaS, Virtualization and more” , Wiley Publications, ISBN: 978-0-470-97389-9
2. Cloud Computing: Principles and Paradims, Rajkumar Buyya, James Broberg, Andrzej Goscinski, Wiley Publication, 1st Edition
3. Mastering Cloud Computing, Rajkumar Buyya, Christian Vecchiola, S Thamarai Selvi, McGraw Hill Publication, 1st Edition



4.	Gautam Shrof, “ENTERPRISE CLOUD COMPUTING Technology Architecture, Applications, Cambridge University Press, ISBN: 9780511778476
<b>Reference Books</b>	
1.	Cloud Computing Insight into New-Era Infrastructure, Dr. Kumar Saurabh, Wiley India Pvt. Ltd., 1st Edition
2.	Cloud Computing- V. K. Pachghare, PHI Learning, New Delhi, ISBN No. 978-81-203-5213-1, Jan 2016
3.	Cloud Computing: A Practical Approach, Anthony T. Velte, Tata McGraw Hill, 2009
4.	Guide to Cloud Computing: Principals and Practices, Richard Hill, Laurie Hirsch, Peter Lake, Siavash Moshiri, Springer, 1st Edition
5.	Enterprise Cloud Computing, Gautam Shroff, Cambridge, 1st Edition
6.	Cloud Security and Privacy, Tim Mather, Subra K, Shahid L.,Oreilly, 1st Edition
<b>Useful Links</b>	
1.	<a href="http://nptel.ac.in/courses/106106129/28">http://nptel.ac.in/courses/106106129/28</a>
2.	<a href="https://cloudacademy.com/courses/">https://cloudacademy.com/courses/</a>
3.	<a href="https://www.lynda.com/Cloud-Computing-training-tutorials/1385-0.html">https://www.lynda.com/Cloud-Computing-training-tutorials/1385-0.html</a>
4.	<a href="http://scpd.stanford.edu/search/publicCourseSearchDetails.do?method=load&amp;courseId=11815">http://scpd.stanford.edu/search/publicCourseSearchDetails.do?method=load&amp;courseId=11815</a>

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	0	1	0	0	0	0	0	0	0	0	0	3	1	0
CO 2	3	1	2	0	0	0	0	0	0	2	2	0	1	3	2
CO 3	3	3	3	0	3	0	0	0	0	0	0	3	0	2	3

### Assessment Pattern (with revised Bloom’s Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	10
Understand	4	4	10
Apply	4	4	10
Analyse	4	4	10
Evaluate	4	4	10
Create	-	-	10
TOTAL	20	20	60

**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC 3202 : Object Oriented Programming**

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	MSE	20
Tutorials		ISE	20
Total Credits	03	ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>			
1.	Analyse and design solution to a problem using object-oriented programming concepts.		
2.	Understanding the proper class protection mechanism to provide security.		
3.	Applying knowledge to demonstrate the use of programming language to implement inheritance, polymorphism etc.		
4.	Evaluate and implement the features of Object Oriented Concepts for providing programmed solutions to complex problems.		
	<b>Course Contents</b>		<b>CO</b>
<b>Unit 1</b>	<b>NET Architecture</b> Block diagram of .net framework, The Common Language Runtime, Advantages of Managed Code, A Closer Look at Intermediate Language & Assemblies, Support for Object Orientation and Interfaces, Distinct Value and Reference Types	1,2	8
<b>Unit 2</b>	<b>C# Basics</b> Compiling and Running the Program, Variables, Data Types, Flow Control, Enumerations, Namespaces, The Main() Method, Multiple Main() Methods, defining & using functions & its scope, Passing Arguments to Main(),Parameter passing technique, Array.	1,2	8
<b>Unit 3</b>	<b>Classes</b> Classes and Structures,Class Members, Data Members, Function Members, Methods, Member Access Modifiers,	2,3	6
<b>Unit 4</b>	<b>Objects</b> Creating Object, Constructors, Constructor Overloading, static Constructor, private Constructor, Destructors	2,3	4
<b>Unit 5</b>	<b>Inheritance and Polymorphism</b> Introduction Types of Inheritance, ImplementationInheritance, Abstract Classes and Functions, Sealed Classes and Functions, Constructors in Derived Classes, Abstract class, Abstract methods, Sealed method and class, Polymorphism	2,3,4	6
<b>Unit 6</b>	<b>Operator Overloading, Exception Handling, Windows Base Applications</b> : Method overloading, Operator overloading, Try, catch, throw, finally, Nested try, Custom exception , Windows Forms, Control, MDI	3,4	8
<b>Tutorials</b>			
<b>Text Books</b>			
1	Programming in C#: A Primer.By E Balgurusamy ISBN 9551343189		
<b>Reference Books</b>			
1	Professional C# – WroxPublication.BySimon Robinson, Christain Nagel,Karli Watson, Jay Glynn, Morgan Skinner, Bill Evjen		
2	.Net Programming Black book		
<b>Useful Links</b>			
1.	<a href="http://www.nptel.iitm.ac.in">http://www.nptel.iitm.ac.in</a>		
2.	<a href="http://www.ocw.mit.edu">www.ocw.mit.edu</a>		

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	1	0	0	0	0	0	0	0	0	0	2	0	0
CO 2	3	1	2	0	0	0	0	0	0	0	0	0	1	2	0
CO 3	1	2	3	0	0	0	0	0	0	0	0	0	1	2	0
CO 4	1	2	3	0	0	0	0	0	0	0	0	0	1	2	0

## Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember				
Understand	03	03	03	15
Apply	04	04	03	20
Analyse	04	04	03	15
Evaluate	04	04	01	10
Create				
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC3203: Research Methodology**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
		ISE	20
Total Credits	04	ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. understand basic concepts of various research areas
2. identify appropriate research topics concerned to Engineering field
3. Select and define appropriate research problem and its related parameters and. prepare a project proposal to investigate expected results/outcomes from a project
4. . develop a skill of writing/publishing a research paper/topic in conferences and reputed journals

