

## **School of Computing Sciences and Engineering**

Periyar Nagar, Vallam Thanjavur - 613 403, Tamil Nadu, India.  
Phone: +91 – 4362 – 264600, Fax: +91 – 4362 - 264660  
Email: headmsc@pmu.edu Web: www. pmu.edu



**NAAC ACCREDITED**

### **DEPARTMENT OF MATHEMATICS AND COMPUTER APPLICATIONS**

#### **SOFTWARE ENGINEERING DIVISION**

**M.Sc - 5 Year Integrated Course  
(Semester III to X)**

**REGULATION 2015 (Revision 1)**

**Curriculum for M. Sc (Software Engineering)**

**5 Years Integrated Course [Batch: 2015 – 2020]**

**Regulation 2015(Revision 1)**

**SEMESTER III**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>H</b>
YSE301	Operating System	3	1	0	4	4
YSE302	Microprocessor and Microcontroller	3	1	1	5	7
YSE303	Object Oriented Programming	3	1	0	4	4
YSE304	Data Structures and Algorithms	3	1	1	5	7
YSE305	Software Engineering	3	0	0	3	3
YSE306	Software Design & Architecture	3	0	0	3	3
YSE307	Interpersonal Communication	1	0	2	0	3
<b>Total Hours: 31</b>				<b>Total Credits: 24</b>		

**SEMESTER IV**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>H</b>
YSE401	Data Base Management System	3	1	1	5	7
YSE402	Programming in Java	3	1	1	5	7
YSE403	Computer Networks	3	1	0	4	4
YSE404	Software Project Management	3	0	0	3	3
YSE405	Software Measurements and Metrics	3	0	0	3	3
YSE406	Technical communication	1	0	2	0	3
<b>Total Hours: 27</b>				<b>Total Credits: 20</b>		

**SEMESTER V**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>H</b>
YSE501	Resource Management Techniques	3	1	0	4	5
YSE502	. Net Technologies	3	1	1	5	7
YSE503	Web Technologies	3	1	1	5	7
YSEE**	Professional Elective -I	3	0	0	3	3
YSE505	Business Communication	1	0	2	0	3
YUM506	Total Quality Management	3	0	0	3	3
<b>Total Hours: 27</b>				<b>Total Credits: 20</b>		

**SEMESTER VI**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>H</b>
YSE601	Object Oriented Analysis and Design	3	1	1	5	7
YUM602	Environmental Studies	3	0	0	2	3
YSE603	Entrepreneurship Development and Management	3	0	0	3	3
YSEE**	Professional Elective -II	3	0	0	3	3
YSEOE1	Open Elective I	3	0	0	3	3
YSE606	Project	0	0	3	3	6
YSE607	Academic Writing	1	0	2	0	3
<b>Total Hours: 28</b>		<b>Total Credits: 19</b>				

**SEMESTER VII**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>H</b>
YSE701	Internship Programme	0	0	12	12	--
						<b>Total Credits: 12</b>

**SEMESTER VIII**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>H</b>
YSE801	Data Mining and Data Warehousing	3	1	1	5	7
YSE802	Software Testing and Quality Assurance	3	1	1	5	7
YSE803	Software Communication and Documentation	3	0	0	3	3
YSEE**	Professional Elective - III	3	0	0	3	3
YSEE**	Professional Elective-IV	3	0	0	3	3
YSEOE2	Open Elective II	3	0	0	3	3
YSE807	Career Development Skills	1	0	1	0	2
<b>Total Hours: 28</b>		<b>Total Credits: 22</b>				

**SEMESTER IX**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>H</b>
YSE901	Mobile Application Development	3	1	1	5	7
YUM902	Cyber Security	3	0	0	3	3
YSEE**	Professional Elective- V	3	0	0	3	3
YSEE**	Professional Elective – VI	3	0	0	3	3
YSEOE3	Open Elective III	3	0	0	3	3
YSE906	Project Phase I	0	0	3	3	6
<b>Total Hours:25</b>				<b>Total Credits: 20</b>		

**SEMESTER X**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>H</b>
YSE1001	Main Project Phase-II	0	0	16	<b>16</b>	--

**Total Credits: 195**

## LIST OF ELECTIVES

CODE.NO	COURSE TITLE	L	T	P	C	
YSEE51	XML and Web services	3	0	0	3	
YSEE52	Software Reuse	3	0	0	3	
YSEE53	User Interface Design	3	0	0	3	
YSEE54	Disaster Management	3	0	0	3	
YSEE55	Software Reliability	3	0	0	3	
YSEE61	Network Protocols	3	0	0	3	
YSEE62	Client Server Computing	3	0	0	3	
YSEE63	Wireless Sensor Network	3	0	0	3	
YSEE64	Pervasive Computing	3	0	0	3	
YSEE65	Mobile Adhoc Network	3	0	0	3	
YSEE81	Internet of Things	3	0	0	3	
YSEE82	Cloud Computing	3	0	0	3	
YSEE83	Distributed Computing	3	0	0	3	
YSEE84	Advanced Data Base Management Systems	3	0	0	3	
YSEE85	Advanced Computer Architecture	3	0	0	3	
YSEE91	Enterprise Resource Planning	3	0	0	3	
YSEE92	E-Commerce	3	0	0	3	
YSEE93	Principles of Management	3	0	0	3	
YSEE94	Digital Image Processing	3	0	0	3	
YSEE95	Big Data Analytics	3	0	0	3	

YSE 301			Operating Systems				L	T	P	C
							3	1	0	4
							L	T	P	H
C	P	A					3	1	0	4
2.5	0.5	0					3	1	0	4
PREREQUISITE: Computer Fundamentals										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Identifying the functional architecture of an operating system.						Cognitive Psychomotor		Remember Perception	
CO2	Ability to <i>analyze</i> the best CPU scheduling algorithms and solve problems related to critical regions						Cognitive		Understand	
CO3	Ability to <i>recognize</i> various memory management techniques and <i>use</i> them to solve the problems.						Cognitive Psychomotor		Understand Set	
CO4	Know the <i>design</i> principles on various Operating Systems.						Cognitive		Apply	
CO5	Recognize the various standard functionality of LINUX OS						Cognitive		Analyze	
UNIT I			OVERVIEW OF AN OPERATING SYSTEM						12	
Introduction to operating systems – review of computer organization – operating system structures – system calls – system programs – system structure – virtual machines. Processes: Process concept – Process scheduling – Operations on processes –Cooperating processes – Interprocess communication – communication in client-server systems. Case study: IPC in Linux. Threads: Multi-threading models – Threading issues. Case Study: Pthreads library.										
UNIT II			PROCESS SCHEDULING AND SYNCHRONIZATION						12	
CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation. Case study: Process scheduling in Linux. Process Synchronization: The critical-section problem –Synchronization hardware – Semaphores – Classic problems of synchronization –critical regions – Monitors. Deadlock: System model – Deadlock characterization –Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance –Deadlock detection – Recovery from deadlock.										
UNIT III			STORAGE MANAGEMENT						12	
Memory Management: Background – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging. Virtual Memory: Background –Demand paging – Process creation – Page replacement – Allocation of frames –Thrashing. Case Study: Memory management in Linux.										
UNIT IV			FILE SYSTEMS						12	
File-System Interface: File concept – Access methods – Directory structure – File system mounting – Protection. File-System Implementation: Directory implementation – Allocation methods – Free-space management – efficiency and performance – recovery – log-structured file systems. Case studies: File system in Linux – file system in Windows XP.										
UNIT V			I/O SYSTEMS						12	
I/O Systems – I/O Hardware – Application I/O interface – kernel I/O subsystem –streams – performance. Mass-Storage Structure: Disk scheduling – Disk management –Swap-space management – RAID – disk attachment – stable storage – tertiary storage. Case study: I/O in										

Linux.			
<b>LECTURE</b>	<b>TUTORIAL</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
<b>45</b>	<b>15</b>	<b>-</b>	<b>60</b>
<b>Text Books</b>			
1. Silbershatz, Galvin, Gagne, 2014, Operating System Concepts, Sixth Edition, Wiley 2. Harvey M. Deital.2004. Operating Systems. Third Edition.US. Pearson Education.			
<b>Reference Books</b>			
1. W. Stallings.2011, Operating Systems. Seventh Edition. US: Prentice Hall.			
<b>E-References</b>			
1. <a href="http://nptel.ac.in/courses/Webcoursecontents/IIScBANG/Operating%20Systems/New_index1.html">http://nptel.ac.in/courses/Webcoursecontents/IIScBANG/Operating%20Systems/New_index1.html</a> 2. <a href="http://nptel.iitg.ernet.in/Comp_Sci_Engg/IISc%20Bangalore/Operating%20Systems.htm">http://nptel.iitg.ernet.in/Comp_Sci_Engg/IISc%20Bangalore/Operating%20Systems.htm</a> .			

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	2	1	1	1	1	1	1	2	2	1
<b>CO2</b>	1	2	2	2	1	2	1	2	1	1
<b>CO3</b>	2	3	1	1	2	1	2	2	3	1
<b>CO4</b>	1	2	2	2	1	2	1	1	2	2
<b>CO5</b>	2	1	2	3	2	1	2	3	2	1
<b>AVG</b>	2	2	2	2	1	1	1	2	2	1

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No Correlation

YSE 302			MICROPROCESSORS AND MICRO CONTROLLERS				L	T	P	C
							3	1	1	5
C	P	A					L	T	P	H
2.0	0.5	0.5					3	1	3	7
PREREQUISITE: Digital principles										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1:	Understand the functional components of Microprocessors and study the functionalities of automation software's.						Cognitive Psychomotor	Remember Perception		
CO2	To Analyze the architecture of the Intel 8085 microprocessor for its various applications.						Cognitive Affective	Understand Receive		
CO3	Understand 8085 instruction set and develop simple programmes and practice						Cognitive Psychomotor	Understand Set		
CO4	Knowing the basics of micro controller 8051 and use the addressing modes and timing diagram for executing programs efficiently						Cognitive Affective	Apply Respond		
CO5	Understand the interfacing of microcontrollers with IO as well as other devices.						Cognitive	Analyze		
UNIT I		THE 8085 MICROPROCESSOR							12	
Organization of Microprocessor based system, 8085 $\mu$ p Architecture, Concept of Address line and Memory interfacing, Address Decoding and Memory Interfacing										
Lab : Study of relay logic, PLC Kit and Indira logic										
UNIT II		INTRODUCTION TO 8085 MICROPROCESSOR							12	
Basic 8085 microprocessor architecture and its functional blocks, - 8085 microprocessor IC pin outs and signals, address, data and control buses, - 8085 features - Interrupt system of 8085 - Stack and subroutine - Types of memory and memory interfacing - Decoding techniques – absolute and partial - Mapping techniques – I / O mapped I / O and memory mapped I / O										
Lab : Verification of logic gates and sub programming concepts										
UNIT III		8085 INSTRUCTION CLASSIFICATION							12	
8085 Programming Model, Instruction Classification, Instruction Format, 8085 Instruction Set										
Lab : Program with standard and user defined library functions										
UNIT IV		BASICS OF 8051							12	
Comparison of microprocessor and microcontroller, -Architecture and pin functions of 8051 chip controller, - CPU timing and machine cycles, - Internal memory organization, - Program counter and stack, - Input/output ports, - Counters and timers, - Serial data input and output Interrupts. - Power saving modes										
Lab : Study of photoelectric and inductive sensors										
UNIT V		PROGRAMMING WITH 8051							12	
Instruction set, addressing modes, - immediate, registers, direct and indirect data movement and exchange instructions, - . push and pop op-codes, arithmetic and logic instructions, bit level operations, Jump and call instructions, input/ output port programming, programming timers, asynchronous serial data communications, and hardware interrupt service routines										
Lab : Automatic Capacitance filling unit and Automatic monitoring of oil level in oil tank unit of										



refineries			
<b>LECTURE</b>	<b>TUTORIAL</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
<b>45</b>	<b>15</b>	<b>45</b>	<b>105</b>
<b>REFERENCES:</b>			
Text Books 1. Microprocessor Architecture Programming and Application, Ganonker, Ramesh, PHI Learning, New Delhi. 2. Microprocessors and Interfacing, Douglas V Hall, Mc–Graw Hill, 2 nd Edition. 3. Kenneth J Ayala, “The 8051 Micro Controller Architecture, Programming and Applications”, Thomson Publishers, 2 <sup>nd</sup> Edition.  Lecture Slides 4. <a href="http://www.mhhe.com/engcs/compsci/forouzan/">http://www.mhhe.com/engcs/compsci/forouzan/</a>			

