

## Government College of Engineering, Karad

### SCHEME OF INSTRUCTION & SYLLABI

#### Programme: Master of Computer Applications

#### Scheme of Instructions: First Year MCA (W.E.F. A.Y. 2020-21)

#### Semester – I

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	ESC	MC2101	Data Structure	3	-	-	3	3	15	15	10	60	100
2	ESC	MC2102	Computer Organisation and Architecture	3	-	-	3	3	15	15	10	60	100
3	BSC	MC2103	Mathematical Foundations for Computer Science	3	-	-	3	3	15	15	10	60	100
4	PCC	MC2104	System Software and Operating System	3	-	-	3	3	15	15	10	60	100
5	PCC	MC2105	Software Engineering	3	-	-	3	3	15	15	10	60	100
6	PCC	MC2106	Computer Network	3	-	-	3	3	15	15	10	60	100
7	ESC	MC2107	Data Structure Lab	-	-	2	2	1	-	-	25	25	50
8	PCC	MC2108	Programming lab		2	2	4	3	-	-	25	25	50
	P/S/IT	MC2109	Seminar		1		1	1			25	-	25
9	HSMC	MC2110	Soft Skills and Business Communication		-	2	2	1	-	-	25	-	25
			<b>Total</b>	<b>18</b>	<b>3</b>	<b>6</b>	<b>27</b>	<b>24</b>	<b>90</b>	<b>90</b>	<b>160</b>	<b>410</b>	<b>750</b>

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core Courses)	PEC (Programme Elective Courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training
<b>Credits</b>	01	03	07	12	-	--	--	1
<b>Cumulative Sum</b>	01	03	07	12	-	--	--	1

**PROGRESSIVE TOTAL CREDITS:24**

Government College of Engineering, Karad  
SCHEME OF INSTRUCTION & SYLLABI  
Programme: Master of Computer Applications  
Scheme of Instructions: First Year MCA

Semester – II

Sr. No	Course Category	Course Code	Course Title	L	T	P	Contact Hrs /Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	BSC	MC2201	Computer Oriented Numerical and Statistical Methods	3	-	-	3	3	15	15	10	60	100
2	PCC	MC2202	Object Oriented Programming	3	-	-	3	3	15	15	10	60	100
3	PCC	MC2203	Software Quality Assurance	3	-	-	3	3	15	15	10	60	100
4	ESC	MC2204	Database Management System	3	-	-	3	3	15	15	10	60	100
5	PCC	MC2205	Design & Analysis of Algorithms	3	-	-	3	3	15	15	10	60	100
6	PEC	MC22*6	Elective-I	3	-	-	3	3	15	15	10	60	100
7	PCC	MC2207	Object Oriented Programming Lab	-	-	2	2	1	-	-	25	-	25
8	PCC	MC2208	Software Quality Assurance Lab	-	-	2	2	1	-	-	25	-	25
9	ESC	MC2209	Database Management System Lab	-	-	2	2	1	-	-	25	25	50
10	PCC	MC2210	Web Programming & Scripting Lab	-	2	2	4	3	-	-	25	25	50
			<b>Total</b>	<b>18</b>	<b>2</b>	<b>8</b>	<b>28</b>	<b>24</b>	<b>90</b>	<b>90</b>	<b>160</b>	<b>410</b>	<b>750</b>

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training
Credits	--	03	04	14	03	-	-	1
Cumulative Sum	01	06	11	26	03	-	--	1

**PROGRESSIVE TOTAL CREDITS:24+24 =48**

## Government College of Engineering, Karad

### SCHEME OF INSTRUCTION & SYLLABI

#### Programme: Master of Computer Applications

Scheme of Instructions: Second Year MCA (W.E.F. A.Y. 2021-22)

#### Semester – III

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	PCC	MC2301	Data Science	3	-	-	3	3	15	15	10	60	100
2	PCC	MC2302	Mobile Technologies	3	-	-	3	3	15	15	10	60	100
3	ESC	MC2303	Information Security	3	-	-	3	3	15	15	10	60	100
4	ESC	MC23*4	Elective-II	3	-	-	3	3	15	15	10	60	100
5	PEC	MC23*5	Elective-III	3	-	-	3	3	15	15	10	60	100
6	PCC	MC2306	Data Science Lab	-	-	2	2	1	-	-	50	-	50
7	PCC	MC2307	Mobile Technologies Lab	-	-	2	2	1	-	-	50	-	50
8	PCC	MC2308	IoT Lab	-	-	2	2	1	-	-	25	25	50
9	P/S/IT	MC2309	Software Development Project Lab	-	2	4	6	4	-	-	50	50	100
10	HSMC	MC2310	Professional Communication	-	-	4	4	2	-	-	25	25	50
<b>Total</b>				<b>15</b>	<b>2</b>	<b>14</b>	<b>31</b>	<b>24</b>	<b>75</b>	<b>75</b>	<b>250</b>	<b>400</b>	<b>800</b>

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core Courses)	PEC (Programme Elective Courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training
<b>Credits</b>	02	--	06	09	3	--	--	4
<b>Cumulative Sum</b>	03	06	17	35	6	--	--	5

**PROGRESSIVE TOTAL CREDITS: 48+24=72**

## Government College of Engineering, Karad

### SCHEME OF INSTRUCTION & SYLLABI

Programme: Master of Computer Applications

Scheme of Instructions: Second Year MCA

Semester – IV

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	PCC	MC2401	Industrial Project	-	-	4	20	10	-	-	100	100	200
2	PCC	MC2402	Seminar	-	-	2	04	02	-	-	50	-	50
			<b>Total</b>	-	-	<b>6</b>	<b>24</b>	<b>12</b>	-	-	<b>150</b>	<b>100</b>	<b>250</b>

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	MCC (Mandatory Courses)	Project / Seminar / Industrial Training
Credits	00	--	--	-	00	--	--	11
Cumulative Sum	03	06	17	35	06	--	--	16

**PROGRESSIVE TOTAL CREDITS: 72+12=84**

List of PROGRAM ELECTIVE courses:

Elective – I		Elective – II		Elective – III	
MC2206	Enterprise Resource Planning	MC2304	Artificial Intelligence	MC2305	Data Mining
MC2216	Business process management	MC2314	Soft computing	MC2315	Cloud Computing
MC2226	Optimization Techniques	MC2324	Business Intelligence	MC2325	Big Data Analytics
MC2236	Multimedia systems	MC2334	Digital forensics	MC2336	Advanced Software Engineering