Course Contents		CO	Hrs
<b>Unit 1</b>	Introduction: Meaning and objectives of research, Types of research, Research approaches, Research process, Research problem, Selection of research problem, Defining research problem, Literature review, Meta-analysis, Effect sizes, Integrating research findings, identification of research gaps, Errors in research	1	(06)
<b>Unit 2</b>	Research Design: Meaning, need, and features of good design, Dependent, independent, and extraneous variables, Experimental and control groups, Treatments, Experiment, Research designs in exploratory studies, Research designs in descriptive studies, Experimental research designs (informal and formal), Replication, Randomization, Blocking	1,2	(07)
<b>Unit 3</b>	Sampling: Need for sampling, Population, Sample, Normal distribution, Steps in sampling, External validity and threats, Sampling error, Probability sampling, Random sampling, Systematic sampling, Stratified sampling, Cluster sampling, Student's t-distribution, Standard error, Determination of sample size Measurement Techniques: Measurement scales, Errors in measurement, Content validity, Criterionrelated validity, Construct validity (convergent and discriminant), Reliability, Rating scales, Paired comparison, Differential scales, Summated scales, Cumulative scales, Factor scales	3	(07)
<b>Unit 4</b>	Data Collection and Analysis: Primary data collection through observations and interviews, Questionnaire surveys, Secondary data collection, Data processing, Measures of central tendency and dispersion, mean, median, mode, range, variance, standard deviation, inter-quartile range, histogram, box-plot, normal probability plot, Measures of association	3,4	(06)
<b>Unit 5</b>	Hypothesis Testing: Null and alternative hypothesis, Level of significance, Type I and type II error, Two-tailed and one-tailed tests, Procedure of hypothesis testing, Power of hypothesis test, Hypothesis testing of means, Hypothesis testing of mean difference	3,4	(06)
<b>Unit 6</b>	Analysis of Variance: Introduction, One-way ANOVA, Two-way ANOVA, Preparation of ANOVA Table and calculation of F-ratio	4	(08)

**Tutorials**

**Text Books**

1. Analysis of Variance: Introduction, One-way ANOVA, Two-way ANOVA, Preparation of ANOVA Table and calculation of F-ratio
2. Montgomery, Douglas C. &Runger, George C. (2007) – Applied Statistics & Probability
3. Panneerselvam – Research Methodology
4. C.R. Kothari, Research Methodology Methods and Techniques, 2/e, VishwaPrakashan, 2006
5. Bendat and Piersol, Random data: Analysis and Measurement Procedures, Wiley Interscience, 2001
6. Shumway and Stoffer, Time Series Analysis and its Applications, Springer, 2000
7. Jenkins, G.M., and Watts, D.G., Spectral Analysis and its Applications, Holden Day, 1986

**Reference Books**

1. Ranjit Kumar, (2006), Research Methodology- A Step-By-Step Guide for Beginners,(Pearson Education, Delhi)
2. Trochim, William M.K., (2003), 2/e, Research Methods, (Biztantra, Dreamtech Press, New Delhi)

3.	Richard I Levin amp; David S. Rubin, Statistics for Management, 7/e. Pearson Education, 2005
4.	Krishnaswamy, K. N., Sivakumar, Appalyer and Mathirajan, M. (2006), Management Research Methodology: Integration of Principles, Methods and Techniques (Pearson Education, New Delhi)
5	Donald R. Cooper, Pamela S. Schindler, Business Research Methods, 8/e, Tata McGraw-Hill Co. Ltd., 2006
<b>Useful Links</b>	
1.	<a href="https://www.explorables.com/research-methodology">https://www.explorables.com/research-methodology</a>
2.	<a href="http://www.socscidiss.bham.ac.uk/methodologies.html">http://www.socscidiss.bham.ac.uk/methodologies.html</a>
3.	<a href="http://www.humanities.manchester.ac.uk/studyskills/methodology.html">http://www.humanities.manchester.ac.uk/studyskills/methodology.html</a>
4.	<a href="http://www.palgrave.com/choosing-appropriate-research-methodologies">http://www.palgrave.com/choosing-appropriate-research-methodologies</a>

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	1	2	0	2	2	2	2	0	1	0	2	2	0	1
CO 2	2	2	1	2	3	1	1	1	2	0	1	1	0	2	1
CO 3	1	1	1	1	2	1	1	0	1	2	1	1	1	1	2
CO 4	0	1	1	0	1	0	2	0	0	0	2	0	1	1	0

### Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	1	1	5
Understand	2	2	5
Apply	5	5	5
Analyse	4	4	10
Evaluate	4	4	10
Create	4	4	15
TOTAL	20	20	60

**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC3204 : Database Management System**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
		ISE	20
Total Credits	03	ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>			
1.	Students will be able to understand basic database concepts, structure and operation of the relational data model.		
2.	Students will be able to construct simple and moderately advanced database queries using SQL.		
3.	Students will be able to apply logical database design principles, E-R diagrams and database normalization.		
4.	Students will be able to know the concept of a database transaction, concurrency control, backup and recovery, data object locking and protocols and database security		
	<b>Course Contents</b>		<b>CO</b>
<b>Unit 1</b>	<b>Introduction: Database-System Applications</b> , Purpose of Database Systems, Database Users and Administrators <b>Overview of the Design Process-</b> The Entity-Relationship Model, Constraints Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Extended ER features	<b>1</b>	<b>(06)</b>
<b>Unit 2</b>	<b>Introduction to the Relational Model:</b> Structure of Relational Databases, Database Schema, Schema Diagrams, Relational Query Languages, Relational Operations, Database Design – ER to Relational, Functional dependencies, Normalization, Normal forms based on primary keys (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF), Loss less joins and dependency preserving decomposition <b>Relational Algebra – Fundamental Operations</b>	<b>3</b>	<b>(06)</b>
<b>Unit 3</b>	<b>Introduction to SQL-</b> Overview of the SQL Query Language - SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database <b>Intermediate SQL-</b> Join Expressions, Views, Transactions, Integrity Constraints <b>Advanced SQL-</b> Functions and procedures, Triggers	<b>2</b>	<b>(08)</b>
<b>Unit 4</b>	<b>Storage and File Structure</b> Overview of physical storage media, Magnetic disk RAID, Tertiary storage, File organization, Organization of records in files, Data dictionary storage	<b>3</b>	<b>(08)</b>
<b>Unit 5</b>	<b>Transaction And Concurrency control-</b> Concept of transaction, ACID properties, Serializability, States of transaction, Concurrency control, Locking techniques, Time stamp based protocols, Multiple Granularity, Deadlock handling	<b>4</b>	<b>(06)</b>
<b>Unit 6</b>	<b>Crash Recovery and Backup-</b> Failure classifications, storage structure, Recovery & atomicity, Recovery Algorithm, Failure with loss of Nonvolatile, Remote Backup System <b>Security and privacy</b> Database security issues, Discretionary access control based on grant & revoking privilege, Mandatory access control, Encryption, Additional issues related to security	<b>4</b>	<b>(06)</b>
<b>Text Books</b>			
1.	Korth, Sudarshan , “Database System Concept”, McGraw Hill		
2.	Ramakrishnan&Gehrke , “Database Management Systems”, McGraw Hill		
<b>Reference Books</b>			
1.	C.J.Date, “Introduction to database systems”, Pearson Education		
2.	ElmasriNavathe, “Fundamentals of Database Systems”, Addison Wesley		
3.	Nilesh Shah, “Database Systems using Oracle”, PHI		
4.	Ramon A. Mata-Toledo, P.K.Cushman “Fundamentals of SQL Programming”, Tata McGraw Hill		
<b>Useful Links</b>			
1.	<a href="http://www.nptel.ac.in">http://www.nptel.ac.in</a> ,		
2.	<a href="http://www.ocw.mit.edu">www.ocw.mit.edu</a>		