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	2	2	2	2	2	1	2	2	2	2
<b>CO2</b>	1	1	2	1	1	1	1	3	1	1
<b>CO3</b>	2	2	3	1	2	2	1	1	3	1
<b>CO4</b>	1	3	1	1	1	1	2	2	2	2
<b>CO5</b>	2	1	1	2	2	2	1	1	1	1
<b>Average</b>	2	2	2	1	2	1	1	2	2	1

3–Strong relation, 2–Medium relation, 1–Low relation, 0–No relation

YSE 303			OBJECT ORIENTED PROGRAMMING				L	T	P	C
							3	1	0	4
C	P	A					L	T	P	H
2.5	0	0.5					3	1	0	4
PREREQUISITE: Computer Programming										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the importance of object oriented programming						Cognitive Psychomotor	Remember Perception		
CO2	Memorize the knowledge of data abstraction, encapsulation and inheritance.						Cognitive Affective	Understand Receive		
CO3	Recognize the consequence of exception handling.						Cognitive Psychomotor	Understand Set		
CO4	Implement good programming design methods for program development.						Cognitive Affective	Apply Respond		
CO5	Develop the solution to the real world problem.						Cognitive	Analyze		
UNIT I		INTRODUCTION							12	
Principles of Object Oriented Programming - Object Oriented Programming paradigm - Basic concepts of Object Oriented Programming - Benefits of OOP - Object Oriented languages - applications of OOP - Beginning with C++ - Tokens, Variables, Identifiers, Expressions and Control Structure – Branch and loop.										
UNIT II		FUNCTIONS							12	
Functions in C++ - Function Prototyping - Call by Reference - Return by Reference - Inline Functions – Default Arguments – Arrays in function - Function Overloading – Friend and virtual Functions – Console Input/Output – Programmer define functions – Scope rules.										
UNIT III		CONSTRUCTORS AND DESTRUCTORS OPERATOR OVERLOADING							12	
Constructors and Destructors – Introduction – Constructors- Copy Constructor, Dynamic Constructors - Destructors. Introduction – Defining Operator Overloading - Overloading Unary Operators - Overloading Binary Operators.										
UNIT IV		CLASSES AND OBJECTS, INHERITANCE AND POLYMORPHISM							12	
Classes and Objects - Inheritance: Introduction - Defining Derived Classes - Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance - Virtual Base Classes - Abstract Classes, Constructors in Derived Classes - Member Classes: Nesting of Classes. Pointers to Objects – Pointers to Derived Classes – Virtual Functions - Polymorphism										
UNIT V		EXCEPTION HANDLING AND FILES							12	
Exception Handling: Introduction – Basics of exception Handling –Exception Handling Mechanism – Throwing and Catching Mechanism – Rethrowing an Exceptions – Specifying Exceptions – Files – Operation on files.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			15						60	

**REFERENCES:**

1. Ira Pohl, 2004. "Object Oriented Programming using C++", 2<sup>nd</sup> Edition Reprint, Pearson Education.
2. Stroustrup, B., 2004. "The C++ Programming language", 3<sup>rd</sup> edition, Pearson Education.
3. Absolute C++
4. A.B. Karthick Anand Babu, D. Maghesh Kumar, 2013 "Object oriented Programming"

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO							PSO	
	1	2	3	4	5	6	7	1	2
CO1	2	1	1	1	1	2	1	1	1
CO2	3	2	2	2	2	2	2	2	1
CO3	2	2	2	2	3	2	2	2	1
CO4	3	2	2	2	2	2	2	3	1
CO5	3	3	3	3	3	3	3	3	1
Average	3	2	2	2	2	2	2	2	1

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE 304			DATA STRUCTURES AND ALGORITHMS				L	T	P	C
							3	1	1	5
C	P	A					L	T	P	H
2.5	0.5	0					3	1	3	7
PREREQUISITE: Computer Programming										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Explains the concept of data structures and analysis of algorithms						Cognitive Psychomotor		Understand Apply	
CO2	Choose the linear and non linear data structures						Cognitive		Remember	
CO3	Apply advance C programming techniques such as pointers, dynamic memory allocation, structures to developing solutions for particular problems						Cognitive Psychomotor		Apply Set	
CO4	Analyse, evaluate appropriate abstract data types and algorithm techniques to solve particular problems						Cognitive		Analyze	
CO5	Build an application using algorithm design techniques						Cognitive		Create	
UNIT I			INTRODUCTION						12 + 9	
Introduction to data structures - Abstract Data Type - Algorithms basic concepts - Efficiency of an algorithm - Asymptotic Notation and Analysis of algorithms										
<b>Lab</b> Analysing sorting algorithms Analysing searching algorithms										
UNIT II			LINEAR DATA STRUCTURES						12 + 9	
List – Application of List – Stacks, Implementation and Application – Queue, Implementation and Application										
<b>Lab</b> Application of list, stack and queue										
UNIT III			TREES						12 + 9	
Basic Tree concept - Binary trees – Tree traversals – Binary search tree, Implementation – AVL tree – Application										
<b>Lab</b> Tree Traversal Binary search tree application										
UNIT IV			GRAPHS						12 + 9	
Basic terminology – Graph traversal – Application – Networks Shortest path algorithms										
<b>Lab</b>										

Graph Traversal Applications using shortest path algorithms			
UNIT V	ALGORITHM DESIGN TECHNIQUES		12 + 9
Divide and Conquer algorithms, Dynamic Programming, Greedy algorithms, Backtracking and Branch & bound.			
Lab Applications using algorithm design techniques			
LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105
REFERENCES:			
1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Second Edition, Pearson Education, 2007.			
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, “Computer Algorithms”, Galgotia Publications Pvt. Ltd., 2002			
3. A.V. Aho, J.E. Hopcroft and J.D. Ullman “Data Structures and Algorithms” Pearson Education Delhi, 2002			
4. www.tutorialspoint.com			
5. <a href="http://www.nptel.com">www.nptel.com</a>			
6. www.virtuallab.ac.inLecture Slides, Multiple Choice Questions, Animations Link: <a href="http://highered.mheducation.com/sites/0072967757/student_view0/index.html">http://highered.mheducation.com/sites/0072967757/student_view0/index.html</a>			
7. Lecture Slides : <a href="http://www.mhhe.com/engcs/compsci/forouzan/">http://www.mhhe.com/engcs/compsci/forouzan/</a>			

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	3	1	1	2	1	1	1	2	1	3
<b>CO2</b>	3	1	3	2	1	1	1	1	1	3
<b>CO3</b>	3	2	2	2	1	1	1	1	1	2
<b>CO4</b>	3	2	2	2	1	1	1	1	2	2
<b>CO5</b>	3	2	2	2	1	1	1	1	2	3
<b>Average</b>	3	2	2	2	1	1	1	1	1	3

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No Correlation

YSE 305			SOFTWARE ENGINEERING				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2	0.5	0.5					3	0	0	3
<b>PREREQUISITE:</b> Computer Fundamentals and Programming										
<b>Course Outcomes</b>							<b>Domain</b>		<b>Level</b>	
After the completion of the course, students will be able to										
CO1	<i>Recognize</i> the importance of computer networks behind business communications and day to day life activities.						Cognitive Psychomotor	Remember Perception		
CO2	<i>Express</i> the functionalities of each layer and aware of the various protocols in different layers.						Cognitive Affective	Understand Receive		
CO3	<i>Describe</i> the wired/wireless technologies and achieve the knowledge of transmission medium.						Cognitive Psychomotor	Understand Set		
CO4	<i>Choose</i> the required routing mechanisms and contribute the appropriate one for the given application.						Cognitive Affective	Apply Respond		
CO5	<i>Analyze</i> the addressing format and techniques of the networks.						Cognitive	Analyze		
<b>UNIT I</b>			<b>INTRODUCTION</b>						<b>9</b>	
The evolving role of software – software – the changing nature of software – software myths – a generic view of process – software engineering – a layered technology – a process frame work – CMMI – process patterns – process assessment – process technology – process models – waterfall model – incremental process model – evolutionary process model – agile view of process.										
<b>UNIT II</b>			<b>SOFTWARE ENGINEERING PRACTICE</b>						<b>9</b>	
Software engineering practice –communication practices – planning practices – modeling practices – construction practice – deployment – system engineering – computer-based systems – the system engineering hierarchy – requirements engineering – bridge to design and construction – requirements engineering tasks–initiating the requirements engineering process–eliciting requirements.										
<b>UNIT III</b>			<b>REQUIREMENTS ANALYSIS AND SPECIFICATION</b>						<b>9</b>	
Building the analysis model – requirements analysis – analysis modelling approaches – data modeling concepts – flow-oriented modeling – design engineering – design with in the context of software engineering – design process and design quality – design concepts – the design model – pattern based software design.										
<b>UNIT IV</b>			<b>SYSTEM DESIGN</b>						<b>9</b>	
Creating an architectural design – software architecture data design – architectural design – modeling component level design – what is a component – designing class-based components										
<b>UNIT V</b>			<b>TESTING AND MAINTENANCE</b>						<b>9</b>	
Software Testing Techniques, software testing fundamentals: objectives, principles, testability; Test case design, white box testing, basis path testing; Control structure testing: Black box testing, testing for specialized environments, architectures and applications. Software Testing Strategies: Verification and validation, Unit testing, Integration testing,; Validation testing, alpha and beta testing; System testing: Recovery testing, security testing, stress testing, performance										

testing; The art of debugging, the debugging process debugging approaches. Software re-engineering , reverse engineering ,restructuring, forward engineering

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	-	45

#### REFERENCES:

##### Books with single author

1. Roger.S.Pressman, 2010. Software Engineering A Practitioner's Approach.. Sixth Edition, MGH.
2. Sommerville, 1999. Software Engineering by Ian Pearson Edu, 5<sup>th</sup> edition, AW.

##### websites

1. [www.tutorialspoint.com/software\\_engineering/](http://www.tutorialspoint.com/software_engineering/)
2. [www.rspa.com/spi](http://www.rspa.com/spi).
3. <https://docs.google.com/folderview?id=0B2Q8Nd2L>.

#### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	2	1	1	2	1	1	1	2	1	2
CO2	3	1	3	2	1	1	1	1	1	2
CO3	2	2	2	2	1	2	1	1	1	1
CO4	3	2	2	2	1	1	1	1	2	2
CO5	2	2	2	2	2	1	1	1	2	1
Average	2	2	2	2	1	1	1	1	1	2

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No Correlation

YSE 306			SOFTWARE DESIGN AND ARCHITECTURE				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2	0.5	0.5					3	0	0	3
PREREQUISITE: Computer Fundamentals and Programming										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the importance of object oriented programming						Cognitive Psychomotor	Remember Perception		
CO2	Memorize the knowledge of data abstraction, encapsulation and inheritance.						Cognitive Affective	Understand Receive		
CO3	Recognize the consequence of exception handling.						Cognitive Psychomotor	Understand Set		
CO4	Implement good programming design methods for program development.						Cognitive Affective	Apply Respond		
CO5	Implement the staffing in software projects.						Cognitive Affective	Apply Respond		
UNIT I		INTRODUCTION TO DESIGN PRINCIPLES							9	
Introduction – Nature of Design process – The role of design activity - Software Design Process building models – Transferring design knowledge – Design in the software development process – A context for design – Linear development processes – Incremental development processes – Design qualities – the quality concept – Assessing quality concept.										
UNIT II		OO DESIGN							9	
Object model – Classes and objects – Object oriented analysis – Key abstractions and mechanisms – Object oriented design – Identifying design elements - Design and Information flow – design process considerations – transform flow – transaction flow – transform analysis – transaction analysis.										
UNIT III		DESIGN PATTERN							9	
Introduction to Design patters - Design context – Reusable solutions – Documenting reusable solutions– The Observer pattern – the Decorator pattern – the factory pattern – the singleton pattern – the command pattern – The adaptor and façade pattern – The template method pattern – other patterns										
UNIT IV		SOFTWARE ARCHITECTURE							9	
Introduction – Software Architecture – Why Software architecture is important? – Quality Attributes: Understanding quality attributes – availability – interoperability – Modifiability – Performance – Security – Testability – Usability – other quality attributes – Architectural patterns – designing an architecture – Architecture in cloud – Architecture in edge.										
UNIT V		SOFTWARE ARCHITECTURE STYLES							9	
Introduction – Data flow styles – Call-return styles – Shared Information styles – Event styles – Case studies for each style										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45									45	
REFERENCES:										



1. David Budgen, "Software Design", 2nd Edition, Addison Wesley, 2003
2. Eric Gamma et al., "Design Patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley Professional, 1994.
3. Kathy sierra, Bert Bates, "Head First Design Pattern", Oreilly publications,
4. David Garlan and Mary Shaw, "Software architecture: Perspectives on an emerging discipline", Prentice Hall, 1996.
5. Anthony J Lattanze, "Architecting Software Intensive System. A Practitioner's Guide", Auerbach Publications, 2010.

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO							PSO	
	1	2	3	4	5	6	7	1	2
<b>CO1</b>	2	1	1	1	1	2	1	1	1
<b>CO2</b>	3	2	2	2	2	2	2	2	1
<b>CO3</b>	2	2	2	2	3	2	2	2	1
<b>CO4</b>	3	2	2	2	2	2	2	3	1
<b>CO5</b>	3	3	3	3	3	3	3	3	1
<b>Average</b>	3	2	2	2	2	2	2	2	1

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE307			INTERPERSONAL COMMUNICATION		L	T	P	SS	C
					0	0	0	2	0
C	P	A			L	T	P	SS	H
0.4	0.4	1.2			0	0	0	2	2
PREREQUISITE :									
\Course Outcomes					Domain			Level	
CO1	Recognize culture and a need for interpersonal communication.				Cognitive			Remember	
CO2	Demonstrate on the need for effective communication between two people.				Cognitive			Understand	
CO3	Explain on family and social relationships and need for socialization.				Cognitive			Understand	
CO4	Practice the IP principles as to how to reduce and repair conflict in interpersonal relationships.				Psychomotor			GR	
CO5	Make use to use effective and appropriate language at various interpersonal situations to avoid conflict.				Cognitive				
UNIT I	UNIVERSALS OF INTERPERSONAL COMMUNICATIONS							5	
Axioms of interpersonal Communication; culture in interpersonal communication and the self in interpersonal communication									
UNIT II	APPREHENSION AND ASSERTIVENESS							5	
Aggressiveness and assertiveness; perception in interpersonal communication; listening in interpersonal communication.									
UNIT III	VERBAL AND NON VERBAL MESSAGES							5	
Relationship and involvement; relationship maintenance and repair.									
UNIT IV	POWER IN INTERPERSONAL RELATIONSHIP							5	
Conflict in interpersonal relationship; friends and relatives; primary and family relationships.									
UNIT V	SOCIALIZATION							10	
Need for socialization and benefits of socialization among students.									
LECTURE		SELF STUDY			PRACTICAL			TOTAL	
--		30			--			30	
Text books									
<ol style="list-style-type: none"> <li>1. DeVito, Joseph, The <i>Interpersonal Communication</i> Book, 13th Edition -, Published by Longman Pub Group, Updated in its <i>13<sup>th</sup> edition</i>, 2000</li> <li>2. Kathleen S. Verderber, Inter-Act: Interpersonal Communication Concepts, Skills and Contexts, Rudolph F. Verderber, 2000</li> <li>3. Clifford Whitcomb, Effective Interpersonal and Task Communication Skills for Engineers, Atlantic Publishers. 2010</li> </ol>									

## Mapping of COs with GAs:

[illegible]

YSE 401			DATA BASE MANAGEMENT SYSTEM				L	T	P	C	
							3	1	1	5	
							L	T	P	H	
C	P	A					3	1	3	7	
2.5	0.5	0									
PREREQUISITE: Computer Fundamentals											
Course Outcomes							Domain		Level		
After the completion of the course, students will be able to											
CO1	Recognize and Express the fundamentals of Data Base Management System and Relational database system						Cognitive	Remember Understand			
CO2	Recognize and Explain the Transaction Management and Storage implementation techniques						Cognitive	Remember Understand			
CO3	Sketch and show the Relational data base design for the real time application.						Cognitive Psychomotor	Apply Set			
CO4	Analyze and Apply proper Relational data base queries						Cognitive	Analyze Apply			
CO5	Design and Construct an application with suitable form design and data base						Psychomotor	Origination			
UNIT I			INTRODUCTION							12	
Data base system Applications - Purpose of Database System – Views of data – Data base languages- Relational Databases – Data base Design - Data Storage and querying – Database System Architecture – Data mining and Information retrieval - Data base users and administrators - History of Data base system											
Lab : Working with DDL, DML ,DCL											
UNIT II			RELATIONAL DATABASES							12	
Structure of Relational Databases – Database schema –keys – schema diagram – Relational operations – Relational Algebra – Introduction to SQL – Overview of the SQL Query Languages – SQL data definition - Basic structure of SQL queries – Additional Basic operations – Set Operations –Null Values –Nested sub queries											
Lab : Working with Database Queries, Trigger , View											
UNIT III			DATABASE DESIGN							12	
Data base design and the ER model - Overview of the design process - Entity– Relationship model – Constraints - Entity Relationship diagrams – Entity Relationship design issues – Extended ER features - Relational database design – Features of good relational designs –Atomic domains and First Normal form - Decomposition using functional dependencies											
Lab : Working with PL/SQL Basics , Procedures and Functions											
UNIT IV			TRANSACTION MANAGEMENT							12	
Transaction Concepts – A simple Transaction model – Storage structure – Transaction atomicity and durability– Transaction Isolation - Serializability - Concurrency control – Lock based protocol – timestamp based protocol - Transaction Recovery – Failure classification – storage –											

Recovery and Atomicity			
Lab : Working with Transaction control			
UNIT V	IMPLEMENTATION TECHNIQUES		12
Storage and file structure - Overview of physical storage media – Magnetic disk and flash storage – RAID – File organization – Organization of records in files - Data dictionary storage - Indexing and hashing – Basic concepts – ordered indices – B+ Tree index files - Distributed data base - Distributed data storage - Distributed transactions			
Lab : Working with Form Design			
LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105
REFERENCES:			
<div>1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, 2011.“Database System Concepts”, Sixth Edition, Tata McGraw Hill.</div> <div>2. Ramez Elmasri, Shamkant B. Navathe., 2008. “Fundamentals of Database Systems”, Fifth Edition , Pearson.</div> <div>3. Raghu Ramakrishnan., 2010. “Database Management Systems”, Fourth Edition, Tata McGraw Hill.</div> <div>4. G.K.Gupta, 2011.”Database Management Systems”, Tata McGraw Hill.</div>			

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	0	1	2	0	1	0	0	1	3	3
<b>CO2</b>	0	1	1	1	0	0	0	0	1	1
<b>CO3</b>	1	3	1	1	1	0	0	1	3	3
<b>CO4</b>	1	3	2	1	1	1	1	1	3	3
<b>CO5</b>	3	3	2	2	1	1	1	2	3	2
<b>Average</b>	1	2	2	1	1	0	0	1	3	2

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE402			PROGRAMMING IN JAVA				L	T	P	C
							3	1	1	5
C	P	A					L	T	P	H
2	1	0					3	1	3	7
<b>PREREQUISITE:</b> Programming knowledge in C and C++ After the completion of the course, students will be able to										
CO1	Recognize the concept of OOP as well as the purpose and usage of OOPS.					Cognitive	Understand			
CO2	Identify the classes, objects, members of a class and the relationships among them needed for a specific problem.					Cognitive	Understand			
CO3:	Describe the principles of inheritance, polymorphism, encapsulation and method overloading.					Psychomotor	Perception			
CO4	Create the hierarchy of Java classes to provide a solution to a given set of requirements.					Psychomotor	Origination			
CO5	Develop a Java application program using proper program structure.					Cognitive	Create			
UNIT I		INTRODUCTION						12		
Introduction to Programming Languages, The Evolution of Java, Object-Oriented Programming Concepts and Java, Differences between C++ and Java, The Primary Characteristics of Java, The Architecture, and Programming with Java. Tokens, Expressions, Using Data Types, Declarations, Control Flow.										
<b>Lab</b> 1. Simple java programs. 2. Write a java program to find the average, sum, min and max of the 'n' numbers using user input.										
UNIT II		CLASSES, METHODS AND OBJECTS						12		
Decision Making and Branching – Decision Making and Looping – Classes, Objects, Methods – Defining a Class – Constructors – Method Overloading – Static Members - Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Finalizer Methods – Abstract Methods and Classes – Visibility Control.										
<b>Lab</b> 3. Programs using constructor and destructor. 4. Programs illustrating overloading and overriding methods in JAVA.										
UNIT III		ARRAYS, INTERFACE AND PACKAGES						12		
One-Dimensional Array – Creating an array – Two-Dimensional Array – Strings – Vectors – Wrapper Classes – Interfaces: Multiple Inheritance – Packages.										
<b>Lab</b> 5. Programs illustrating the implementation of various forms of inheritance. 6. Program to create packages in JAVA.										
UNIT IV		MULTITHREADED PROGRAMMING						12		
Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of										

a Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Synchronization – Implementing the - ‘Runnable’ Interface – Managing Errors and Exceptions – Types of Errors – Exceptions – Multiple Catch Statements – Using Finally Statement – Throwing our own exceptions.

### Lab

7. Program to create multiple threads in JAVA (using runnable interface and extending thread class)

8. Write a program using exception handling mechanism.

<b>UNIT V</b>	<b>APPLET PROGRAMMING</b>	<b>12</b>
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Introduction, Applet Examples, The java. applet. Applet Class, The Five Stages of an Applet's Life Cycle, Methods for Adding GUI Components, Methods for Drawing and Event Handling.

### Lab

9. Programs to Applets to draw the various shapes.

10. Program demonstrating mouse events and keyboard events.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
<b>45</b>	<b>15</b>	<b>45</b>	<b>105</b>

### REFERENCES:

#### References

1. C. Xavier, 2011, “Java Programming: A Practical Approach”, Tata McGraw Hill.
2. Keyur shah, 2002, “Gateway to Java Programmer Sun Certification”, Tata Mc Graw Hill.
3. Poornachandra Sarang, 2012, “Java Programming”, McGraw Hill Professional.
4. Herbert Schildt, Dale Skrien, 2013, “Java Fundamentals – A Comprehensive Introduction”, Tata Mc Graw Hill,
5. John Dean, Raymond Dean, 2012, “Introduction to Programming with JAVA – A Problem Solving Approach”, Tata Mc Graw Hill.
6. Ralph Bravaco, Shai Simonson, 2012, “Java Programming : From the Ground Up”, Tata McGraw Hill Edition.
7. D.S.Malik, 2009, “Java Programming”, Cengage Learning.
8. Rashmi Kanta Das, 2011, “Core Java for Beginners”, Vikas Publishing House Pvt. Ltd.
9. C.Muthu, 2009, Programming With Java 2nd Edition, Tata Mcgraw Hill Education private ltd.