<b>Government College of Engineering, Karad</b>				
<b>First Year (Sem – I) Master of Computer Application</b>				
<b>MC 2101:Data Structure</b>				
<b>Teaching Scheme</b>			<b>Examination Scheme</b>	
Lectures	03 Hrs/week		CT – 1	15
			CT – 2	15
Total Credits	03		TA	10
			ESE	60
			<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>				
1.	To learn how data structure concepts are useful in problem solving.			
2.	To implement different ways of data structures such as stacks, linked lists and trees			
3.	To analysed design notation of algorithm			
<b>Course Contents</b>				<b>Hours</b>
<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>(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>(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>(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>(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>(6)</b>
<b>Unit 6</b>	<b>Searching and sorting:</b> Searching techniques, sorting-insertion, selection, merge, radix sort, searching and data modification.			<b>(7)</b>
<b>Text Books</b>				
1.	Data structure by Lipschutz, MGH			
2.	Data and file structure by A. Tanenbaum by PHI			
<b>Reference Books</b>				
1.	Data structure using C++by Tremblay			
2.	Data structure and algorithm using C++ M.T Goodrich-Wiley India Education ISBN: 9788126512607			
<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 6	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	CT 1	CT 2	TA	ESE
Remember	5	5	2	10
Understand	5	5	3	10
Apply	5	5	5	20
Analyse	-	-	-	-
Evaluate	-	-	-	20
Create	-	-	-	-
<b>TOTAL</b>	<b>15</b>	<b>15</b>	<b>10</b>	<b>60</b>

<b>Government College of Engineering, Karad</b>			
<b>First Year (Sem – I) Master of Computer Application</b>			
<b>MC2102:Computer Organisation</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	3 Hrs/Week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>			
1. Identify Computer system components.			
2. Analyse the Memory System, Speed, Size, Cost and Performance			
3. Demonstrate the Instruction execution concept			
<b>Course Contents</b>			<b>Hours</b>
<b>Unit 1</b>	<b>Basic Structure of Computers:</b> Computer Types, Functional Units, Basic Operational Concepts, Bus Structures, Performance – Processor Clock, Basic Performance Equation, Pipelining and Superscalar Operation, Clock Rate, Instruction set: CISC and RISC, Performance Measurement, Historical Perspective.		<b>(8)</b>
<b>Unit 2</b>	<b>Machine Instructions and Programs:</b> Numbers, Arithmetic Operations, and Characters, Memory Locations and Addresses, Instruction and Instruction Sequencing, Addressing Modes, Basic Input/output Operations.		<b>(6)</b>
<b>Unit 3</b>	<b>Input/output Organization:</b> Accessing I/O Devices, Interrupts- Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Controlling Device Requests, Exceptions, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces.		<b>(6)</b>
<b>Unit 4</b>	<b>The Memory System:</b> Basic Concepts, Semiconductor RAM Memories, Read Only Memories, Speed, Size and Cost, Cache Memories-Mapping Functions, Replacement Algorithms, Performance Consideration, Virtual Memories, Memory Management Requirements, Secondary Storage.		<b>(6)</b>
<b>Unit 5</b>	<b>Basic Processing Unit:</b> Some Fundamental Concepts, Execution of a Complete Instruction, Multiple Bus Organization, Hard wired Control, Microprogramed Control, Pipelining; Basic Concepts, Data Hazards.		<b>(6)</b>
<b>Unit 6</b>	<b>Multicores, Multiprocessors, and Clusters:</b> Performance, The Power Wall, The Switch from Uniprocessors to Multiprocessors, Amdahl's Law, Shared Memory Multiprocessors, Clusters and other Message Passing Multiprocessors, Hardware Multithreading, SISD, IMD, SIMD, SPMD, and Vector		<b>(8)</b>
<b>Tutorials</b>			
<b>Text Books</b>			
1. Computer Organization by Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Mc-Graw Hill 5 <sup>th</sup> Edition,			
2. Computer Architecture and Organization, John P. Hayes, McGraw-Hill Series, 3 <sup>rd</sup> Edition,			
3. Computer Organization and Design – The Hardware / Software Interface ARM Edition, David A. Patterson, John L. Hennessy, Elsevier, 2010, 4 <sup>th</sup> Edition,.			
<b>Reference Books</b>			
1. Computer Organization & Architecture, William Stallings, PHI, 7 <sup>th</sup> Edition,			
2. Computer Systems Design and Architecture, Vincent P. Heuring & Harry F. Jordan, Pearson Education, 2 <sup>nd</sup> Edition,			
<b>Useful Links</b>			
1. <a href="http://nptel.ac.in/courses/106103068/">http://nptel.ac.in/courses/106103068/</a>			
2. <a href="http://nptel.ac.in/courses/106103068/pdf/coa.pdf">http://nptel.ac.in/courses/106103068/pdf/coa.pdf</a>			
3. <a href="http://www.srmuniv.ac.in/downloads/computer_architecture.pdf">http://www.srmuniv.ac.in/downloads/computer_architecture.pdf</a>			
4. <a href="http://williamstallings.com/ComputerOrganization/">http://williamstallings.com/ComputerOrganization/</a>			

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	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	CT 1	CT 2	TA	ESE
Remember				
Understand	02	02	02	10
Apply	05	02	03	20
Analyse	04	04	03	20
Evaluate	04	04	02	10
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

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

**MC 2103 : Mathematical Foundations of Computer Science**

Teaching Scheme		Examination Scheme	
Lectures	03Hrs/week	CT – 1	15
		CT – 2	15
		TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
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.		
3.	Student Should Understand techniques for constructing mathematical proofs illustrated by discrete mathematical examples		
Course Contents			Hours
<b>Unit 1</b>	<b>Relations And Ordered Sets and Lattices</b> Introduction, Product Sets, 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 databasesIntroduction, 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		<b>(09)</b>
<b>Unit 2</b>	<b>Graph Theory</b> Introduction, Data Structures ,Graphs and Multigraphs,Subgraphs, Isomorphic and HomeomorphicGraphs,Paths, Connectivity,Traversable and Eulerian Graphs, Bridges of Königsberg,LabeledandWeighted Graphs ,Complete, Regular, and Bipartite Graphs,TreeGraphs,PlanarGraphs,GraphColorings,Representing Graphs in Computer Memory, Graph Algorithms,Traveling-Salesman Problem		<b>(06)</b>
<b>Unit 3</b>	<b>Boolean algebra</b> Introduction,Basic Definitions ,Duality,BasicTheorems,Boolean Algebras as Lattices,RepresentationTheorem,Sum-of-Products Form for Sets,Sum-ofProducts Form for Boolean Algebras,Minimal Boolean Expressions, Prime Implicants, Logic Gates and Circuits, Truth Tables, Boolean Functions, KarnaughMaps,SolvedProblems,Supplementary Problems		<b>(06)</b>
<b>Unit 4</b>	<b>Theory of Automata &amp; Regular Sets and Regular Automata</b> , 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, Undecidability.		<b>(10)</b>
<b>Unit 5</b>	Probability– Sample space, Distributions, Random Variables, Expectation, Tail Inequalities - Chernoff Bound, Chebyshev inequality, Functions of random variables, Applications.		<b>(08)</b>
<b>Unit 6</b>	Linear Algebra– Fields, Vector Spaces, Basis, Matrices and Linear Transformations, Eigen values, Orthogonality, Vector and Matrix Norms - Applications to optimization problems and graph theory		<b>(06)</b>
Text Books			
1.	Discrete Mathematics By Lipschutz		
2.	Theory of Computer Science By K.L.P.Mishra		
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.	<a href="http://www.nptel.ac.in/">http://www.nptel.ac.in/</a> Discrete Mathematical Structure		
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 6	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	CT 1	CT 2	TA	ESE
Remember	02	02	02	10
Understand	04	04	02	15
Apply	04	04	03	15
Analyse	-	-	-	-
Evaluate	05	05	03	20
Create	02	02	02	10
TOTAL	15	15	10	60