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	0	2	3	0	0	0	0	0	3	3	3	1	2
CO 2	3	1	0	2	3	0	0	0	0	0	3	3	3	2	3
CO 3	2	2	1	1	3	0	0	0	0	0	3	3	3	1	3
CO 4	2	2	1	2	2	0	0	0	0	0	3	3	2	2	2

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	3	3	9
Apply	3	3	9
Analyse	3	3	9
Evaluate	4	4	12
Create	3	3	9
TOTAL	20	20	60

**Government College of Engineering, Karad**

**Second Year (Sem – II) Master of Computer Application**

**MC2215 (Elective-I): Artificial Intelligence**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
		ISE	20
Total Credits	03	ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Identify and describe problems that are amenable to solution by AI methods.
2. Identify appropriate AI methods to solve a given problem and implement basic AI algorithms.
3. Solve the problems using neural networks techniques and apply fuzzy logic techniques to find solution of uncertain problems.
4. Analyze the genetic algorithms and their applications.

**Course Contents**

		CO	Hrs
<b>Unit 1</b>	<b>Introduction of Artificial Intelligence:</b> What is Artificial Intelligence, Use of AI in daily life, Goals, Application and History of AI, Limitations of AI. <b>Intelligent Agent:</b> Agents in AI, Types of AI Agents, Structure of Agents, PEAS Representation, Agent Environment in AI, Features of Environment, Turing Test in AI, Chatbots and features for a machine to pass the Turing test.	<b>1</b>	<b>(05)</b>
<b>Unit 2</b>	<b>Problem Solving Methods:</b> Problems, problem spaces and search: Define the problem as a state space search, Production systems, Problem characteristics, Production system characteristic, Issues in design of search program <b>Search Algorithms:</b> Terminologies, Properties and features of Search Algorithms, Uninformed and Informed Search Algorithms, Hill Climbing Algorithms	<b>1,2</b>	<b>(07)</b>
<b>Unit 3</b>	<b>Representation of Knowledge:</b> What is Knowledge Representation, what to represent, Types of Knowledge, Knowledge Cycle in AI, Different approaches and Networks of Knowledge representation <b>Propositional Logic:</b> Propositional logic in AI, Syntax of propositional logic, Logical Connectives, Precedence, Limitation of Propositional Logic, Inference in AI, Inference Rules and types of Inference Rules, First-order logic, forward and backward chaining in AI	<b>3</b>	<b>(08)</b>
<b>Unit 4</b>	<b>Reasoning in AI:</b> Reasoning, Types of reasoning, Uncertainty, Causes of uncertainty, Probabilistic reasoning, Bayes's theorem and Bayesian Belief Network in AI <b>Neural Network:</b> Artificial Neural Network: Introduction, Fundamental Concept, Artificial Neural Network, Brain vs. Computer - Comparison Between Biological Neuron and Artificial Neuron, Basic Models of Artificial Neural Network Supervised Learning Network-Linear Separability, Perceptron Networks, Adaptive Linear Neuron (Adaline), Multiple Adaptive Linear Neurons, Back-Propagation Network. Unsupervised Learning Networks	<b>3,4</b>	<b>(08)</b>
<b>Unit 5</b>	<b>Introduction to Fuzzy Logic:</b> Classical Sets and Fuzzy Sets: Introduction to Fuzzy Logic, Classical Sets (Crisp Sets), Fuzzy Sets Classical Relations and Fuzzy Relations: Introduction, Cartesian Product of Relation, Classical Relation, Fuzzy Relations Membership Functions: Introduction, Features of the Membership Functions, Fuzzification, Methods of Membership Value Assignments Defuzzification: Introduction, Lambda-Cuts for Fuzzy Sets (Alpha-Cuts), Lambda-Cuts for Fuzzy Relations, Defuzzification Methods <b>Fuzzy Inference System:</b> Truth Values and Tables in Fuzzy Logic, Fuzzy Propositions, Formation of Rules, Decomposition of Rules (Compound Rules), Aggregation of Fuzzy Rules, Fuzzy Inference Systems (FIS)- Construction and Working Principle of FIS, Methods of FIS.	<b>3,4</b>	<b>(10)</b>
<b>Unit 6</b>	<b>Genetic Algorithm:</b> Basic concepts, Difference between genetic algorithm and traditional methods, Simple genetic algorithm, Working principle, Procedures of GA, Genetic operators reproduction, Mutation, crossover. <b>Subsets of AI:</b> Subsets of AI, Types of Machine learning, NLP, Deep learning, Expert Systems, Components of Expert Systems, Applications and Limitation of Expert systems.	<b>4</b>	<b>(06)</b>