#### For websites

[https://www.cse.iitb.ac.in/~nlp-ai/javalect\\_august2004.html](https://www.cse.iitb.ac.in/~nlp-ai/javalect_august2004.html)

<http://www.tutorialspoint.com/java/>

<http://www.w3schools.in/java/>

<http://beginnersbook.com/java-tutorial-for-beginners-with-examples/>

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	2	4	5	6	7	8	1	2
<b>CO1</b>	2	2	2	3	2	1	1	2	2	1
<b>CO2</b>	1	2	2	2	1	2	1	2	2	1
<b>CO3</b>	1	2	2	3	1	1	1	1	2	1
<b>CO4</b>	1	2	3	3	1	1	1	2	2	0
<b>CO5</b>	2	2	2	3	2	1	1	1	3	1

3–Strong relation, 2–Medium relation, 1–Low relation, 0–No relation



YSE 403			COMPUTER NETWORKS				L	T	P	C
							3	1	0	4
C	P	A					L	T	P	H
2	0.5	0.5					3	1	0	4
PREREQUISITE: Computer Fundamentals										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the importance of computer networks behind business communications and day to day life activities.						Cognitive Psychomotor	Remember Perception		
CO2	Express the functionalities of each layer and aware of the various protocols in different layers.						Cognitive Affective	Understand Receive		
CO3	Describe the wired/wireless technologies and achieve the knowledge of transmission medium.						Cognitive Psychomotor	Understand Set		
CO4	Choose the required routing mechanisms and contribute the appropriate one for the given application.						Cognitive Affective	Apply Respond		
CO5	Analyze the addressing format and techniques of the networks.						Cognitive	Analyze		
UNIT I		NETWORK FUNDAMENTALS AND PHYSICAL LAYER							12	
Introduction – Data Communications – Networks – Network Types – Internet History – Standards and Administration - Network Models – Protocol Layering – TCP/IP Protocol Suite – The OSI Model – Transmission Media – Switching										
UNIT II			DATA LINK LAYER					12		
Introduction to Data Link Layer – Link Layer Addressing - Error Detection and Error Correction - Data Link Control - MAC – Wired LANs: Ethernet - Wireless LANs – Other Wireless Networks - Connecting Devices and Virtual LANs										
UNIT III			NETWORK LAYER					12		
Introduction to Network Layer – Network Layer Protocols – Unicast Routing – Multicast Routing										
UNIT IV			TRANSPORT LAYER					12		
Introduction to Transport Layer – Transport Layer Protocols – User Datagram Protocol – Transmission Control Protocol - SCTP										
UNIT V			APPLICATION LAYER AND SECURITY					12		
Introduction to Application Layer – Standard Client Server Protocols – Multimedia – WWW and HTTP – FTP – Electronic Mail – TELNET - DNS										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			15			-			60	
REFERENCES:										
1. Behrouz A.Forouzan, “Data Communications and Networking”, Fifth Edition, McGraw Hill Education, 2013.										
2. Achyut S Godbole,Atul Hahate, “ Data Communications and Networks”, Second Edition, New Delhi : Tata McGraw-Hill Education, 2011.										
3. Andrew S. Tanenbaum, David J. Wetherall “Computer Networks”, Fifth Edition, Pearson										

Education Inc., 2013.

4. William Stallings, “Data and Computer Communications”, Tenth Edition, Pearson Education, 2014.
5. Video Lecture Link:  
[http://media.pearsoncmg.com/ph/streaming/esm/tanenbaum5e\\_videonotes/tanenbaum\\_video\\_Notes.html](http://media.pearsoncmg.com/ph/streaming/esm/tanenbaum5e_videonotes/tanenbaum_video_Notes.html)
6. Lecture Slides, Multiple Choice Questions, Animations Link:  
[http://highered.mheducation.com/sites/0072967757/student\\_view0/index.html](http://highered.mheducation.com/sites/0072967757/student_view0/index.html)
7. Lecture Slides : <http://www.mhhe.com/engcs/compsci/forouzan/>

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	2	1	0	1	0	1	0	1	0	0
CO2	1	2	2	1	0	1	0	1	1	0
CO3	1	1	3	3	2	2	1	2	0	0
CO4	1	1	3	3	2	2	1	2	2	0
CO5	0	1	3	2	1	1	1	1	0	0
Average	1	1	2	2	1	1	1	1	1	0

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE 404			SOFTWARE PROJECT MANAGEMENT				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2	0	1					3	0	0	3
PREREQUISITE: Software Engineering										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the importance of object oriented programming						Cognitive Psychomotor	Remember Perception		
CO2	Memorize the knowledge of data abstraction, encapsulation and inheritance.						Cognitive Affective	Understand Receive		
CO3	Recognize the consequence of exception handling.						Cognitive Psychomotor	Understand Set		
CO4	Implement good programming design methods for program development.						Cognitive Affective	Apply Respond		
CO5	Implement the staffing in software projects.						Cognitive Affective	Apply Respond		
UNIT I			PROJECT EVALUATION AND PROJECT PLANNING						9	
Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.										
UNIT II			PROJECT LIFE CYCLE AND EFFORT ESTIMATION						9	
Software process and Process Models – Choice of Process models – mental delivery– Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points – COCOMO II A Parametric Productivity Model – Staffing Pattern.										
UNIT III			ACTIVITY PLANNING AND RISK MANAGEMENT						9	
Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules.										
UNIT IV			PROJECT MANAGEMENT AND CONTROL						9	
Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.										
UNIT V			STAFFING IN SOFTWARE PROJECTS						9	
Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45									45	

<b>REFERENCES:</b>		
1. Bob Hughes and Mike Cotterell, 2002 “ Software Project Management “2 <sup>nd</sup> edition , Tata McGraw Hill Publishing Company , New Delhi. 2. Walker Royce: “Software Project Management”- Addison-Wesley, 1998. 3. Gopalaswamy Ramesh, “Managing Global Software Projects” – McGraw Hill Education (India), Fourteenth Reprint 2013.		

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc SE	PO							PSO	
	1	2	3	4	5	6	7	1	2
CO1	2	1	1	1	1	2	1	1	1
CO2	3	2	2	2	2	2	2	2	1
CO3	2	2	2	2	3	2	2	2	1
CO4	3	2	2	2	2	2	2	3	1
CO5	3	3	3	3	3	3	3	3	1
Average	3	2	2	2	2	2	2	2	1

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE 405			SOFTWARE MEASUREMENT AND METRICS				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Software Engineering										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the fundamentals of measurement and experimentation						Cognitive		Understand	
CO2	Examine various methods of software metrics						Cognitive		Analyze	
CO3	Differentiate software measurement data						Cognitive		Analyze	
CO4	Demonstrate the various methods of software reliability						Cognitive		Apply	
CO5	Classify the possible tools to manage software metrics						Cognitive		Analyze	
UNIT I			FUNDAMENTALS OF MEASUREMENT AND EXPERIMENTATION						9	
Measurement: what is it and why do it-Measurement in everyday life-Measurement in software engineering-The scope of software metrics -The representational theory of measurement-Measurement and models-Measurement scales and scale types-Meaningfulness in measurement.										
UNIT II			EMPIRICAL INVESTIGATION AND SOFTWARE-METRICS DATA COLLECTION						9	
Four principles of investigation- Planning formal experiments- Planning case studies. -What is good data-How to define the data-How to collect data-When to collect data-How to store and extract data.										
UNIT III			ANALYZING SOFTWARE-MEASUREMENT DATA						9	
Introduction- Analyzing the results of experiments-Examples of simple analysis techniques-More advanced methods-Overview of statistical tests. Measuring internal product attributes: size-Aspects of software size-Length-Reuse-Functionality-Complexity. Structure-Types of structural measures-Control-flow structure- Modularity and information flow attributes.										
UNIT IV			SOFTWARE RELIABILITY: MEASUREMENT AND PREDICTION						9	
Basics of reliability theory-The software reliability problem-Parametric reliability growth models-Predictive accuracy- Cost estimation: problems and approaches-Models of effort and cost-Problems with existing modeling methods- Dealing with problems of current estimation methods.										
UNIT V			MEASUREMENT AND MANAGEMENT						9	
Planning a measurement program-What is a metrics plan?-Why and what: developing goals, questions, and metrics- Where and when: mapping measures to activities- How: measurement tools-Who: measurers, analysts, and audience- Revising the plan. Measurement in practice-Success criteria-Measurement in the small-Measurement in the large.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			0			0			45	
REFERENCES:										
1. Norman E.Fenton , Shari Lawrence Pfleeger, 2004, Software Measurement and Metrics, Second Edition, PWS Publishing Co. Boston.										

2. Norman Fenton and Shari Lawrence Pfleeger, 2004, Software Metrics: A Rigorous and Practical Approach, Second Edition, PWS Publishing Co. Boston.
3. Roger S.Pressman, Software Engineering – A Practitioners approach, 2010, Tenth Edition, McGraw-Hill Publications.

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	3	1	1	1	1	1	1	1	0	0
<b>CO2</b>	1	1	1	1	0	1	0	1	0	0
<b>CO3</b>	1	1	0	1	0	2	2	1	1	0
<b>CO4</b>	1	1	1	1	0	1	0	1	0	0
<b>CO5</b>	1	1	0	0	1	2	1	1	1	1
<b>Average</b>	1	1	1	1	0	1	1	1	0	0

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE 406			TECHNICAL COMMUNICATION				L	T	P	C
							1	0	2	0
C	P	A					L	T	P	H
3	1	1					1	0	2	3
PREREQUISITE: Speech Communication										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Understand the nature and purpose of Technical Communication						Cognitive		Remembering	
CO2	Identify the techniques used in technical communication						Cognitive		Understanding	
CO3	Ability to <i>integrate</i> both technical subject skill and language skill to write a project						Cognitive		Understanding	
CO4	Knowledge on the linguistic competence to write a technical report						Cognitive		Guided response	
CO5	plan and organize a technical project report and Confidence to present a project in 10 to 15 minutes						Psychomotor Affective		Apply	
UNIT I								9		
Basic principles of good technical writing, Style in technical writing, out lines and abstracts, language used in technical writing : technical words, jargons etc										
UNIT II								9		
Special techniques used in technical writing: Definition, description of mechanism, Description of a process, Classifications, division and interpretation										
UNIT III								9		
Report/ project layout The formats: chapters, conclusion, bibliography, annexure and glossary, Graphics aids etc										
UNIT IV								18		
Presentation of the written project 10 – 15 minutes,										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
30			0			0			30	
REFERENCES:										
1. <b>Technical Writing</b> – April, 1978, by <u>Gordon H. Mills</u> (Author), <u>John A. Walter</u> (Author)										
2. <b>Effective Technical Communication:</b> A guide for scientists and Engineers. Author: Barun K. Mitra, Publication: Oxford University press.										

#### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1						1	3			
CO2						1	3			
CO3						1	3			
CO4						1	3			

CO5						1	3				
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3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE 501			RESOURCE MANAGEMENT TECHNIQUES				L	T	P	C
							3	1	0	4
C	P	A					L	T	P	H
3	0	0					3	2	0	5

**PREREQUISITE:** Mathematical Simplifications, Distributions.

Course Outcomes	Domain	Level
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After the completion of the course, students will be able to

CO1	<i>Explain</i> the basic concepts of optimization and to formulate and <i>Solve</i> Linear programming problems.	Cognitive	Understand Apply
CO2	<i>Explain</i> and <i>Apply</i> the concepts of Transportation problem and Assignment Problem.	Cognitive	Understand Apply
CO3	<i>Explain</i> and <i>Apply</i> the concepts of sequencing problem	Cognitive	Understand Apply
CO4	<i>Explain</i> and <i>Demonstrate</i> the basic concepts of PERT-CPM and their applications in product planning control.	Cognitive	Understand
CO5	<i>Solve</i> the Minimal Spanning Tree Problem, Shortest Route Problem, Maximal Flow Problem and Minimal Cost Capacitated Flow Problem.	Cognitive	Apply

UNIT I	Linear Models	15
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Basics of OR & Decision making - Role of computers in OR, Linear Programming Problem – Formulation, Graphical solution of two variables canonical & standard form of LPP, Simplex method, Charne’s method of penalties, Two phase simplex method.

UNIT II	Transportation and Assignment Problems	15
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Transportation algorithm - Degeneracy algorithm- Unbalanced Transportation problem- Unbalanced assignment algorithm.

UNIT III	Sequencing Problem	15
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Processing of n jobs through two machines -Processing of n jobs through three machines- Processing of n jobs through m machines.

UNIT IV	PERT & CPM	15
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Network - Fulkerson’s rule- Measure of activity- PERT computation- CPM computation- Resource scheduling.

UNIT V	Network Models	15
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Network definition- Minimal spanning tree problem- Shortest route problem- Maximal flow problem- Minimal cost capacitated flow problem.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	30	--	75

TEXT		
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1. Kantiswaroop, Gupta P.K and Manmohan, Operations Research, Sultan Chand & Sons, New Delhi, (2008).
2. Hamdy A. Taha, “Operations Research” An Introduction Eighth Edition, Pearson Education, Inc.(2008).

## REFERENCES



1. Prem Kumar Gupta and D.S. Hira, “Operations Research” S. Chand and Co., Ltd. New Delhi (2008).
2. Gupta R. K. “Linear Programming”, Krishna Prakashan Media(P) Ltd. ,(2009).

#### **E REFERENCES**

1. [www.nptel.ac.in](http://www.nptel.ac.in)
2. Fundamentals of Operations Research , Advanced Operations Research,
3. Prof.G. Srinivasan, Department of Management Studies, Indian Institute of Technology, Madras.

#### **Mapping of CO's with PO's:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>CO1</b>	<b>3</b>					<b>1</b>		<b>1</b>
<b>CO2</b>	<b>3</b>					<b>1</b>		<b>1</b>
<b>CO3</b>	<b>3</b>					<b>1</b>		<b>1</b>
<b>CO4</b>	<b>3</b>					<b>1</b>		<b>1</b>
<b>CO5</b>	<b>3</b>					<b>1</b>		<b>1</b>

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE 502			.NET TECHNOLOGIES				L	T	P	C	
							3	1	1	5	
C	P	A					L	T	P	H	
2.5	0.5	0					3	1	3	7	
PREREQUISITE: Computer Fundamentals and Computer Programming											
Course Outcomes							Domain		Level		
After the completion of the course, students will be able to											
CO1	Recognize the basics of .net frame work						Cognitive Psychomotor	Remember Perception			
CO2	Apply decision and iteration control structures to implement programs						Cognitive	Apply			
CO3	Create database connection and manipulate the data source						Cognitive Psychomotor	Create Guided Response			
CO4	Design, debug, and Show well-structured .NET applications.						Cognitive Psychomotor	Create Mechanism			
CO5	Analyze web services to improve the performance						Cognitive	Create			
UNIT I		INTRODUCTION TO .NET FRAMEWORK							12		
Managed Code and the CLR- Intermediate Language, Metadata and JIT Compilation - Automatic Memory Management.- Visual Studio .NET - Using the .NET Framework.- The Framework Class Library - .NET objects - ASP .NET - .NET web services – Windows Forms											
Lab: 1. Familiarizing with .NET Environment											
UNIT II		INTRODUCTION TO VISUALBASIC.NET							12		
Variables and constants – data types – declaration. Operators – types – precedence. Expressions. Program flow – Decision statements – if .. then, if..then..else, select..case– Loop statements – while..end while, do..loop, for..next, for..each..next. - Value data types – Structures, Enumerations. Reference data types- Single dimensional – Multi-dimensional arrays – jagged arrays – dynamic arrays Windows programming – creating windows Forms – windows controls – Button, Check box, Combo box, Label, List box, Radio Button, Text box. Events – Click, close, Deactivate, Load, Mousemove, Mousedown, MouseUp. Menus and Dialog Boxes – Creating menus – menu items – context menu – Using dialog boxes – showDialog() method.											
Lab: 1. Work with Console 2. Looping and Conditional Statements 3. Working with various Controls such as timer, calendar, etc., 4. Create basic text editor											
UNIT III		APPLICATION DEVELOPMENT USING ADO .NET							12		
Architecture of ADO.NET – ADO.NET providers – Connection – Command – Data Adapter – Dataset. Accessing Data with ADO.NET - Connecting to Data Source, Accessing Data with Data set and Data Reader - Create an ADO.NET application - Using Stored Procedures.											
Lab: 1. Insert, Delete, Update and Modify Operations 2. Store and retrieve data using Data Grids											
UNIT IV		INTRODUCING ASP.NET							12		

ASP.NET Features: Change the Home Directory in IIS - Add a Virtual Directory in IIS Set a Default Document for IIS - Change Log File Properties for IIS - Stop, Start, or Pause a Web Site. Web Controls - HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications - Adding web controls to a Page. Server Controls - Types of Server Controls - Adding ASP.NET Code to a Page.

**Lab:** 1. Working with various Controls  
2. Using stored Procedures  
3. Form Creation with HTML

<b>UNIT V</b>	<b>XML WEB SERVICES</b>	<b>12+9</b>
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Overview of XML : XML Serialization in the .NET Framework -SOAP Fundamentals- Using SOAP with the .NET Framework. Introduction to web services: Web Services protocol and standards – WSDL Documents - Overview of UDDI - Calling a Web Service from a Browser - Calling a Web Service by Using a Proxy - Creating a simple web service - Creating and Calling a Web Service by Using Visual Studio .NET.

**Lab:** 1. XML web services

LECTURE	TUTORIAL	PRACTICAL	TOTAL
<b>45</b>	<b>15</b>	<b>45</b>	<b>105</b>

**REFERENCES:**

1. David S. Platt, "Introducing Microsoft .NET", Microsoft Press, 2001
2. Deitel Harvey M, P.J.Deitel, T.R Nitro, "Visual Basic .NET: How to program", Pearson Edition.
3. Eric A.Smith, "ASP3 Programming Bible", Second Edition, Wiley Dream Tech, 2002.
4. "Introduction to Microsoft® ASP .NET Work book", Microsoft Press
5. [www.tutorialspoint.com](http://www.tutorialspoint.com)
6. [www.microsoft.com/net](http://www.microsoft.com/net)
7. [www.w3schools.com/aspnet](http://www.w3schools.com/aspnet)

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	2	1	1	1	1	2	1	1	1	2
<b>CO2</b>	3	2	2	2	2	2	2	2	1	3
<b>CO3</b>	2	2	2	2	3	2	2	2	1	2
<b>CO4</b>	2	2	2	2	2	2	2	3	1	3
<b>CO5</b>	3	3	3	3	3	3	3	3	1	3
<b>Average</b>	3	2	2	2	2	2	2	2	1	3

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE 503			WEB TECHNOLOGIES				L	T	P	C
							3	1	1	5
C	P	A					L	T	P	H
2	0.75	0.25					3	1	3	7
PREREQUISITE: Computer Fundamentals, Computer Programming										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the significance of Web Technology.						Cognitive Psychomotor		Remember Perception	
CO2	Express the knowledge on HTML, CSS, JavaScript and PHP in Web Design.						Cognitive		Understand	
CO3	Employ the understanding of the Client and Server side scripts and actively <i>participate</i> in teams for the creation of static and dynamic web pages.						Cognitive Affective		Apply Respond	
CO4	Utilize the web designing tools effectively in the real world applications.						Cognitive		Apply	
CO5	Design and Establish the Website or Web based Software.						Cognitive Psychomotor		Create Set	
UNIT I		INTRODUCTION TO WEB TECHNOLOGY & HTML							12+9	
Introduction to Web Technology – Concept of Tier – Web Pages – Static Web Pages – Dynamic Web Pages – HTML Basics – HTML CSS – Links – Images – Tables – Lists - Frames - HTML forms and Input tags										
<b>Lab:</b> 1. Formatting tags, ordered list and unordered list. 2. Tables, frame, image map and hyperlink.										
UNIT II		CSS & JAVASCRIPT							12+9	
CSS Basics – Texts and Fonts – Links, Lists and Tables – Border and Outline – Position – Dimension and Display - Java Script Basics – Functions – Objects – Events – Scope – Strings – Numbers – Date – Arrays – Conditional and Looping Statements – Forms										
<b>Lab:</b> 1. Font, color and style 2. Background and Links 3. Form Validation 4. Looping and Conditional Statements										
UNIT III		PHP BASIC CONCEPTS							12+9	
PHP - Basic Syntax – Data Types – Variables & Constants in PHP - String and Operators - Selective and Iterative flow of controls - PHP arrays & types - PHP function declaration - adding parameters - Server side includes - Built in functions										
<b>Lab:</b> 1. Strings and Operators 2. Flow of controls and Arrays 3. PHP Forms 4. PHP Functions										
UNIT IV		PHP ADVANCED CONCEPTS							12+9	
PHP File Handling - Opening a File - Closing a File - Check End-Of-File - Reading a File Line										

By Line - Reading File Character By Character - PHP File Upload - Exception Handling - Creating Custom Exception Class - Re-Throwing Exceptions - Cookies - Sessions - E-Mails

**Lab:** 1. File Handling  
2. Exception Handling  
3. PHP Sessions and Cookies

UNIT V

PHP & MySQL

12+9

MySQL Database – Connect – Create DB – Create Table – Insert Data – Get Last ID – Insert Multiple - Select Data – Delete Data – Update Data – Limit Data

Lab: 1. PHP with MySQL

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105

REFERENCES:

1. Achyut S.Godbole, Atul Kahate, “Web Technologies TCP/IP To Internet Application Architectures”, First Edition, Tata McGraw-Hill Publishing Company Limited, 2003.

2. Kevin Tatroe, Peter MacIntyre and Rasmus Lerdorf, “Programming PHP”, Third Edition, O’Reilly Media, Inc., 2013.

3. N.P. Gopalan, J.Akilandeswari, “Web Technology: A Developer’s Perspective, Second Edition, PHI Learning Private Limited, 2014.