<b>Government College of Engineering, Karad</b>				
<b>First Year (Sem – I) Master of Computer Application</b>				
<b>MC 2104 : System Software and Operating System</b>				
<b>Teaching Scheme</b>			<b>Examination Scheme</b>	
03 Hrs/week			CT – 1	15
			CT – 2	15
03			TA	10
			ESE	60
			<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>				
1.	To understand the components of Assembler, Compiler and Macro			
2.	To understand and apply the functions of Assembler, Compiler and Macro			
3.	To be aware of understanding of design issues associated with operating systems.			
	<b>Course Contents</b>			<b>Hours</b>
<b>Unit 1</b>	<b>Assemblers</b> General design procedure –design assembler, statement of problem, data structure, format of database, algorithm and flowchart of various passes of assembler. <b>Macro-processor</b> Macro-instruction, features of macro facility-Macro instruction argument, conditional macro expansion, macro calls within macros, macro instruction defining macros, implementation.			<b>(08)</b>
<b>Unit 2</b>	<b>Loader</b> Loading schemes-compile and go ,general loader ,absolute loader ,subroutine linkages ,reloading loaders ,direct linking loaders ,binders ,linking loaders ,overlays ,dynamic binders ,design of an absolute loader and designing of direct linking loader			<b>(08)</b>
<b>Unit 3</b>	<b>Compilers:</b> Introduction to design of compiler, phases of compiler. Data structures, recursion call and return statement, storage classes, implementation, block structure compiler writing tools.			<b>(04)</b>
<b>Unit 4</b>	<b>Operating system structures:</b> System components, operating system services, system programs, system structures. <b>Process Management:</b> Process Concept, Process scheduling, operations on processes, cooperating processes, interprocess communication, threads overview.			<b>(06)</b>
<b>Unit 5</b>	<b>CPU Scheduling:</b> Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Algorithm evaluation. <b>Process Synchronization:</b> The critical –Section problem, synchronization hardware, and semaphore, classic problems of synchronization, critical regions..			<b>(06)</b>
<b>Unit 6</b>	<b>Deadlock:</b> System Model, Deadlock Characterization, Resource-Allocation Graph, Methods for Handling Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection. <b>Memory Management:</b> Concept, Memory Management Techniques, Swapping, Contiguous Memory Allocation, Memory Protection, Memory Allocation, Fragmentation, Paging, Basic Method, Segmentation with Paging, Virtual Memory Concept, Demand Paging, Page Replacement.			<b>(08)</b>
<b>Text Books</b>				
1.	System Programming by J.J.Donavan , TMH			
2.	Operating Systems: Concepts: By Abraham Siberschatz, Peter Galvin- Willey- Sixth edition.			
<b>Reference Books</b>				
1.	Operating Systems: Andrew S. Tanenbaum-Pearson Education- Second Edition.			
2.	Introduction to system software by D.M.Dhamdhere, TMH			
3.	System Programming and Operating Systems by D.M. Dhamdhere-TMH –Second Edition.			
4.	Operating Systems: Internals and Design Principles, Seventh Edition by William Stallings, Pearson Publications			
<b>Useful Links</b>				
1.	<a href="http://www.nptel.ac.in">http://www.nptel.ac.in</a>			

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	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	CT 1	CT 2	TA	ESE
Remember	02	02	02	10
Understand	04	04	02	15
Apply	04	04	03	15
Analyse	-	-	-	-
Evaluate	05	05	03	20
Create	02	02	02	10
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

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

**MC 2105 : Software Engineering**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**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 build cases and automation t scripts for projects as required and design.

Course Contents		Hours
<b>Unit 1</b>	<b>Introduction to Software Engineering:</b> The Evolving Role of Software, Software, The Changing Nature of Software, Legacy Software, Software Myths, A Generic View of process-Software Engineering, a process framework, Process Pattern, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process.	<b>(08)</b>
<b>Unit 2</b>	<b>Software Process Models:</b> Prescriptive Models, The Waterfall Models, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, Agile View Of Process.	<b>(06)</b>
<b>Unit 3</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. Software Building the Analysis Models: Requirement Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Object-Oriented Analysis, Scenario-Based Modeling, Flow Oriented Modeling, Class-Based Modeling, Creating Behavioral Model.	<b>(08)</b>
<b>Unit 4</b>	<b>Software Design Engineering:</b> Design within the Context of Software Engineering, Design Process and Design Quality, Design Concepts, The Design Model, Pattern-Based Software Design, Software Architecture, Data Design, Architectural Styles And Patterns, Architectural Design, Assessing Alternative Architectural Designs, Mapping Data Flow into a Software Architecture.	<b>(06)</b>
<b>Unit 5</b>	<b>Software Modeling Component-Level Design:</b> What is Component, Designing Class-Based Components, Conducting Component-Level Design, Object Constraint Language, Designing Conventional Components, The Golden Rules, User Interface Analysis and Design, Interface analysis, Interface Design Steps, Design Evolution.	<b>(06)</b>
<b>Unit 6</b>	<b>Software Product Metrics:</b> Software Quality, Framework for product metrics, Metrics for the analysis Model, Metrics for the Design Model, Metrics for source Code, Metrics for testing, Metrics for Maintenance, Reengineering.	<b>(06)</b>

**Text Books**

1. Software Engineering – a practitioner’s approach by Roger S. Pressman, MGH.

**Reference Books**

1. Software Engineering by Shoomar, PHI
2. System Analysis and Design by Award, TMH
3. An Integrated Approach to Software Engineering by Pankaj Jalote

**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 6	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	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

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

**MC2106 : Computer Networks**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		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**

		Hours
<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>(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>(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>(08)</b>
<b>Unit 4</b>	<b>The Application layer:</b> Network security – principle of cryptography, secret key and public key algorithm, digital signatures, Domain name system-The DNS name space, resource records, name server, simple network management Protocol.	<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>(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>(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 Mc Graw Hill
- AchyutGodbole, “Data Communications and Networks”, Tata Mc Graw Hill
- Craig Zacker, “Complete Reference Networking”, Tata Mc Graw 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 6	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	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