**Text Books**



1.	Kevin Night and Elaine Rich, Nair B., “Artificial Intelligence (SIE)”, Second Edition, Mc Graw Hill- 2008
2.	Stuart Russel, Peter Norvig, “Artificial Intelligence– A Modern Approach”, Second Edition, PHI/Pearson Education.
<b>Reference Books</b>	
1.	Kumar Satish, “Neural Networks” Tata McGraw Hill
2.	Timothy J. Ross, “Fuzzy Logic with Engineering Applications” Wiley India
3.	Artificial Intelligence, 3rd Edition, Elaine Rich, Kevin Knight, S.B. Nair, Tata McGraw Hill
4.	Simon Hhaykin, “Neural networks - A comprehensive foundations”, Pearson Education 2nd Edition 2004.
<b>Useful Links</b>	
1.	<a href="https://www.javatpoint.com/artificial-intelligence-tutorial">https://www.javatpoint.com/artificial-intelligence-tutorial</a>
2.	<a href="https://nptel.ac.in/courses/106/105/106105077/">https://nptel.ac.in/courses/106/105/106105077/</a>
3.	<a href="https://www.vssut.ac.in/lecture_notes/lecture1428643004.pdf">https://www.vssut.ac.in/lecture_notes/lecture1428643004.pdf</a>

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	0	1	0	0	0	0	0	0	0	0	2	0	0
CO 2	3	2	0	2	0	0	0	0	0	0	0	0	1	0	0
CO 3	2	2	0	2	0	0	0	0	0	0	0	0	1	0	0
CO 4	2	1	0	1	0	0	0	0	0	0	0	0	1	0	0

### Assessment Pattern (with revised Bloom’s Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	3	3	9
Apply	3	3	9
Analyse	3	3	9
Evaluate	4	4	12
Create	3	3	9
TOTAL	20	20	60

**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC3225 : Elective-I (Enterprise Resource Planning)**

Teaching Scheme		Examination Scheme	
Lectures	03Hrs/week	MSE	20
Tutorials	01Hrs/week	ISE	20
Total Credits	04	ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>			
1.	Demonstrate a good understanding of the basic issues in ERP system.		
2.	Analyse the strategic options of ERP identification & adaption		
3.	Design the ERP implementation strategies.		
	<b>Course Contents</b>		
<b>Unit 1</b>	<b>Enterprise Resource Planning:</b> Introduction to ERP ,Disadvantages of non-ERP systems ,Need of ERP Advantage of ERP , Risks of ERP, Growth of ERP	<b>CO</b>	<b>Hrs</b>
<b>Unit 2</b>	<b>ERP Modules:</b> Finance, Production Planning, Control and Management, Sales and Distribution, Human Resource Management, Inventory Control System, Quality Management, Plant Maintenance.	<b>1</b>	<b>(09)</b>
<b>Unit 3</b>	<b>ERP Implementation Life Cycle:</b> Evaluation and selection of ERP package, Project planning, Implementation, Team Training and Testing, End User Training and Going Live Post Evaluation and Maintenance.	<b>2</b>	<b>(06)</b>
<b>Unit 4</b>	<b>ERP Market and Vendors:</b> ERP Marketplace and Marketplace Dynamics, Comparison of Current ERP Packages and Vendors, like; SAP, Oracle, PeopleSoft, BAAN etc.	<b>2</b>	<b>(04)</b>
<b>Unit 5</b>	<b>ERP and related technologies:</b> Business Process Re-Engineering (BPR), Management Information System (MIS), Decision Support System (DSS), Executive Support System (ESS) Data Warehousing, Data Mining, On-Line Analytical Processing (OLAP) ,Supply Chain Management, Customer Relationship Management	<b>3</b>	<b>(09)</b>
<b>Unit 6</b>	<b>Case Studies:</b> ERP systems implemented in – for example :TISCO, SKF Automotive Bearings Co. Ltd. Customization of ERP for different types of Industries, Post Implementation review of ERP packages - in Manufacturing, Services and Others Organizations	<b>3</b>	<b>(08)</b>
<b>Tutorials</b>			
	A set of Tutorial / problems based on above syllabus is to be performed and submitted		
<b>Text Books</b>			
1.	Enterprise Resource Planning –Concepts &Practice (Second Edition) ByV.K.Garg&N.K.Venkitakishnan		
2.	Enterprise ResourcePlanning by Alexis Leon.		
<b>Reference Books</b>			
1.	ERPWARE – E R P Implementation Framework By V. K. Garg&N. K. Venkitakishnan.		
2.	Enterprise ResourcePlanning by MahadevJaiswal, Ganesh Vanupalli.		
<b>Useful Links</b>			
1.	<a href="http://www.nptel.ac.in/">http://www.nptel.ac.in/</a>		
2.	<a href="http://www.ocw.mit.edu/">http://www.ocw.mit.edu/</a>		

**Mapping of COs and Pos**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2	3	0	3	0	0	0	0	0	3	1	2	0	0
CO 2	2	3	2	0	0	0	0	0	0	0	1	0	1	2	0
CO 3	1	2	1	0	0	0	0	0	0	0	0	0	1	2	0

**Assessment Pattern (with revised Bloom’s Taxonomy)**

Knowledge Level	MSE	ISE	ESE
Remember	4	4	10
Understand	4	4	10
Apply	4	4	10
Analyse	4	4	10
Evaluate	4	4	10
Create	-	-	10
<b>TOTAL</b>	<b>20</b>	<b>20</b>	<b>60</b>

**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC3235 : Elective-I (Computer Organisation And Architecture)**

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	MSE	20
Tutorials		ISE	20
Total Credits	03	ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- Identify various components of computer and their interconnection
- Identify basic components and design of the CPU: the ALU and control unit
- Compare various Memory devices and types of IO mapping techniques