4. Robin Nixon, “Learning PHP, MySQL & JavaScript With jQuery, CSS & HTML5”, Fourth Edition, O’Reilly Media, Inc., 2015.

5. [www.w3schools.com](http://www.w3schools.com)

6. [www.php.net/manual/en/intro-what-is.php](http://www.php.net/manual/en/intro-what-is.php)

7. [www.tutorialspoint.com](http://www.tutorialspoint.com)

### Mapping of Course Outcomes (CO) with Programme Outcomes (PO):

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	2	0	1	1	0	1	0	1	1	2
<b>CO2</b>	2	2	2	1	1	0	1	1	2	3
<b>CO3</b>	1	2	2	1	2	1	1	2	2	3
<b>CO4</b>	0	1	2	2	2	1	0	1	2	3
<b>CO5</b>	1	2	3	2	3	2	1	1	3	3
<b>Average</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

<b>YSE 505</b>			<b>BUSINESS COMMUNICATION</b>				<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
							<b>1</b>	<b>0</b>	<b>2</b>	<b>0</b>
<b>C</b>	<b>P</b>	<b>A</b>					<b>L</b>	<b>T</b>	<b>P</b>	<b>H</b>
<b>3</b>	<b>1</b>	<b>1</b>					<b>1</b>	<b>0</b>	<b>2</b>	<b>3</b>
<b>PREREQUISITE:</b> Speech Communication										
<b>Course Outcomes</b>							<b>Domain</b>		<b>Level</b>	
After the completion of the course, students will be able to										
<b>CO1</b>	To choose and apply different styles to various forms of business communication					Cognitive		Remembering		
<b>CO2</b>	Identify the proper tone of language required in writing and speaking in business communication					Cognitive		Understanding		
<b>CO3</b>	Display knowledge on grammar and other linguistic features in writing various forms of business communication					Cognitive		Understanding		
<b>CO4</b>	To distinguish between letters and memos and various forms of Business Communication					Cognitive		Guided response		
<b>CO5</b>	Learn how to write business reports, minutes, proposals					Psychomotor Affective		Apply		
<b>UNIT I</b>								<b>9</b>		
Introduction to business communication; modern developments in the style of writing letters memos and reports: block letters, semi block letters, full block letters, simplified letters etc.,										
<b>UNIT II</b>								<b>9</b>		
The language used in memos/minutes/telephone memos/ letters/ assignments art of writing E-mail etc. Advantages of written and spoken communication										
<b>UNIT III</b>								<b>9</b>		
The use of active and passive voice; the use of grammar, propriety, accuracy , exactness , the tone & other elements of language used in these writings										
<b>UNIT IV</b>								<b>18</b>		
The format of various types of Reports/ projects etc.,										
<b>LECTURE</b>			<b>TUTORIAL</b>			<b>PRACTICAL</b>		<b>TOTAL</b>		
<b>30</b>			<b>15</b>			<b>-</b>		<b>45</b>		
<b>REFERENCES:</b>										
<ol style="list-style-type: none"> <li>1. Writing and Speaking Author: John Sealy, Oxford University Press, New Delhi Third Edition 2009.</li> <li>2. Communicating in Business (8th Edition)Paperback – 2012 by <u>Williams K S</u> , Engage Learning India Pvt. Ltd.; 08 edition</li> </ol>										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1						1	3			
CO2						1	3			
CO3						1	3			
CO4						1	3			
CO5						1	3			

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE 505			TOTAL QUALITY MANAGEMENT				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE:										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	List and Explain the basic concepts of total quality concepts and its limitations.						Cognitive	Remembering Understanding		
CO2	Analyze and Explain the Customer satisfaction, Employee involvement, supplier selection and appraise the performance by TQM principle.						Cognitive	Analyse Evaluate		
CO3	Explain and Apply the Statistical Process Control Tools.						Cognitive	Understand Apply		
CO4	Select and Explain the different TQM tools and their significance						Cognitive	Remembering Understanding		
CO5	Explain the importance aspects of different quality systems.						Cognitive	Understanding		
UNIT I			INTRODUCTION					9		
Definition of quality – Dimensions of quality – Quality planning – Quality costs – Analysis techniques for quality costs – Basic concepts of Total Quality Management – Historical review – Principles of TQM – Leadership – Concepts – Role of senior management – Quality Council – Quality statements – Strategic planning – Deming philosophy – Barriers to TQM implementation										
UNIT II			TQM PRINCIPLES					9		
Customer satisfaction – Customer perception of quality – Customer complaints – Service quality –Customer retention – Employee involvement – Motivation, empowerment, teams, recognition and reward – Performance appraisal – Benefits – Continuous process improvement – Juran trilogy – PDSA cycle – 5S – Kaizen – Supplier partnership – Partnering – Sourcing – Supplier selection – Supplier rating – Relationship development – Performance measures – Basic concepts – Strategy – Performance measure.										
UNIT III			STATISTICAL PROCESS CONTROL (SPC)					9		
The seven tools of quality – Statistical fundamentals – Measures of central tendency and dispersion – Population and sample – Normal curve – Control charts for variables and attributes – Process capability – Concept of six sigma – New seven management tools.										
UNIT IV			TQM TOOLS					9		
Benchmarking – Reasons to benchmark – Benchmarking process – Quality Function Deployment (QFD) – House of quality – QFD process – Benefits – Taguchi quality loss function – Total Productive Maintenance (TPM) – Concept – Improvement needs – FMEA – Stages of FMEA.										
UNIT V			QUALITY SYSTEMS					9		
Need for ISO 9000 and other quality systems – ISO 9000:2000 quality system – Elements – Implementation of quality system – Documentation – Quality auditing – TS 16949 – ISO 14000 –Concept, requirements and benefits.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	



<b>45</b>	-	-	<b>45</b>
<b>REFERENCES:</b>			
<ol style="list-style-type: none"> <li>1. Dale H. Besterfield, et. Al. "Total Quality Management", New Delhi, Pearson Education, Inc.. 2007.</li> <li>2. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 5<sup>th</sup> Edition, South-Western, 2002.</li> <li>3. Feigenbaum, A.V., "Total Quality Management", McGraw Hill, 1991.</li> <li>4. Oakland, J.S., "Total Quality Management", Butterworth Heineman, 1989.</li> <li>5. Narayana V. and Sreenivasan, N.S., "Quality Management – Concepts and Tasks", New Age International, 1996.</li> <li>6. Zeiri, "Total Quality Management for Engineers", Wood Head Publishers, 1991.</li> <li>7. <a href="http://nptel.ac.in/faq/110101010/Prof.IndrajitMukherjee,IIT,Bombay">http://nptel.ac.in/faq/110101010/Prof.IndrajitMukherjee,IIT,Bombay</a> and Prof.Tapan P.Bagchi, IIT, Kharagpur.</li> </ol>			

**Table 1: COs Vs CPA (Learning Domain) mapping**

Domain/Components	CO1	CO2	CO3	CO4	CO5	Total	Scaled total
Cognitive = 3							
Remembering	0.25			0.25			0.5
Understanding	0.25		0.5	0.5	0.5		1.75
Analyzing		0.25					0.25
Applying			0.25				0.25
Evaluating		0.25					0.25

**Table 2: COs Vs GA mapping**

	CO1	CO2	CO3	CO4	CO5	Total	Scaled total
GA1	2	1	2	1	1	7	2
GA4	1	1	2	2	1	7	2
GA5	1	1	2	2	1	7	2
GA6	1	1	2	1	2	7	2
GA7	1	1	1	1	1	5	1
GA8	1	1	1	2	2	7	2
GA9	1	1	1	-	1	4	1
GA10	1	1	1	2	2	7	2
GA12	1	1	-	-	2	4	1

Scale :

0	- 0
1-5	- 1
6- 10	- 2
11 – 15	- 3

YSE601			OBJECT ORIENTED ANALYSIS AND DESIGN		L	T	P	C
					3	1	1	5
C	P	A			L	T	P	H
2.5	0.5	0			3	1	3	7
<b>PREREQUISITE :</b> Object Oriented Programming concepts								
After the completion of the course, students will be able to								
CO1	<i>Recognize</i> the difference between various objects and their relationships				Cognitive		Remember	
CO2	<i>Express</i> and <i>Choose</i> appropriate notation associated with each model				Cognitive Psychomotor		Understand Choose	
CO3	<i>Design</i> and <i>Explain</i> CASE TOOLS for the construction of UML Models				Cognitive Psychomotor		Analyze Set	
CO4	<i>Construct</i> various UML Models				Cognitive		Create	
CO5	<i>Show</i> the importance of System Analysis and Design in solving complex problems				Cognitive		Apply	
<b>UNIT I</b>		<b>OBJECT MODELLING</b>					<b>12</b>	
Object Oriented Philosophy – Object – Object State, behaviors and methods. Encapsulation and information hiding - Class Relationship among classes -polymorphism, aggregation and object containment, Meta classes.								
<b>Lab:</b> Problem Analysis and Project Planning Thorough study of the problem – Identify project scope, Objectives, infrastructure.								
<b>UNIT II</b>		<b>OBJECT ORIENTED METHODOLOGIES</b>					<b>12</b>	
Booch methodology- OMT- Coad/Yourdon approach- Shalear/ Mellor's approach- OOSE- Comparative study.								
<b>Lab:</b> Software Requirement Analysis Describe the individual Phases/ modules of the project, Identify deliverables.								
<b>UNIT III</b>		<b>UML AND USE CASE MODELLING</b>					<b>12</b>	
UML: an Introduction- Views and Diagrams- extended UML - Modeling requirements using use case diagrams – Components of use case model- Components of a use case diagram- steps in processing requirements specifications to construct use case diagram- Use case identification and description.								
<b>Lab:</b> Data Modelling Use work products – data dictionary, use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.								

UNIT IV	WORKFLOW AND BEHAVIORAL MODELING		12
Modeling workflows using Activity diagrams: Components of activity diagrams- Steps in construction – Examples - Modeling behavior with state diagrams: Notations- Nesting of states- steps in construction – Examples. UML Interaction diagrams: Interaction diagrams – Components- steps in construction- examples. Collaboration diagrams- Timing diagrams- Interaction overview diagrams.			
Lab: Software Development and Debugging.			
UNIT V	STRUCTURAL MODELING		12
Class diagrams- Object diagrams- Component diagrams- Deployment diagrams- Package diagrams- Composite structure diagrams. CASE STUDIES: Patterns and frameworks- Modeling ATM.			
Lab: Software Testing Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.			
Lecture: 45		Tutorial:15	Practical:45
			Total:105
REFERENCES			
1. Ali Bahrami, “Object Oriented Systems Development” Tata-McGraw Hill, New Delhi, International editions, 2008			
2. Grady Booch, James Rumbaugh and Ivar Jacobson, “The Unified Modeling Language User Guide”, Addison-Wesley Longman, USA, 2005.			
3. Fowler, “Analysis Patterns”, Addison Wesley, USA, 1996.			
4. Erich Gamna, “Design Patterns”, Addison Wesley, USA, 1994.			

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	1	2	1	1	1	1	1	1	1	1
<b>CO2</b>	2	1	3	2	2	1	0	1	1	0
<b>CO3</b>	1	2	2	0	1	3	1	2	1	1
<b>CO4</b>	2	2	2	2	2	1	1	1	1	0
<b>CO5</b>	2	2	2	1	2	3	1	3	1	0