<b>Government College of Engineering, Karad</b>				
<b>First Year (Sem – I) Master of Computer Application</b>				
<b>MC 2107:Data Structure Lab</b>				
<b>Laboratory Scheme</b>			<b>Examination Scheme</b>	
Practical	02 Hrs/week		CA	25
			ESE	25
Total Credits	01			
<b>Course Outcomes (CO)</b>				
<b>1.</b>	Implement the advance C programming concepts and searching, sorting methods			
<b>2.</b>	Implement sequential and linked representation of linear data structure.			
<b>3.</b>	Implement nonlinear data structure like tress and graph.			
<b>List of Experiments</b>				
Experiment 1	Program to implement array operations (Insert, Delete, Display)			
Experiment 2	Program to sort an array using bubble sort.			
Experiment 3	Program to search an element in array in array using linear & binary search.			
Experiment 4	Program to implement linked list & its operations (Insert, Delete, Display).			
Experiment 5	Program to search an element from linked list.			
Experiment 6	Program to implement stack operation (PUSH, POP & Show).			
Experiment 7	Program for conversion of infix expression to postfix expression.			
Experiment 8	Program to evaluate postfix expression.			
Experiment 9	Program to sort an array using quick sort method.			
Experiment 10	Program to implement queue.			
Experiment 11	Program for traversing of a binary tree (Preorder, Inorder, Postorder).			
Experiment 12	Program to implement binary search tree.			
Experiment 13	Program to sort an array using merge sort.			
Experiment 14	Program to sort an array using insertion & selection sort.			
Experiment 15	Program to sort an array using radix sort method.			
<b>List of Submission</b>				
	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 6	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



**Government College of Engineering, Karad**

**First Year MCA (Sem-I)**

**MC 2108:Programming Lab**

Laboratory Scheme		Examination Scheme	
Practical	02 Hrs/week	CA	25
Tutorial	02 Hrs/week	ESE	25
Total Credits	03		

**Course Outcomes (CO)**

1. Implement basic c programming concepts.
2. Analyse program behaviour and errors for different set of inputs.
3. Solve various problem statements by using c programming.

**Course Contents**

<b>Unit 1</b>	<b>Overview:</b> History of C, Importance of C, Basic Structure of C Programs, Executing a C Program, Constants, Variables, and Data Types: Character Set, C Tokens, Keywords and Identifiers, Constants Variables, Data Types, Declaration of Storage classes. Operators and Expressions: Arithmetic Operators , Relational Operators , Logical Operators , Assignment Operators , Increment and Decrement Operators , Conditional Operator , Bitwise Operators , Special Operators , Operator Precedence and Associativity Managing Input and Output Operations : Formatted Input ,Formatted Output 98
<b>Unit 2</b>	<b>Decision Making and Branching:</b> Decision Making with IF Statement, Simple IF Statement, The IF.....ELSE Statement, Nesting of IF....ELSE Statements, The ELSE IF Ladder, The Switch Statement, The? : Operator, The GOTO Statement. Looping: WHILE ,DO, FOR LOOPS
<b>Unit 3</b>	<b>Arrays:</b> One-dimensional Arrays, Two-dimensional Arrays, Multi-dimensional Arrays, Dynamic Arrays Character Arrays and Strings: Declaring and Initializing String Variables, Reading Strings from Terminal , Writing Strings to Screen ,String-handling Functions
<b>Unit 4</b>	<b>Function:</b> Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions, Recursion, Passing Arrays to Functions, Passing Strings to Functions Structure: Defining a Structure, Arrays of Structures, Arrays within Structures, Structures and Functions, Structures within Structures, Size of Structures Pointer: Pointer Expressions, Pointers and Arrays, Array of Pointers, Pointers to Functions, Pointers and Structures.
<b>Unit 5</b>	<b>File Management in C :</b> Introduction , Defining and Opening a File, Closing a File, Input/output Operations on Files ,Error Handling During I/O Operations , Random Access to Files , Command Line Arguments

**Text Book**

1. Ansi C By E Balagurusamy , Tata McGraw-Hill Education 7 th Edition

**Reference Books**

1. Let us C - Y.Kanetkar, BPB Publications.14th Edition
2. C: The Complete Reference - by Herbert Schildt Tata McGraw-Hill Education 4th Edition

**List of Experiments**

Experiment 1	Program to sum of no. from m to n.
Experiment 2	List of no from 1 to 35 which is not divisible by 5 and 7, the last digit is not 7.
Experiment 3	Program to print prime no. up to 'n' number's.
Experiment 4	Program to sort an array.
Experiment 5	Write a program to add first numbers using command line argument.
Experiment 6	Writ a program to 3*3 matrix multiplication.
Experiment 7	Program to calculate, find no of character, words and vowels.
Experiment 8	Program to display Fibonacci series using function.
Experiment 9	Program to display student information using structure.
Experiment 10	Program to concatenate two strings and display no of characters.
Experiment 11	Program to copy content of one file to another.
Experiment 12	Program to display student record using structure and pointer.

**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 6	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

**Government College of Engineering, Karad**

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

**MC2109 : Seminar**

Teaching Scheme		Examination Scheme	
Tutorials	01 Hrs/week	CA	25
Total Credits	01		
<b>Course Outcomes (CO)</b>			
1.	To develop and support a relevant and informed thesis, or point of view, that is appropriate for its audience, purpose, discipline, and theme.		
2.	To demonstrate effective writing skills and processes by employing the rhetorical techniques of academic writing, including invention, research, critical analysis and evaluation, and revision.		
3.	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.		
<b>Course Contents</b>			
	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.		
<b>Tutorials</b>			
1.	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 6	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

**Government College of Engineering, Karad****First Year (Sem – I) Master of Computer Application****MC2110 : Soft Skills & Professional Communication**

Teaching Scheme		Examination Scheme	
Practical	02 Hrs/week	CA	25
Total Credits	01		

**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	Hours
<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>(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>(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>(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>(06)</b>
<b>Unit 5</b>	<b>Speaking</b>  Module-I: Group Discussions Module-II: JAM / Role Play Module-III: Debate	<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>(06)</b>

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	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