Course Contents		CO	Hrs
<b>Unit 1</b>	<b>STRUCTURE OF COMPUTERS:</b> Computer types, Functional units, Basic operational concepts, VonNeumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputer, Data representation, Fixed and Floating point, Error detection and correction codes. <b>COMPUTER ARITHMETIC:</b> Addition and Subtraction, Multiplication and Division algorithms, Floating-point Arithmetic Operations, Decimal arithmetic operations	<b>1</b>	<b>(8)</b>
<b>Unit 2</b>	<b>BASIC COMPUTER ORGANIZATION AND DESIGN:</b> Instruction codes, Computer Registers, Computer Instructions and Instruction cycle. Timing and Control, Memory-Reference Instructions, Input-Output and interrupt. Central processing unit: Stack organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Complex Instruction Set Computer (CISC) Reduced Instruction Set Computer (RISC), CISC vs RISC	<b>1,2</b>	<b>(8)</b>
<b>Unit 3</b>	<b>REGISTER TRANSFER AND MICRO-OPERATIONS:</b> Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logic shift unit.	<b>1,2</b>	<b>(4)</b>
<b>Unit 4</b>	<b>MICRO-PROGRAMMED CONTROL:</b> Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit.	<b>1,2</b>	<b>(4)</b>
<b>Unit 5</b>	<b>REGISTER TRANSFER AND MICRO-OPERATIONS:</b> Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logic shift unit. <b>MICRO-PROGRAMMED CONTROL:</b> Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit.	<b>1,2</b>	<b>(8)</b>
<b>Unit 6</b>	<b>INPUT OUTPUT:</b> I/O interface, Programmed IO, Memory Mapped IO, Interrupt Driven IO, DMA. <b>MULTIPROCESSORS:</b> Characteristics of multiprocessors, Interconnection structures, Inter Processor Arbitration, Inter processor Communication and Synchronization, Cache Coherence.	<b>3</b>	<b>(8)</b>

**Tutorials**

**Text Books**

- M. Moris Mano (2006), Computer System Architecture, 3rd edition, Pearson/PHI, India.

**Reference Books**

- Carl Hamacher, ZvonksVranesic, SafeaZaky (2002), Computer Organization, 5th edition, McGraw Hill, New Delhi, India.
- William Stallings (2010), Computer Organization and Architecture- designing for performance, 8th edition, Prentice Hall, New Jersey.
- Anrew S. Tanenbaum (2006), Structured Computer Organization, 5th edition, Pearson Education Inc
- John P. Hayes (1998), Computer Architecture and Organization, 3rd edition, Tata McGrawHill

**Useful Links**

- <http://nptel.ac.in/courses/106103068/>
- <http://nptel.ac.in/courses/106103068/pdf/coa.pdf>
- [http://www.srmuniv.ac.in/downloads/computer\\_architecture.pdf](http://www.srmuniv.ac.in/downloads/computer_architecture.pdf)
- <http://williamstallings.com/ComputerOrganization/>

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2	1	0	0	0	0	0	0	0	0	0	2	0	0
CO 2	3	2	2	0	0	0	0	0	0	0	0	0	2	2	0
CO 3	3	2	2	0	0	0	0	0	0	0	0	0	1	2	0

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	10
Understand	4	4	10
Apply	4	4	10
Analyse	4	4	10
Evaluate	4	4	10
Create	-	-	10
TOTAL	20	20	60

**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC3245: Elective-I(Information Retrieval & web mining)**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
Tutorials	01 Hrs/week	ISE	20
Total Credits	04	ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- To demonstrate genesis and diversity of information retrieval situations for text and hyper media
- To describe hands-on experience store, and retrieve information from www using semantic approaches
- To demonstrate the usage of different data/file structures in building computational search engines
- To analyse the performance of information retrieval using advanced techniques such as classification, clustering, and filtering over multimedia.

Course Contents		CO	Hrs
<b>Unit 1</b>	Introduction: Basic Concepts of IR, Data Retrieval & Information Retrieval, IR system block diagram. Automatic Text Analysis: Luhn's ideas, Conflation Algorithm, Indexing and Index Term Weighing, Probabilistic Indexing. Automatic Classification: Measures of Association, Classification Methods, Cluster Hypothesis (Self-study: Clustering Algorithms, Single Link Algorithm)	<b>1</b>	<b>(06)</b>
<b>Unit 2</b>	Indexing, Modeling and Searching Techniques: Indexing & searching: Inverted file, Suffix trees & suffix arrays, Signature Files, Scatter storage or hash addressing, Clustered files. Modeling: Basic concepts, Boolean Model, Vector Model, probabilistic Model Searching strategies: Boolean Search, Serial search, cluster based retrieval. Query languages: Types of queries, Patterns matching, structural queries.	<b>1,2</b>	<b>(07)</b>
<b>Unit 3</b>	Text and Multimedia Languages: Introduction, Metadata, Text, Mark-up Languages, Multimedia, Trends and Research Issues.	<b>3</b>	<b>(07)</b>
<b>Unit 4</b>	Retrieval and Text Operations: Retrieval Evaluation: Precision and recall, alternative measures. Text Operations: Introduction, Document Pre-processing, Document Clustering, Text Compression, Comparing Text Compression techniques	<b>1,4</b>	<b>(06)</b>
<b>Unit 5</b>	Distributed and Multimedia IR: Distributed IR: Introduction, Collection Partitioning, Source Selection, Query Processing, web issues. Multimedia IR: Introduction, Data Modeling, Query languages, Generic multimedia indexing approach, One dimensional time series (Self-study: Two dimensional color images, Automatic feature extraction)	<b>3</b>	<b>(06)</b>
<b>Unit 6</b>	Searching the Web: Searching the Web: Challenges, Characterizing the Web, Search Engines, Browsing, Matasearchers, Finding needle in the Haystack, Searching using Hyperlinks	<b>3,4</b>	<b>(08)</b>

**Tutorials**

**Text Books**

- C.J. Rijsbergen, "Information Retrieval", Butterworth-Heinemann publisher, 2nd edition, 1979 ISBN-13: 978-0408709293. (Unit:1)
- Yates, Neto, "Modern Information Retrieval", Pearson Education, 1st edition, 2010, ISBN 81-297-0274-6. (Unit:2,3,4)
- Bing Liu, "Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data, 2nd edition, Springer, 2011, ISBN-10: 3642194591. (Unit: 5,6)