3–Strong relation, 2–Medium relation, 1–Low relation, 0–No relation

YSE602			ENVIRONMENTAL STUDIES		L	T	P	C
					3	0	0	2
C	P	A			L	T	P	H
1.5	0	0.5			3	0	0	3
<b>PREREQUISITE :</b>								
Course Outcomes					Domain		Level	
After the completion of the course, students will be able to								
CO1	<i>Describe</i> the significance of natural resources and <i>explain</i> anthropogenic impacts.				Cognitive		Remember Understand	
CO2	<i>Illustrate</i> the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance.				Cognitive		Understand	
CO3	<i>Identify</i> the facts, consequences, preventive measures of major pollutions and <i>recognize</i> the disaster phenomenon				Cognitive Affective		Remember Receiving	
CO4	<i>Explain</i> the socio-economic, policy dynamics and <i>practice</i> the control measures of global issues for sustainable development.				Cognitive		Understand Analyse	
CO5	the impact of population and the concept of various welfare programs, and <i>apply</i> the modern technology towards environmental protection.				Cognitive		Understand Apply	
<b>UNIT I</b>		<b>INTRODUCTION TO ENVIRONMENTAL STUDIES AND ENERGY</b>					<b>12</b>	
Definition, scope and importance – Need for public awareness – Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, flood, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – Role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.								
<b>UNIT II</b>		<b>ECOSYSTEMS AND BIODIVERSITY</b>					<b>7</b>	
Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity - Conservation of biodiversity: In-situ and Ex-situ								

conservation of biodiversity.			
UNIT III	ENVIRONMENTAL POLLUTION		10
Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – Solid waste management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: flood, earthquake, cyclone and landslide.			
UNIT IV	SOCIAL ISSUES AND THE ENVIRONMENT		10
Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation – Consumerism and waste products – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.			
UNIT V	HUMAN POPULATION AND THE ENVIRONMENT		6
Population growth, variation among nations – Population explosion – Family welfare programme – Environment and human health – Human rights – Value education - HIV / AIDS – Women and Child welfare programme– Role of Information Technology in Environment and human health – Case studies.			
Lecture: 45		Tutorial:0	Practical:0
		Total:45	
REFERENCES			
<div>1. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co, USA, 2000.</div> <div>2. Townsend C., Harper J and Michael Begon, Essentials of Ecology, Blackwell Science, UK, 2003</div> <div>3. Trivedi R.K and P.K.Goel, Introduction to Air pollution, Techno Science Publications, India, 2003.</div> <div>4. Disaster mitigation, Preparedness, Recovery and Response, SBS Publishers &amp; Distributors Pvt. Ltd, New Delhi, 2006.</div> <div>5. Introduction to International disaster management, Butterworth Heinemann, 2006.</div> <div>6. Gilbert M.Masters, Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., Second Edition, New Delhi, 2004.</div> <div>7. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media, India, 2009.</div> <div>8. Cunningham, W.P.Cooper, T.H.Gorhani, Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001.</div> <div>9. S.K.Dhameja, Environmental Engineering and Management, S.K.Kataria and Sons, New Delhi, 2012.</div> <div>10. Sahni, Disaster Risk Reduction in South Asia, PHI Learning, New Delhi, 2003.</div> <div>11. Sundar, Disaster Management, Sarup &amp; Sons, New Delhi, 2007.</div> <div>12. G.K.Ghosh, Disaster Management, A.P.H.Publishers, New Delhi, 2006.</div> <div>13. <a href="http://www.e-booksdirectory.com/details.php?ebook=10526">http://www.e-booksdirectory.com/details.php?ebook=10526</a></div> <div>14. <a href="https://www.free-ebooks.net/ebook/Introduction-to-Environmental-Science">https://www.free-ebooks.net/ebook/Introduction-to-Environmental-Science</a></div> <div>15. <a href="https://www.free-ebooks.net/ebook/What-is-Biodiversity">https://www.free-ebooks.net/ebook/What-is-Biodiversity</a></div>			

16. [https://www.learner.org/courses/envsci/unit/unit\\_vis.php?unit=4](https://www.learner.org/courses/envsci/unit/unit_vis.php?unit=4)

17. <http://bookboon.com/en/pollution-prevention-and-control-ebook>

18. <http://www.e-booksdirectory.com/details.php?ebook=8557>

19. <http://www.e-booksdirectory.com/details.php?ebook=6804>

	<b>GA1</b>	<b>GA2</b>	<b>GA3</b>	<b>GA4</b>	<b>GA5</b>	<b>GA6</b>	<b>GA7</b>	<b>GA8</b>	<b>GA9</b>	<b>GA10</b>
<b>CO1</b>	2						2		2	2
<b>CO2</b>	1						2			2
<b>CO3</b>	2	1	2				3		2	3
<b>CO4</b>	2	2	2				2			3
<b>CO5</b>	2				3	3				2
	<b>9</b>	<b>3</b>	<b>4</b>		<b>3</b>	<b>3</b>	<b>9</b>		<b>4</b>	<b>12</b>
<b>Scaled to 0,1,2,3 scale</b>	<b>2</b>	<b>1</b>	<b>1</b>		<b>1</b>	<b>1</b>	<b>2</b>		<b>1</b>	<b>3</b>

YSE603			ENTREPRENEURSHIP DEVELOPMENT		L	T	P	C
					3	0	0	3
C	P	A			L	T	P	H
3	0	1			3	0	0	3
PREREQUISITE :								
Course Outcome					Domain		Level	
After the completion of the course, students will be able to								
CO1	Recognize and describe the personal traits of an entrepreneur.				Affective Cognitive		Receiving Understand	
CO2	Determine the new venture ideas and analyze the feasibility report.				Cognitive		Understand Analyse	
CO3	Develop the business plan and analyze the plan as an individual or in team.				Affective Cognitive		Receiving Analyse	
CO4	Describe various parameters to be taken into consideration for launching and managing small business.				Cognitive		Understand	
CO5	Describe Technological management and Intellectual Property Rights				Cognitive		Understand	
UNIT I		ENTREPRENEURIAL TRAITS AND FUNCTIONS					9	
Definition of Entrepreneurship; competencies and traits of an entrepreneur; factors affecting Entrepreneurship Development; Role of Family and Society ; Achievement Motivation; Entrepreneurship as a career and national development;								
UNIT II		NEW PRODUCT DEVELOPMENT AND VENTURE CREATION					9	
Ideation to Concept development; Sources and Criteria for Selection of Product; market assessment ; Feasibility Report ;Project Profile; processes involved in starting a new venture; legal formalities; Ownership; Case Study.								
UNIT III		ENTREPRENEURIAL FINANCE					9	
Financial forecasting for a new venture; Finance mobilization; Business plan preparation; Sources of Financing, Angel Investors and Venture Capital; Government support in startup promotion.								
UNIT IV		LAUNCHING OF SMALL BUSINESS AND ITS MANGEMENT					9	
Operations Planning - Market and Channel Selection - Growth Strategies - Product Launching – Incubation, Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units.								
UNIT V		TECHNOLOGY MANAGEMENT, IPR PORTFOLIO FOR NEW PRODUCT VENTURE					9	

Technology management; Impact of technology on society and business; Role of Government in supporting Technology Development and IPR protection; Entrepreneurship Development Training and Other Support Services.

Lecture	Tutorial	Practical	Total
45	0	0	45

#### REFERENCES

1. Hisrich, 2016, *Entrepreneurship*, Tata McGraw Hill, New Delhi.
2. S.S.Khanka, 2013, *Entrepreneurial Development*, S.Chand and Company Limited, New Delhi.
3. Mathew Manimala, 2005, *Entrepreneurship Theory at the Crossroads, Paradigms & Praxis*, Biztrantra, 2nd Edition.
4. Prasanna Chandra, 2009, *Projects – Planning, Analysis, Selection, Implementation and Reviews*, Tata McGraw-Hill.
5. P.Saravanavel, 1997, *Entrepreneurial Development*, Ess Pee kay Publishing House, Chennai.
6. Arya Kumar, 2012, *Entrepreneurship: Creating and Leading an Entrepreneurial Organisation*, Pearson Education India.
7. Donald F Kuratko, T.V Rao, 2012, *Entrepreneurship: A South Asian perspective*, Cengage Learning India.
8. Dinesh Awasthi, Raman Jaggi, V.Padmanand, *Suggested Reading / Reference Material for Entrepreneurship Development Programmes (EDP/WEDP/TEDP)*, EDI Publication, Entrepreneurship Development Institute of India, Ahmedabad. Available from: <http://www.ediindia.org/doc/EDP-TEDP.pdf>
9. Jeff Hawkins, “Characteristics of a successful entrepreneur”, ALISON Online entrepreneurship courses, “<https://alison.com/learn/entrepreneurial-skills>”
10. Jeff Cornwall, “Entrepreneurship -- From Idea to Launch”, Udemy online Education, <https://www.udemy.com/entrepreneurship-from-idea-to-launch/>

#### MAPPING COURSE OUTCOME WITH GRADUATE ATTRIBUTES:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1									3	3	3	1
CO2			1	2	3	2	1	1	1	2	3	
CO3						1		2	3	3		2
CO4						1	1	2	3		3	3
CO5						1	1	3				3
			1	2	3	5	3	8	10	8	9	9
			1	1	1	2	1	2	3	2	2	2

0 -0, 1-5 -1, 6-10 -2, 11-15 -3



YSE607			ACADEMIC WRITING SKILLS					L	T	P	SS	C
								0	0	0	2	0
C	P	A						L	T	P	SS	H
1.2	0.4	0.4						0	0	0	2	2
PREREQUISITE :												
Course Outcomes								Domain		Level		
CO1	<i>Knowledge</i> on the need for going beyond grammar in writing paragraphs and essays						Cognitive		Remember			
CO2	<i>Integrate</i> all the written language elements into the production of a cohesive whole called a paragraph.						Cognitive		Understand			
CO3	<i>Practice</i> the discourse features that connects sentences and paragraphs.						Cognitive		Understand			
CO4	<i>Synthesize</i> language and ideas to develop sentences , paragraphs and essays						Cognitive		GR			
CO5	<i>Produce</i> correct, proper, and fluent pieces of writing						Psychomotor		A			
UNIT I	TYPES OF PARAGRAPHS									5		
Definition of a paragraph, writing different types of paragraphs: definition paragraph, descriptive paragraph, process paragraph, comparison and contrast paragraph etc.												
UNIT II	DISCOURSE FEATURES									5		
Cohesion, coherence (connectives) etc; précis writing, summarizing												
UNIT III	VARIOUS TYPES OF ESSAYS									5		
Discursive, argumentative, cause & effect, chronological etc;												
UNIT IV	USE OF LANGUAGE									5		
Essays according to the type of essays												
UNIT V	ESSAY WRITING PRACTICE									5		
LECTURE			SELF STUDY			PRACTICAL			TOTAL			
0			30			0			30			
Text books												
<ol style="list-style-type: none"> <li>1. D. H. Howe and G. MC Arthur, <i>Advance with English</i>, Oxford University Press,1993</li> <li>2. Wren and Martine, <i>High School English Grammar and Composition</i>, S, Chand and Company, 1999.</li> <li>3. Raymond Murphy, <i>Intermediate English Grammar</i>, li Ed., , Cambridge University Press, New Delhi,1994</li> <li>4. Bikrim K. Das, <i>Functional Grammar and Spoken and written communication in English</i>, Orient Black swan, Hyderabad.Reprinted 2011,</li> </ol>												

### Mapping of COs with GAs:

[illegible]

YSE 801			DATA MINING AND DATA WAREHOUSING				L	T	P	C
							3	1	1	5
C	P	A								
2.75	0.25	0					L	T	P	H
							3	1	1	5
PREREQUISITE: Data Base Management System										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Analyze Multidimensional Intelligent model from typical system						Cognitive		Analyze	
CO2	Evaluate various mining techniques on complex data objects						Cognitive		Evaluate	
CO3	Understand Data Mining processes using Open Source Data Mining tool.						Cognitive		Understand	
CO4	Choose the appropriate techniques and algorithms for extracting data						Cognitive Affective		Apply Respond	
CO5	Recognize the knowledge of data mining, data preprocessing and data warehousing						Cognitive Psychomotor		Analyze Perception	
UNIT I			INTRODUCTION						12	
Introduction, Fundamentals of data mining, Data Mining Functionalities, Data Preprocessing : Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction										
Lab:										
<ul style="list-style-type: none"> <li>Perform Data Preprocessing using tool</li> <li>Perform Visualization of data using tool</li> </ul>										
UNIT II			DATA WAREHOUSING						12	
Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining.										
Lab:										
Implement the following Multidimensional Data Models										
i.Star Schema										
ii.Snowflake Schema										
iii.Fact Constellation										
UNIT III			ASSOCIATION						12	
Mining Association Rules in Large Databases, Association Rule Mining, Apriori Algorithm and Frequent pattern growth algorithm										
Lab:										
<ul style="list-style-type: none"> <li>Classification, Association and Clustering algorithms using tool</li> <li>Implement Apriori algorithm to generate frequent Item Sets</li> </ul>										
UNIT IV			CLASSIFICATION						12 + 9	
Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining										
Lab:										
<ul style="list-style-type: none"> <li>Implement the following classification algorithms</li> </ul>										

i.Decision Tree Induction ii.KNN			
UNIT V	CLUSTERING		12
Cluster Analysis Introduction Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.			
Lab: <ul style="list-style-type: none"><li>Implement the following clustering algorithms<ul style="list-style-type: none"><li>i.K-means</li><li>ii.K-mediods</li></ul></li></ul>			
LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105
REFERENCES:			
<ol style="list-style-type: none"><li>1. Data Mining – Concepts And Techniques - Jiawei Han &amp; Micheline Kamber Harcourt India.</li><li>2. Data Mining Introductory And Advanced Topics –Margaret H Dunham, Pearson Education</li><li>3. Data Mining Techniques – Arun K Pujari, University Press.</li><li>4. Data Warehousing In The Real World – Sam Anahory &amp; Dennis Murray. Pearson Edn Asia.</li><li>5. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley Student Edition.</li><li>6. The Data Warehouse Life Cycle Tool Kit – Ralph Kimball Wiley Student Edition.</li><li>7. <a href="http://www.tutorialspoint.com/data_mining">http://www.tutorialspoint.com/data_mining</a></li><li>8. <a href="http://www.dataminingconsultant.com/resources.html">http://www.dataminingconsultant.com/resources.html</a></li></ol>			