**Government College of Engineering, Karad**

**First Year (Sem – II) MCA**

**MC 2201 : Computer Oriented Numerical and Statistical Methods**

Teaching Scheme		Examination Scheme	
Lectures	03Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>			
1. Student should aware of the mathematical and statistical techniques for problem solving			
2. To develop mathematical skills and enhance logical thinking power of students			
3. Students will able to design the computer algorithms for solving Numerical Methods for problem solving			
<b>Course Contents</b>			<b>Hours</b>
<b>Unit 1</b>	<b>Solution of transcendental polynomial equations and Linear Equation:</b> Bisection method, False-position Method,N-R method.Cramer’s rule, Gauss elimination method,Gauss Jordan method, Gauss seidel iterative method. (Implementation of All these methods using ‘C’ language)		<b>(08)</b>
<b>Unit 2</b>	<b>Interpolation and Numerical Integration:</b> Lagrange’s method, Newton’s forward and backward formulae, sterling interpolation, Trapezoidal, Simpson’s Rule 1/3, Simpson’s Rule 3/8, Romberg’s method(Implementation of All these methods using ‘C’ language)		<b>(08)</b>
<b>Unit 3</b>	<b>Ordinary differential equations:</b> Euler’s method, Taylor series method,Runge-Kutta method (Implementation of these methods using ‘C’ language)		<b>(06)</b>
<b>Unit 4</b>	<b>Frequency distributions</b> -Mathematical expectations, moment generating and cumulative functions discrete probability distribution, least square co-relation and regression method.		<b>(06)</b>
<b>Unit 5</b>	<b>Sampling and Test:</b> Sampling and test-Introduction,types of Sampling, Sampling distribution, standard error,Test of significance, Null hypothesis, Test of significance for large samples,test for difference of proportions, Test for single mean and difference of standard deviation,CHI square distribution,CHI square variate , Test for population variates.		<b>(08)</b>
<b>Unit 6</b>	<b>Data validation and information abstraction:</b> Method of collecting data, efficiently gathering information from data, charting, decides between alternatives, estimating cost of uncertainty, forecasting technique.		<b>(04)</b>
<b>Text Books</b>			
1.	Computer oriented Numerical methods by V. Rajaraman, PHI.		
2.	Introductory methods of Numerical Analysis by S.S. Sastry, PHI.		
<b>Reference Books</b>			
1.	Numerical Methods for engineers by S.C. Chapra, TMH		
2.	Fundamentals of mathematical statistics by S.C. Gupta, V.K Kapoor, S. Chand		
<b>Useful Links</b>			
1.	<a href="https://nptel.ac.in/courses/111107063/">https://nptel.ac.in/courses/111107063/</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 6	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	CT 1	CT 2	TA	ESE
Remember	02	02	02	10
Understand	-	-	-	-
Apply	05	05	03	20
Analyse	-	-	-	-
Evaluate	08	08	05	30
Create	-	-	-	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**First Year (Sem – II) MCA**

**MC 2202 : Object Oriented Programming**

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	CT – 1	15
Tutorials		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO)**

- Analyse and design solution to a problem using object-oriented programming concepts.
- Understanding the proper class protection mechanism to provide security.
- Applying knowledge to demonstrate the use of programming language to implement inheritance, polymorphism etc.
- Evaluate and implement the features of Object Oriented Concepts for providing programmed solutions to complex problems.

Course Contents		Hours
<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	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.	8
<b>Unit 3</b>	<b>Classes and Objects</b> Classes and Structures,Class Members, Data Members, Function Members, Methods, Member Access Modifiers, Creating Object, Constructors, Constructor Overloading, static Constructor, private Constructor, Destructors	6
<b>Unit 4</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	10
<b>Unit 5</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	8

**Tutorials**

**Text Books**

- Programming in C#: A Primer.By E Balgurusamy ISBN 9551343189

**Reference Books**

- Professional C# – Wrox Publication.BySimon Robinson, Christain Nagel,Karli Watson, Jay Glynn, Morgan Skinner, Bill Evjen
- .Net Programming Black book

**Useful Links**

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

**Mapping of COs and POs**

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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) M.C.A.**

**MC2203 : Software Quality Assurance**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO)**

- Utilize the concepts in software development life cycle.
- Demonstrate their capability to adopt quality standards.
- Assess the quality of software product.
- Apply the concepts in preparing the quality plan & documents.

**Course Contents**

**Hours**

<b>Unit 1</b>	<p><b>Software Testing:</b> Testing as an Engineering Activity, Role of Process in Software Quality, Testing as a Process, Software Testing Principles, Tester Role in Software Development, Artifacts of testing (Faults, errors, and Failures), Limitations of Testing, Challenges in Software Testing, Testing and debugging, Verification, Validation, Test levels.</p> <p><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.</p>	<b>(09)</b>
<b>Unit 2</b>	<p><b>White Box And Black Box Testing</b> Different Testing Techniques, Differences between testing techniques <b>Black Box Testing:</b> Requirements based testing techniques, Boundary value analysis, Equivalence partitioning, Decision table, State/Graph based testing <b>White Box Testing:</b> Static testing techniques, Static analysis tools, Unit/Code functional testing, Control flow testing, Code complexity testing, Data flow testing</p>	<b>(08)</b>
<b>Unit 3</b>	<p><b>Integration, System And Acceptance Testing:</b> Integration testing approaches, System testing, Scenario Testing, Deployment testing, Non-functional testing techniques, <b>Acceptance Testing:</b> Acceptance criteria, types, test cases selection and execution.</p>	<b>(06)</b>
<b>Unit 4</b>	<p><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.</p>	<b>(08)</b>
<b>Unit 5</b>	<p><b>Test Selection &amp; Minimization for Regression Testing</b> Regression testing, Regression test process, Selection of regression tests, Dynamic Slicing, Test Minimization, Tools for regression testing. Test Management and Automation Test Planning, Management, Execution and Reporting, Software Test Automation: Scope of automation, Design &amp; Architecture for automation, Testing tools, Object Oriented Testing.</p>	<b>(09)</b>

**Text Books**

- Yogesh Singh, "Software Testing", Cambridge University Press, 2011
- Sagar Naik, Piyu Tripathy, "Software Testing and Quality Assurance", Wiley

**Reference Books**

- Effective methods for Software Testing William Perry, Wiley
- Aditya P. Mathur, "Foundation of Software Testing", Pearson Education.
- Milind Limaye, "Software Quality Assurance, McGraw-Hill publication
- Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Auerbach Publications, 2008

**Useful Links**

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

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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) M.C.A.**

**MC 2204 : Database Management System**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO)**

- Students will be able to understand basic database concepts, structure and operation of the relational data model.
- Students will be able to construct simple and moderately advanced database queries using SQL.
- Students will be able to apply logical database design principles, E-R diagrams and database normalization.
- 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

**Course Contents**

		<b>Hours</b>
<b>Unit 1</b>	<b>Introduction: Database-</b> System Applications, 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>(08)</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>(08)</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>(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>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>(08)</b>
<b>Unit 5</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>(08)</b>

**Text Books**

- Korth, Sudarshan, “Database System Concept”, Mc Graw Hill
- Ramakrishnan & Gehrke, “Database Management Systems”, Mc Graw Hill

**Reference Books**

- C.J.Date, “Introduction to database systems”, Pearson Education
- Elmasri Navathe, “Fundamentals of Database Systems”, Addison Wesley
- Nilesh Shah, “Database Systems using Oracle”, PHI
- Ramon A. Mata-Toledo, P.K.Cushman “Fundamentals of SQL Programming”, Tata Mc Graw Hill

**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 6	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	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