**Reference Books**

- Bing Liu, "Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data, 2nd edition, Springer, 2011, ISBN-10: 3642194591. (Unit: 5,6)

2.	Pang-Ning Tan, Michael Steinbach, and Vipin Kumar, "Introduction to Data Mining", Pearson/Addison Wesley, 2006, ISBN-10: 0321321367.
3.	Anthony Scime, "Web Mining: Applications and Techniques", IDEA group publishing.
4.	SoumenChakrabarti, "Mining the Web: Discovering Knowledge from Hypertext Data".
<b>Useful Links</b>	
1.	<a href="https://nptel.ac.in/courses/106/101/106101007/">https://nptel.ac.in/courses/106/101/106101007/</a> Prof. Pushpak Bhattacharya
2.	<a href="https://nptel.ac.in/courses/106/105/106105174/">https://nptel.ac.in/courses/106/105/106105174/</a> Prof. Pabitra Mishra.
3.	<a href="http://openlib.org/home/krichel/courses/lis618/readings/rijsbergen79_infor_retriev.pdf">http://openlib.org/home/krichel/courses/lis618/readings/rijsbergen79_infor_retriev.pdf</a>
4.	<a href="http://people.ischool.berkeley.edu/~hearst/irbook/print/chap10.pdf">http://people.ischool.berkeley.edu/~hearst/irbook/print/chap10.pdf</a>

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	1	2	0	2	2	2	2	0	1	0	2	2	0	1
CO 2	2	2	1	2	3	1	1	1	2	0	1	1	0	2	1
CO 3	1	1	1	1	2	1	1	0	1	2	1	1	1	1	2
CO 4	0	1	1	0	1	0	2	0	0	0	2	0	1	1	0

### Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	10
Understand	4	4	10
Apply	4	4	10
Analyse	4	4	10
Evaluate	4	4	10
Create	-	-	10
TOTAL	20	20	60

**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC3255: Elective-I (Design and Analysis of Algorithms)**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	MSE	20
		ISE	20
Total Credits	03	ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

At the end of this course, the students will be able to

1. Categorize problems based on their characteristics and practical importance.
2. Develop Algorithms using iterative/recursive approach
3. Design algorithm using an appropriate design paradigm for solving a given problem
4. Implement algorithms using various design strategies and determine their order of growth

**Course Contents**

	CO	Hrs
<b>Unit 1</b> <b>Introduction:</b> Algorithms and structured programming, analysing algorithms, asymptotic behaviour of an algorithm, Order notations, time and space complexities (polynomial, logarithmic and exponential), average and worst case analysis, lower and upper bounds	<b>2</b>	<b>(8)</b>
<b>Unit 2</b> <b>Algorithm design strategies:</b> Divide and conquer contd. – Quicksort, Selection, Strassen's matrix multiplication – Greedy Method: General Method –knapsack problem - Tree vertex splitting - Job sequencing with dead lines – optimal storage on tapes.	<b>1,2,3</b>	<b>(10)</b>
<b>Unit 3</b> <b>Dynamic Programming:</b> General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack. Search techniques for graphs – DFS-BFS-connected components – biconnected components	<b>2,3</b>	<b>(8)</b>
<b>Unit 4</b> <b>Back Tracking:</b> General Method – 8-queens - Sum of subsets - Graph Coloring – Hamiltonian cycles. Branch and Bound: General Method - Traveling Salesperson problem.	<b>2,3</b>	<b>(6)</b>
<b>Unit 5</b> <b>Lower Bound Theory:</b> Comparison trees - Oracles and advisory arguments - Lower bounds through reduction - Basic Concepts of NP-Hard and NP-Complete problems.	<b>3,4</b>	<b>(8)</b>

**Text Books**

1. E. Horowitz, S. Sahni and S. Rajasekaran, 1999, Computer Algorithms, Galgotia, New Delhi

**Reference Books**

1. G. Brassard and P. Bratley, 1997, Fundamentals of Algorithms, PHI, New Delhi.
2. A.V. Aho, J.E. Hopcroft, J.D. Ullmann, 1974, The design and analysis of Computer Algorithms, Addison Wesley, Boston.

**Useful Links**

1. <http://www.cise.ufl.edu/~raj/BOOK.html>

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
<b>CO 1</b>	3	2	1	0	0	0	0	0	0	0	0	0	2	0	0
<b>CO 2</b>	3	1	2	0	0	0	0	0	0	0	0	0	1	2	0
<b>CO 3</b>	1	2	3	0	0	0	0	0	0	0	0	0	1	2	0

**Assessment Pattern (with revised Bloom's Taxonomy)**

Knowledge Level	MSE	ISE	ESE
Remember	2	1	5
Understand	2	3	5
Apply	3	3	10
Analyse	4	3	10
Evaluate	4	4	15
Create	5	5	15
<b>TOTAL</b>	<b>20</b>	<b>20</b>	<b>60</b>

**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC3206: SWAYAM/MOOC COURSE**

Teaching Scheme		Examination Scheme	
Contact Hours	-	ESE	100
Total Credits	1		
<b>Course Outcomes (CO)</b>			
Student should able to			
1.	Explore the new technology of their interests.		
2.	Evaluate the technical and practical knowledge required in industries.		
3.	Implement the knowledge learnt from this course in real time projects.		
<b>Nature of Project</b>			<b>CO</b>
	The student should choose any one of the SWAYAM/MOOC course of their choice from the knowledge domains mentioned below. It is necessary that every student should take prior permission of the course to be chosen from the DBoS.		<b>1,2,3</b>
	Credits earned by the students in the respective course are transferred to the credit 1 as per the departmental policy for this course.		
<b>Useful Links:</b>			
1	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>		
2	<a href="https://swayam.gov.in/">https://swayam.gov.in/</a>		
<b>Knowledge Domains</b>	1. Technical Courses 2. Management Courses 3. Soft Skills		

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	0	2	3	0	0	0	0	0	3	3	3	1	2
CO 2	3	1	0	2	3	0	0	0	0	0	3	3	3	2	3
CO 3	2	2	1	1	3	0	0	0	0	0	3	3	3	1	3

**Assessment Pattern (with revised Bloom's Taxonomy)**

Knowledge Level	ESE
Remember	10
Understand	20
Apply	20
Analyse	20
Evaluate	15
Create	15
TOTAL	100



**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC3207 : Object Oriented Programming Lab**

Teaching Scheme		Examination Scheme	
Lectures	2 Hrs/week	ISE	25
Tutorials			
Total Credits	1	ESE	50

**Course Outcomes (CO)**

1. Apply and implement major object oriented concepts.
2. Understand and implement windows based applications using c# programming concepts.
3. Analyse design and development solution to real world problems applying OOP Concepts.