<b>Government College of Engineering, Karad</b>				
<b>First Year (Sem – II) Master of Computer Application</b>				
<b>MC 2205: Design and Analysis of Algorithms</b>				
<b>Teaching Scheme</b>			<b>Examination Scheme</b>	
Lectures	03 Hrs/week		CT – 1	15
			CT – 2	15
Total Credits	03		TA	10
			ESE	60
			<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>				
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			
<b>Course Contents</b>				<b>Hours</b>
<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>(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>(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>(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>(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>(8)</b>
<b>Text Books</b>				
1.	E. Horowitz, S. Sahni and S. Rajasekaran, 1999, Computer Algorithms, Galgotia, New Delhi			
<b>Reference Books</b>				
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.			
<b>Useful Links</b>				
1.	<a href="http://www.cise.ufl.edu/~raj/BOOK.html">http://www.cise.ufl.edu/~raj/BOOK.html</a>			

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	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	CT 1	CT 2	TA	ESE
Remember	5	5	2	10
Understand	5	5	3	10
Apply	5	5	5	20
Analyse	-	-	-	-
Evaluate	-	-	-	20
Create	-	-	-	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**Second Year (Sem – II) M. C. A**

**MC 2206 : Elective-I Enterprise Resource Planning**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Lectures	03Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>			
1.	Student Should Get knowledge of Enterprise Activities and Work flow.		
2.	Student Should Aware Different Web Portals.		
3.	Student Should Get knowledge of Enterprise level IT based Solutions.		
	<b>Course Contents</b>		<b>Hours</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>(04)</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>(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>(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>(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>(09)</b>
<b>Unit 6</b>	Case Studies: 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>(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 6	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	CT 1	CT 2	TA	ESE
Remember	05	05	-	10
Understand	05	05	02	10
Apply	05	05	03	20
Analyse	-	-	-	-
Evaluate	-	-	02	20
Create	-	-	03	-
TOTAL	15	15	10	60



**Government College of Engineering, Karad**

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

**MC2116: Elective-I Business Process Management**

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>

**Course Outcomes (CO)**

- The student will be able to create, analyze and monitor business process models
- Understanding various BPR methodologies and their applications.
- 

	Course Contents	Hours
<b>Unit 1</b>	<b>Introduction to Business Process Management:</b> Processes Everywhere, Ingredients of a Business Process ,Origins and History of BPM - The Functional Organization, The Birth of Process Thinking, The Rise and Fall of BPR, The BPM Lifecycle.	<b>(5)</b>
<b>Unit 2</b>	<b>Process Identification:</b> Focusing on Key Processes- The Designation Phase, The Evaluation Phase, Designing a Process Architecture-- Identify Case Types, Identify Functions for Case Types, Construct Case/Function Matrices,Identify Processes, Complete the Process Architecture.	<b>(8)</b>
<b>Unit 3</b>	<b>Process Modeling:</b> Process Decomposition, Process Reuse, Handling Events, Handling Exceptions, Processes and Business Rules.	<b>(5)</b>
<b>Unit 4</b>	<b>Process Discovery and Process Analysis:</b> The Setting of Process Discovery, Discovery Methods, Process Modeling Method, Process Model Quality Assurance, Qualitative Process Analysis—Value-Added Analysis, Root Cause Analysis, Quantitative Process Analysis-- Performance Measures, Flow Analysis	<b>(8)</b>
<b>Unit 5</b>	<b>Process Redesign:</b> The Essence of Process Redesign, Heuristic Process Redesign, The Case of a Health Care Institution, Product-Based Design.	<b>(6)</b>
<b>Unit 6</b>	<b>Process Automation and Monitoring:</b> Process Automation, Process Monitoring, Limitation of Process Modeling, Process Mining, event logs, extracting process models from events logs, control flow mining, alpha algorithm, process monitoring, conformance checking, organizational mining, process enhancement, Working with PROM.	<b>(8)</b>

**Text Books**

- Dumas, La Rosa, Mendling & Reijers: Fundamentals of Business Process Management, Springer 2013

**Reference Books**

- Dumas, La Rosa, Mendling & Reijers: Fundamentals of Business Process Management, Springer 2013

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	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	CT 1	CT 2	TA	ESE
Remember	5	5	2	10
Understand	5	5	3	10
Apply	5	5	5	20
Analyse	-	-	-	-
Evaluate	-	-	-	20
Create	-	-	-	-
<b>TOTAL</b>	<b>15</b>	<b>15</b>	<b>10</b>	<b>60</b>

<b>Government College of Engineering, Karad</b>				
<b>First Year (Sem – II) M. C. A. (W.E.F. A.Y. 2020-21)</b>				
<b>MC2226: Elective I Optimisation Techniques</b>				
<b>Teaching Scheme</b>			<b>Examination Scheme</b>	
Lectures	03 Hrs/week		CT – 1	15
			CT – 2	15
Total Credits	03		TA	10
			ESE	60
			<b>Duration of ESE</b>	<b>02 Hrs 30 Min</b>
<b>Course Outcomes (CO)</b>				
	1. To familiar with various types of optimization techniques.			
	2. To apply optimization techniques for the organizational business activities.			
	3. To apply optimization techniques to get better outcomes.			
<b>Course Contents</b>				<b>Hours</b>
<b>Unit 1</b>	<b>Linear Programming problem:</b> Mathematical formulation, assumptions in linear programming, graphical method of solution, simplex method, Big-M method and Two phase method, Dual simplex method.			<b>(06)</b>
<b>Unit 2</b>	<b>Integer Programming:</b> Introduction, Gomory's cutting plane method, Fractional cut method, Branch and bound techniques.			<b>(06)</b>
<b>Unit 3</b>	<b>Transportation Problem:</b> General transportation problem, Finding an initial basic feasible solution, Loops in transportation tables, Degeneracy, Optimality method-MODI method. <b>Assignment Problem:</b> Hungarian Method, Travelling salesman problem.			<b>(07)</b>
<b>Unit 4</b>	<b>Game theory:</b> Introduction, two-person zero-sum games, some basic terms, the max-mini mini-max principle, games without saddle points-Mixed Strategies, graphical solution of $2 \times n$ and $m \times 2$ games, dominance property. <b>Simulation:</b> Introduction, Definition of Monte-Carlo Simulation.			<b>(07)</b>
<b>Unit 5</b>	<b>Dynamic Programming</b> Introduction, The Recursive equation approach, Algorithm, Solution of a L.P.P by Dynamic Programming. <b>Sequencing Models:</b> Processing n-jobs through 2-machines, n-jobs through 3-machines, 2-jobs through m-machines. <b>Network Analysis:</b> CPM & PERT – Network minimization, shortest route problem, maximal-flow problem, Project scheduling, critical path calculations, PERT calculation.			<b>(08)</b>
<b>Unit 6</b>	<b>Queuing Theory:</b> Introduction, Queuing system, Elements of Queuing system, Characteristics of Queuing system, Classification of Queuing Models, Poisson Queuing systems – Model-I (M/M/1): ( $\infty$ :FIFO) - Characteristics of Mode-I and waiting time characteristics. Characteristics of (M/M/1) : (N/FIFO), (M/M/C) : ( $\infty$ /FIFO), (M/M/C) : (N/FIFO) - all without derivation.			<b>(06)</b>
<b>Tutorials</b>				
<b>Text Books</b>				
1.	Operation Research - An introduction by Hamdy A Taha, Prentice Hall.			
2.	Operation Research Applications and Algorithms, Winston, Thomson Learning, 4Edn.			
<b>Reference Books</b>				
1.	Introduction to Management Science, Anderson, Thomson Learning, 11Edn.			
2.	Introduction to Operation Research by Hiller/Lieberman. McGraw Hill.			
3.	Operation Research by Dr. Kalavathy. S. Vikas Publishing			
<b>Useful Links</b>				
1.	<a href="https://nptel.ac.in/syllabus/111105039.pdf">https://nptel.ac.in/syllabus/111105039.pdf</a> Prof. A. Goswami, IIT Kharagpur			
2.	<a href="https://nptel.ac.in/course.php_106108101">https://nptel.ac.in/course.php_106108101</a> Dr. Joydeep Dutta, IIT Kanpur			
3.	<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 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	2	0									3	1	1
CO 2	2	2	2	1									2	2	3
CO 3	2	2	3	2									3	2	2
AVG	2.33	2.0	2.33	1.00									2.67	1.67	2.00

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

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**First Year (Sem – II) M. C. A.**

**MC2236 : Elective-I Multimedia Systems**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- To apply basic concepts of multimedia system.
- To learn various methods of signal processing on multimedia systems.
- To understand various digital multimedia systems.
- To develop ability to design various digital multimedia systems

**Course Contents**

		<b>Hours</b>
<b>Unit 1</b>	<b>Introduction to Multimedia</b> Goals, objectives, and characteristics of multimedia, Multimedia building blocks, Multimedia architecture, Multimedia Applications Media Entertainment, Media consumption, web-based applications, e-learning and education	<b>(08)</b>
<b>Unit 2</b>	<b>Text and Image Processing:</b> <b>Text:</b> Text file formats: TXT, DOC; RTF, PDF, PS <b>Text compression:</b> Huffman coding, LZ & LZW <b>Image:</b> Basic Image fundamentals, Image File formats - (BMP, TIFF, JPEG, GIF) Image processing Cycle- Image acquisition, storage ,Communication,and display, Image Enhancement, <b>Image Compression:</b> Types of Compression: Lossless & Lossy Lossless: RLE, Shannon - Fano algorithm, Arithmetic coding. Lossy: Vector quantization, Fractal Compression Technique, Transform coding and Hybrid: JPEGDCT	<b>(10)</b>
<b>Unit 3</b>	<b>Audio and Video Processing:</b> AUDIO: Nature of sound waves, characteristics of sound waves, psycho-acoustic, MIDI, digital audio, CD formats. <b>Audio file formats:</b> WAV, AIFF, VOC, AVI, MPEG Audio File formats, RMF, WMA Audio compression techniques: DM, ADPCM and MPEG <b>Video:</b> Video signal formats, Video transmission standards: EDTV, CCIR, CIF, SIF, HDTV,digitization of video, <b>Video file formats:</b> MOV, Real Video, H-261, H-263, Cinepack, Nerodigital,Video editing, DVD formats, MPEG.	<b>(10)</b>
<b>Unit 4</b>	<b>Multimedia Information System:</b> Operating System Support for Continuous Media-Introduction, Limitations, Middleware System Services Architecture, Multimedia Devices, Presentation Services, and the User Interface, Multimedia File Systems and Information Models.	<b>(06)</b>
<b>Unit 5</b>	<b>Multimedia Communications Systems:</b> Multimedia Services over the Public Network: Requirements, Architectures, and Protocols, Multimedia Interchange, Multimedia Conferencing <b>Future Directions:</b> High Definition Television and Desktop Computing, Knowledge-Based Multimedia Systems	<b>(06)</b>

**Text Books**

- Multimedia Systems, ed. by John F. Koegel Buford, 13th edition (ACM Press/Addison- Wesley, 1994)
- Fundamentals of Multimedia: Ze-Nian Li & Mark S. Drew, 2nd edition, Pearson Prentice Hall, 2004

**Reference Books**

- Digital Signal Processing: Steven W. Smith, 2nd edition, California Technical Publishing, 1999
- Tharkar, Multimedia Systems Design, 1st edition, Prentice Hall India Learning Private Limited
- Ashok Banerji, AnandaGhosh, “Multimedia Technologies”, ISBN: 9780070669239.

**Useful Links**

- <http://nptel.ac.in/courses/117105083/1> , Multimedia Systems, IIT Kharagpur
- <http://freevideolectures.com/Course/2652/CSE-40373-Multimedia-Systems> , Video Lectures, Spring 2009 , Prof.Surendar Chandra

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	3	0	1	3	2	0	0	0	0	0	1	3	3	1
CO 2	3	3	0	2	3	2	0	0	0	0	0	1	3	1	1
CO 3	3	3	3	2	0	2	0	0	0	0	0	1	3	1	1
CO 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG	2.25	2.25	0.75	1.25	1.5	1.5	0	0	0	0	0	0.75	2.25	1.25	0.75

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

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

<b>Government College of Engineering, Karad</b>				
<b>First Year (Sem – II) MCA</b>				
<b>MC 2207 : Object Oriented Programming Lab</b>				
<b>Teaching Scheme</b>			<b>Examination Scheme</b>	
Practical	2 Hrs/week		CA	25
Total Credits	1			
<b>Course Outcomes (CO)</b>				
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.				
<b>Course Contents</b>				
<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>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>Experiment 3</b>	Write a program to find sum of the elements of each row of the given matrix.			
<b>Experiment 4</b>	Write a program to generate the mark sheet of the student using class			
<b>Experiment 5</b>	Write a program to implement constructor.			
<b>Experiment 6</b>	Write a program to illustrate multiple inheritances with virtual methods.			
<b>Experiment 7</b>	Write a program of operator overloading.			
<b>Experiment 8</b>	Write a program to demonstrate exception handling for stack overflow.			
<b>Experiment 9</b>	Write a program to implement abstract class.			
<b>Experiment 10</b>	Write a program to illustrate polymorphism technique.			
<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)

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	CA
Assembling	√		√								
Testing				√		√			√		
Observing/ implementing	√	√	√	√	√	√	√	√		√	√
Analyzing	√	√	√	√	√	√	√	√		√	√
Interpreting											
Designing					√			√	√		
Creating	√					√					
Deducing conclusions		√					√			√	