	Course Contents	CO
<b>Experiment 1</b>	Write a program using c# to produce the following output. 1 2     3 4     5     6 7     8     9     10	<b>1</b>
<b>Experiment 2</b>	Write a function that takes two values, num1 and num2 as command line arguments and return multiplication of these two numbers.	<b>1</b>
<b>Experiment 3</b>	Write a program to find sum of the elements of each row of the given matrix.	<b>1,2</b>
<b>Experiment 4</b>	Write a program to generate the mark sheet of the student using class	<b>1,2</b>
<b>Experiment 5</b>	Write a program to implement constructor.	<b>2</b>
<b>Experiment 6</b>	Write a program to illustrate multiple inheritances with virtual methods.	<b>2</b>
<b>Experiment 7</b>	Write a program of operator overloading.	<b>2,3</b>
<b>Experiment 8</b>	Write a program to demonstrate exception handling for stack overflow.	<b>2,3</b>
<b>Experiment 9</b>	Write a program to implement abstract class.	<b>2,3</b>
<b>Experiment 10</b>	Write a program to illustrate polymorphism technique.	<b>3</b>
<b>Tutorials</b>		
<b>List of Submission</b>		
1	Total number of Experiments based on syllabus : 10	

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO 1	3	2	3	3	1	0	1	0	0	0	0	0	3	0	0
CO 2	2	0	2	0	2	0	0	0	0	0	0	0	0	3	0
CO 3	3	2	0	0	0	2	0	0	0	0	0	0	0	3	0

**Assessment Pattern (with revised Bloom's Taxonomy)**

Knowledge Level	ISE	ESE
Remember	4	8
Understand	4	8
Apply	4	8
Analyse	4	8
Evaluate	4	8
Create	5	10
TOTAL	25	50

<b>Government College of Engineering, Karad</b>				
<b>First Year (Sem – II) Master of Computer Applications</b>				
<b>MC3208 : Database Management Systems Lab</b>				
<b>Teaching Scheme</b>			<b>Examination Scheme</b>	
Lectures	02 Hrs/week		ISE	25
			ESE	25
Total Credits	01			
<b>Course Outcomes (CO)</b>				
1.	Students will be able to demonstrate fundamental concepts of relational databases			
2.	Students will be able to understand view, index, exceptions, joins in RDBMS			
3.	Students will be able to construct simple and moderately advanced database queries using SQL			
4.	Students will be able to apply triggers, functions, procedures, cursors in RDBMS			
<b>Course Contents</b>				<b>CO</b>
<b>Experiment 1</b>	Basic Data Types- Char, varchar/varchar2, long, number, Fixed Commands to create table, Alter table, Drop table.			<b>1</b>
<b>Experiment 2</b>	Commands for record handling - Insert, Update, Delete Select with operators like arithmetic, comparison, logical operators, Ordering the records with orderby, Grouping the records.			<b>1</b>
<b>Experiment 3</b>	SQL functions - Date, Numeric, Character, conversion Group functions avg, max, min, sum, count Set operations- Union, Union all, intersect, minus.			<b>1,2</b>
<b>Experiment 4</b>	Exceptions-Predefined and User-defined exceptions.			<b>1,2</b>
<b>Experiment 5</b>	Join concept- Simple, equi, non equi, self, outer join.			<b>2,3</b>
<b>Experiment 6</b>	Nested queries and Sub-queries			<b>2,3</b>
<b>Experiment 7</b>	View - Intro, create, update, drop Index -Introduction, create			<b>2,3</b>
<b>Experiment 8</b>	Primary introduction to DBA, User create, granting privileges (Grant, Revoke, Commit, Rollback, Savepoint)			<b>3,4</b>
<b>Experiment 9</b>	To demonstrate the use of package in PL/SQL.			<b>3,4</b>
<b>Experiment 10</b>	Database Triggers- Definition, syntax, parts of triggers, Types of triggers, enabling & disabling triggers			<b>3,4</b>
<b>Experiment 11</b>	Sub programs- Cursors, Procedures- Definition, creating, Parameter			<b>4</b>
<b>Experiment 12</b>	Function- Definition & implementation			<b>4</b>
<b>List of Submission</b>				
	Minimum 10 experiments to be performed and evaluated Journal			

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	1	1	0	1	2	2	1	0	1	1	2	2	0	1
CO 2	1	2	2	2	1	1	1	1	2	0	0	1	1	2	1
CO 3	0	1	1	1	2	0	2	2	1	2	0	0	1	1	1
CO 4	0	1	1	0	1	0	2	1	0	0	2	0	1	1	0

### Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	ISE	ESE
Remember	4	8
Understand	4	8
Apply	4	8
Analyse	4	8
Evaluate	4	8
Create	5	10
<b>TOTAL</b>	<b>25</b>	<b>50</b>

**Government College of Engineering, Karad**  
**First Year (Sem – I) Master of Computer Applications**  
**MC3109 : Java Programming Lab**

Teaching Scheme		Examination Scheme	
Practical	02 Hrs/week	ISE	25
		ESE	50
Total Credits	01		

**Course Outcomes (CO)**

- Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing etc.
- Design and develop Web applications
- Designing applications using pre-built frameworks