<b>Government College of Engineering, Karad</b>				
<b>First Year (Sem – II) M.C.A.</b>				
<b>MC 2208 : Software Quality Assurance Lab</b>				
<b>Teaching Scheme</b>			<b>Examination Scheme</b>	
Practical	02 Hrs/week		CA	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>Experiment 1</b>	To determine the nature of roots of a quadratic equations, its input is triple of +ve integers (say x,y,z) and values may be from interval[1,100] the program output may have one of the following:- [Not a Quadratic equations, Real roots, Imaginary roots, Equal roots] Perform BVA.			
<b>Experiment 2</b>	To determine the type of triangle. Its input is triple of +ve integers (say x,y,z) and the values may be from interval[1,100].The program output may be one of the following [Scalene, Isosceles, Equilateral, Not a Triangle].Perform BVA			
<b>Experiment 3</b>	Perform robust case testing on Experiment No. 1.			
<b>Experiment 4</b>	Perform robust case testing on Experiment No. 2.			
<b>Experiment 5</b>	Create a test plan document for any application (e.g. Library Management System)			
<b>Experiment 6</b>	Study of Any Testing Tool (Win Runner)			
<b>Experiment 7</b>	Study of Any Test Management Tool ( QA Complete)			
<b>Experiment 8</b>	Automate the Test cases using Test Automation tool(using QA Complete)			
<b>Experiment 9</b>	Learn how to raise and report Bugs using Bug tracking tool (Bugzilla,Jira using QA Complete)			
<b>Experiment 10</b>	Study of any open source testing tool (Web Performance Analyzer/O STA)			
<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 6	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)

**Government College of Engineering, Karad****First Year (Sem – II) M.C.A.****MC 2209 : Database Management Systems Lab**

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

**Course Outcomes (CO)**

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

**Course Contents**

<b>Experiment 1</b>	<p><b>A. Table</b> Basic Data Types- Char, varchar/varchar2, long, number, Fixed Commands to create table Commands for table handling- Alter table, Drop table, Insert records</p> <p><b>B. Commands for record handling</b> Update, Delete Select with operators like arithmetic, comparison, logical Query Expression operators Ordering the records with orderby Grouping the records</p> <p><b>C. SQL functions</b> Date, Numeric, Character, conversion Group functions avg, max, min, sum, count Set operations- Union, Union all, intersect, minus</p>
<b>Experiment 2</b>	<b>Exceptions</b> -Predefined and User-defined exceptions
<b>Experiment 3</b>	<b>Join concept</b> - Simple, equi, non equi, self, outer join
<b>Experiment 4</b>	<b>Nested queries and Sub-queries</b>
<b>Experiment 5</b>	<b>View</b> - Intro, create, update, drop <b>Index</b> -Introduction, create
<b>Experiment 6</b>	<b>Primary introduction to DBA</b> User create, granting privileges (Grant, Revoke, Commit, Rollback, Savepoint)
<b>Experiment 7</b>	To demonstrate the use of package in PL/SQL.
<b>Experiment 8</b>	<b>Database Triggers</b> - Definition, syntax, parts of triggers, Types of triggers, enabling & disabling triggers
<b>Experiment 9</b>	<b>Sub programs</b> - Cursors
<b>Experiment 10</b>	<b>Procedures</b> - Definition, creating, Parameter
<b>Experiment 11</b>	<b>Function</b> - Definition & implementation
<b>Experiment 12</b>	To demonstrate the use of ODBC connection.

**List of Submission**

	Minimum 10 experiments to be performed and evaluated Journal
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## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	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)

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	CA
Assembling		√	√	√		√					√
Testing			√					√			
Observing	√	√	√	√	√	√	√	√	√	√	
Analyzing	√	√	√		√	√	√	√	√	√	
Interpreting	√	√	√	√		√	√				
Designing	√	√		√	√	√	√	√	√	√	
Creating		√		√	√	√	√	√	√	√	
Deducing conclusions	√		√		√	√	√	√	√	√	

**Government College of Engineering, Karad**

**Second Year (Sem – II) M. C. A.**

**MC2210 : Web Programming & Scripting Lab**

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

**Course Outcomes (CO)**

- Understand and use of HTML tags.
- Implement client side scripting languages such as JavaScript and JQuery.
- Implement server side scripting language such as Php.
- Implement I/O operations using Python.

	Course Contents	Hours
<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.	<b>(06)</b>
<b>Unit 2</b>	<b>Tables, layouts and frames:</b> Table creation and layouts, frame creation and layouts. <b>Multimedia:</b> Audio, video and animation. <b>Cascading style sheets:</b> Basics, creation and use	<b>(04)</b>
<b>Unit 3</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>(06)</b>
<b>Unit 4</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>AJAX:</b> Ajax Basics, Ajax Components, DOM, Passing Data, Server Side Code, API, Ajax Applications, Ajax/Javascript Frameworks, Ajax Applications.	<b>(06)</b>
<b>Unit 5</b>	<b>PHP:</b> PHP Basic 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 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.	<b>(10)</b>
<b>Unit 6</b>	<b>Python:</b> Variable and Data Types, Operator, Conditional Statements, Looping, Control Statements, String Manipulation, Lists, Tuple, Dictionaries, Functions, Modules, Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files, Exception Handling	<b>(08)</b>

**Tutorials**

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

**Sample List of Experiments:**

<b>Experiment 1</b>	To create a web page using basic HTML tags.	
<b>Experiment 2</b>	To create a web page using link, button & map tags.	
<b>Experiment 3</b>	To create a web page using table & multimedia tags.	
<b>Experiment 4</b>	To create a web page using css.	
<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>Experiment 6</b>	To create a text box and submit button of event handling submitform () using AJAX.	
<b>Experiment 7</b>	Develop a dynamic webpage demonstrating the use of AJAX and APIs.	
<b>Experiment 8</b>	Program to PHP Enumerated Arrays, PHP Associative Arrays, Array Iteration, PHP Multi-Dimensional Arrays, Array Functions.	

<b>Experiment 9</b>	String Handling in PHP.	
<b>Experiment 10</b>	Program to PHP Form handling, PHP GET, PHP POST, PHP FormValidation, PHP Form Sanitization.	
<b>Experiment 11</b>	Develop a program demonstrating the use of Variables, strings, andNumbers in Python	
<b>Experiment 12</b>	Use Python to demonstrate Input-Output, Printing on screen, Readingdata from keyboard, Opening and closing file, Reading and writing files.	
<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.	HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery) 2Ed. By DT Editorial Services	
2.	The Joy ofPHP: A Beginner’s Guide by Alan Forbes	
3.	Head-First Python by Paul Barry	
<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 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
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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)

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp10	CA
Assembling		√	√	√		√					√
Testing			√					√			
Observing	√	√	√	√	√	√	√	√	√	√	
Analyzing	√	√	√		√	√	√	√	√	√	
Interpreting	√	√	√	√		√	√				
Designing	√	√		√	√	√	√	√	√	√	
Creating		√		√	√	√	√	√	√	√	
Deducing conclusions	√		√		√	√	√	√	√	√	