**Course Contents**

**Hours**

**Tutorials**

A set of Tutorial/ problems based on above syllabus is to be submitted

**Sample List of Experiments:**

**CO**

<b>Experiment 1</b>	Program to Class and Method.	<b>1</b>
<b>Experiment 2</b>	Program to Packages & Interfaces.	<b>1</b>
<b>Experiment 3</b>	Program using JDBC demonstrating the use of prepared statement.	<b>1</b>
<b>Experiment 4</b>	Develop a program demonstrating the use of generic servlet class.	<b>1,2</b>
<b>Experiment 5</b>	Develop a program demonstrating the use of HTTP Servlet class.	<b>1,2</b>
<b>Experiment 6</b>	Develop a program demonstrating the use of cookies management.	<b>2</b>
<b>Experiment 7</b>	Develop a dynamic webpage demonstrating the use of JSP.	<b>1</b>
<b>Experiment 8</b>	Write applet to draw human face.	<b>1</b>
<b>Experiment 9</b>	Program to create an extended AWT component.	<b>3</b>
<b>Experiment 10</b>	Develop a program to demonstrate the communication between client and server using socket programming.	<b>1</b>
<b>Experiment 11</b>	Develop a program demonstrating the use of Swing.	<b>1</b>
<b>Experiment 12</b>	Develop a program demonstrating the use of Struts.	<b>3</b>
<b>Experiment 13</b>	Develop a program demonstrating the use of Java Beans.	<b>3</b>

**Tutorials**

A set of Tutorial/ problems based on above syllabus is to be submitted

**List of Submission:**

Minimum 10 experiments to be performed and evaluated Journal.

**Text Books**

- Web Design with HTML, CSS, JavaScript and jQuery Set by Jon Duckett
- Head First PHP and MySQL by Lynn Beighley and Michael Morrison
- Python Crash Course by Eric Matthews

**Reference Books**

- HTML5BlackBook(CoversCSS3,JavaScript,XML,XHTML,AJAX,PHP,jQuery)2Ed.ByDTEditorial Services
- The Joy ofPHP: A Beginner's Guide by Alan Forbes
- Head-First Python by Paul Barry

**Useful Links**

- <https://nptel.ac.in/courses/106105084/25>
- <https://nptel.ac.in/courses/106105084/13>
- <https://nptel.ac.in/courses/117106113/34>

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	0	2	3	0	0	0	0	0	3	3	3	1	2
CO 2	3	1	0	2	3	0	0	0	0	0	3	3	3	2	3
CO 3	2	2	1	1	3	0	0	0	0	0	3	3	3	1	3
CO 4	1	2	1	2	3	0	0	0	0	0	3	3	3	2	3

**Assessment Pattern (with revised Bloom's Taxonomy)**

Knowledge Level	ISE	ESE
Remember	4	8
Understand	4	8
Apply	4	8
Analyse	4	8
Evaluate	4	8
Create	5	10
TOTAL	25	50

**Government College of Engineering, Karad**

**First Year (Sem – II) Master of Computer Applications**

**MC3210: Mini Project**

Teaching Scheme		Examination Scheme	
Practical	04 Hrs/week	ISE	50
Tutorial	02 Hrs/week	ESE	50
Total Credits	04		

**Course Outcomes (CO)**

Student should able to

- Demonstrate knowledge of the distinction between critical and noncritical systems.
- Demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
- Demonstrate proficiency in rapid software development techniques.

**Nature of Project**

**CO**

	The project batches of 2-3 students should be formed, which will work on the project allocated by the department. The batch must complete it during first semester only. Term work submission should be done in the form of a joint report. The term work assessment will be done jointly by teachers appointed by Head of the Institution. The oral examination will be conducted by an internal and external examiner as appointed by the University.	<b>1,2,3</b>
<b>1</b>	Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.	
<b>2</b>	Two mid-term evaluations should be done, which includes presentations and demos of the work done.	
<b>Project Report Format:</b>	Project report should be of 15 to 20 pages (typed on A4 size sheets). For standardization of the project reports the following format should be strictly followed.	
	<ol style="list-style-type: none"> <li><b>Page Size:</b> Trimmed A4</li> <li><b>Top Margin:</b> 1.00 Inch</li> <li><b>Bottom Margin:</b> 1.32 Inches</li> <li><b>Left Margin:</b> 1.5 Inches</li> <li><b>Right Margin:</b> 1.0 Inch</li> <li><b>Para Text:</b> Times New Roman 12 Point Font</li> <li><b>Line Spacing:</b> 1.5 Lines</li> <li><b>Page Numbers:</b> Right Aligned at Footer. Font 12 Point. Times New Roman</li> <li><b>Headings:</b> Times New Roman, 14 Point Bold Face</li> <li><b>Certificate:</b> All students should attach standard format of Certificate as described by the department. Certificate should be awarded to batch and not to individual student. Certificate should have signatures of Guide, Head of Department and Principal/ Director.</li> <li><b>Index of Report:</b> <ol style="list-style-type: none"> <li>Title Sheet</li> <li>Certificate</li> <li>Acknowledgement</li> <li>Table of Contents</li> <li>List of Figures</li> <li>List of Tables</li> </ol> </li> <li><b>References:</b> References should have the following format For Books: "Title of Book", Authors, Publisher, Edition For Papers: "Title of Paper", Authors, Journal/Conference Details, Year</li> </ol>	
<b>Useful Links:</b>		
<b>1</b>	<a href="http://www.geeksforgeeks.org/">http://www.geeksforgeeks.org/</a>	
<b>2</b>	<a href="https://in.udacity.com/">https://in.udacity.com/</a>	
<b>3</b>	<a href="https://graphics.stanford.edu/~seander/bithacks.html">https://graphics.stanford.edu/~seander/bithacks.html</a>	
<b>4</b>	<a href="https://www.youtube.com/results?search_query=mycodeschool">https://www.youtube.com/results?search_query=mycodeschool</a>	
<b>5</b>	<a href="https://www.hackerrank.com/">https://www.hackerrank.com/</a>	
<b>Tutorials:</b>		
	Eight tutorials based on project is to be submitted.	

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	3	3	3	0	0	0	0	0	0	0	1	3	1	2
CO 2	3	2	3	1	3	0	3	0	0	3	3	2	3	2	3
CO 3	3	1	3	2	0	0	2	2	0	2	3	3	3	1	3

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	ISE	ESE
Remember	5	5
Understand	5	5
Apply	10	10
Analyse	10	10
Evaluate	10	10
Create	10	10
TOTAL	10	10