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	3	2	3	2	2	1	1	1	1	3
<b>CO2</b>	2	3	2	3	1	1	1	1	2	3
<b>CO3</b>	3	2	3	2	2	2	1	1	2	3
<b>CO4</b>	3	2	2	3	1	1	1	1	1	3
<b>CO5</b>	2	3	2	2	2	2	1	1	2	3

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No Correlation

YSE802			SOFTWARE TESTING AND QUALITY ASSURANCE				L	T	P	C
							3	1	1	5
C	P	A					L	T	P	H
2	1	0					3	1	1	7

**PREREQUISITE:** Software Engineering

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	<i>Recognize</i> the software quality assurance plan	Cognitive	Remember
CO2	<i>Demonstrate</i> the software Testing concepts.	Cognitive	Understand
CO3	<i>Analyze</i> the different testing strategies and methods for test case design.	Cognitive	Analyze
CO4	<i>Identify</i> the levels of testing and management.	Psychomotor	Perception
CO5	<i>Describe</i> various test process.	Psychomotor	Perception

<b>UNIT I</b>	<b>INTRODUCTION TO SOFTWARE QUALITY ASSURANCE PLAN</b>	<b>12</b>
An overview of software quality assurance plan- Software quality assurance plan purpose and scope – Software quality assurance management- Problem reporting and corrective action-Tools, Techniques and Methodologies-Risk Management.		
<b>Lab:</b> 1. Preparation of project management plan. 2. Preparation of Requirement Management plan using any case tools.		

<b>UNIT II</b>	<b>INTRODUCTION TO SOFTWARE TESTING</b>	<b>12</b>
Introduction to testing as an Engineering Activity – The evolving process of Software Engineering – The role of process in software quality – Testing as a process – Overview of the testing maturity model (TMM) – Testing fundamentals – Defects , hypothesis and tests.		
<b>Lab:</b> 1. Case study preparation of cost estimation model.		

<b>UNIT III</b>	<b>STRATEGIES AND METHODS FOR TEST CASE DESIGN</b>	<b>12</b>
Introduction to testing design strategies- The smart tester – Test case design strategies – Using black box approach to test case design – Random testing – Equivalence class partitioning boundary value analysis – strategies and methods for test case design II		
<b>Lab :</b> 1. Test case generation manually for real time application. 2. Practice function testing using manual testing. 3. Practice black box testing concepts manually.		

<b>UNIT IV</b>	<b>LEVELS OF TESTING AND MANAGEMENT</b>	<b>12</b>
The need for levels of testing – Unit test – Planning – Designing the unit tests –The test harness Integration test goals, strategies, design plan and documentation – The test organization		
<b>Lab :</b> 1. Generate a test case and defect tracking report manually for real time application. 2. Practice creating software documentation for all the phases of software development life cycle with respect to any real time application		

<b>UNIT V</b>	<b>CONTROLLING AND MONITORING THE TEST PROCESS</b>	<b>12</b>
Measurements and Milestones for controlling and monitoring – Software Configuration and management – Reviews as a testing activity - Defect analysis and prevention – Process control and Optimization – Need for Testing Maturity Model – Structure of testing maturity model –		

Relationships of the TMM to other process improvement models.

- Lab :** 1. Simulate tools for path testing principles.  
2. Simulate tools for testing based on control structures.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105

**REFERENCES:**

1. Ilene Burnstein, “Practical Software Testing “, Springer International Edition, Chennai 2003.
2. Renu Rajani and Pradeep Oak “ Software Testing – Effective Methods, Tools and Techniques” Tata McGraw Hill Publications New Delhi 2007.
3. Elfriede Dustin, “Effective Software Testing “Pearson Education, New Delhi, 2003.
4. Glenford J. Myers, John Wiley & Sons "The Art of Software Testing," Hoboken, New Jersey, 2004.
5. Edward Kit, “Software Testing in the Real World - Improving the Process”, Pearson Education, New Delhi, 1995.

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	2	1	1	1	1	1	3	1	1	0
CO2	2	1	1	1	1	1	1	1	1	0
CO3	2	2	1	1	2	2	2	1	1	0
CO4	2	1	1	1	0	1	1	1	1	0
CO5	1	1	1	1	1	1	2	1	1	0
Average	2	1	1	1	1	1	3	1	1	2

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSE 803			SOFTWARE COMMUNICATION AND DOCUMENTATION				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2.0	0.5	0.5					3	0	0	3
PREREQUISITE: English										
Course Outcomes						Domain		Level		
After the completion of the course, students will be able to										
CO1	Recognize and Express various Types of communication and Documentation.					Cognitive		Remember Understand		
CO2	Discuss and Practice the Characteristics and Elements of Spoken and Group Communication					Cognitive Affective		Understand Responding to a phenomena		
CO3	Discuss and Analyze the procedure to be followed in Group Communication					Cognitive		Understand Analyze		
CO4	Propose and Write various types of Letters, Resume, Proposals and Contracts					Affective		Responding to a phenomena		
CO5	Adapt and follow the appropriate Technology and Standards for documentation					Psychomotor Affective		Adaptation Valuing		
UNIT I		BASIC CONCEPTS						9		
Importance of communication and documentation - Different types of Communications - Spoken communication - written communication - Different types of documentation.										
UNIT II		SPOKEN COMMUNICATION						9		
Elements of good individual communication – getting over nervousness – organizing one self characteristics of effective communication – augmenting spoken words by actions and other means – other aspects of spoken communication like speeches – presentation - use of visual aids.										
UNIT III		GROUP COMMUNICATION						9		
Meeting – Effective participation – effective management of meetings – preparing minutes – “Virtual” meetings – audio conference – video conference – use of collaboration tools										
UNIT IV		DIFFERENT TYPES OF WRITTEN COMMUNICATION						9		
Principles of effective written communication – differences between written communication and spoken communication – resume writing – email - effective email techniques – proposals – contracts – user guides – external technical documentation for software – internal software technical documentation – users guides – letters and different types of letters – legal issue.										
UNIT V		TECHNOLOGY AND STANDARDS						9		
Use of various tools and technologies – need for standardization – role of processes and standards in documentation – on-line help – Impact of internet on documentation – common challenges in the harnessing of technology - course summary										
LECTURE			TUTORIAL			PRACTICAL		TOTAL		
45			-			-		45		
REFERENCES:										
1. Effective Technical Communication ,Asraf Ali										
2. Day –to –day English Part I - Prof.Dr.V.R. Angapan ,2010, 7 <sup>th</sup> edition										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

<b>M.Sc. SE</b>	<b>PO</b>								<b>PSO</b>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>1</b>	<b>2</b>
<b>CO1</b>	0	0	0	0	0	3	3	0	1	1
<b>CO2</b>	0	1	0	0	0	3	3	0	0	0
<b>CO3</b>	0	1	0	0	0	3	3	0	1	1
<b>CO4</b>	0	1	0	0	0	3	3	0	1	1
<b>CO5</b>	1	1	0	0	0	1	1	1	1	1
<b>Average</b>	0	1	0	0	0	3	3	0	1	1

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation



YS807			CAREER DEVELOPMENT SKILLS			L	T	P	SS	C
						0	0	0	2	0
C	P	A				L	T	P	SS	H
0	0.5	1.5				0	0	0	2	2
PREREQUISTE :										
Course Outcomes						Domain			Level	
CO1	Knowledge on a career related communication and learning the different formats of CV					Cognitive		Knowledge		
CO2	Prepare how to face an interview and to learn how to prepare for an interview					Psychomotor		Set		
CO3	Communicates with the group of people in discussion					Affective		Receiving		
UNIT I	CV WRITING							5		
Difference between resume and CV; characteristics of resume and CV; basic elements of CV and resume, use of graphics in resume and CV; forms and functions of Cover Letters.										
UNIT II	INTERVIEW SKILLS							5		
Tips for various types of interviews. Types of questions asked ; body language, etiquette and dress code in interview, interview mistakes, telephonic interview , frequently asked questions. Planning for the interview.										
UNIT III	WORK SHOP							5		
Mock interviews - workshop on CV writing – Group Discussion										
LECTURE		SELF STUDY			PRACTICAL			TOTAL		
0		30			0			30		
Text books										
1. How To Write a CV That Really Works: A Concise, Clear and Comprehensive Guide to Writing an Effective CV, Paul McGee Hachette UK, 2014										
2. Essentials of Business Communication, Mary Ellen Guffey, Dana Loewy, Cengage Learning, 2012										
3. Interview Skills that win the job: Simple techniques for answering all the tough questions, Michael Spiropoulos, Allen & Unwin, 2005										
4. Effective Interviewing and Interrogation Techniques, William L. Fleisher, Nathan J. Gordon, Academic Press, 2010										
5. <a href="http://www.utsa.edu/careercenter/PDFs/Interviewing/Types%20of%20Interviews.pdf">http://www.utsa.edu/careercenter/PDFs/Interviewing/Types%20of%20Interviews.pdf</a>										
6. <a href="http://www.amu.apus.edu/career-services/interviewing/types.htm">http://www.amu.apus.edu/career-services/interviewing/types.htm</a>										
7. <a href="http://www.careerthinker.com/interviewing/types-of-interview/">http://www.careerthinker.com/interviewing/types-of-interview/</a>										

#### Mapping of COs with GAs:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1										2		
CO2							1			2		
CO3				2						3		

YSE901			MOBILE APPLICATION DEVELOPMENT				L	T	P	C
							3	1	3	5
C	P	A					L	T	P	H
3	1	0					3	1	3	7
PREREQUISITE: Knowledge on Object oriented programming and web technologies										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the significance of Android development						Cognitive		Remember	
CO2	Summarize the knowledge on java, xml with android and detect about the android development.						Cognitive Psychomotor		Understand Perception	
CO3	Manipulate and utilize the layout, resources and user interface.						Cognitive Affective		Application Receiving	
CO4	To know about the database in android						Cognitive		Understand	
CO5	Design and test the android environment using exception handling, accessing the cloud data.						Cognitive		Create	
UNIT I		INTRODUCTION							12	
Overview of JAVA Programming – Inheritance – Polymorphism – Android software layers – Android libraries – Components of android application – Application life cycle – Android studio – android project structure – Android manifest file – Structure of manifest file										
Lab: 1. Installing Android 2. Create a simple application										
UNIT II		ANDROID SDK TOOLS AND OTHERS							12	
Android SDK tools – activity – methods to remember – Fragments – views – List vies and list activity – Intents and intent filter – native action										
Lab: 1. Working with fragments 2. Working with Intents and intent filters. 3. Creating contact based application.										
UNIT III		ANDROID LAYOUT, RESOURCES AND UI							12	
Views – Layout – customized view – Resources – themes and style – material design – User interaction – dialogs – Activities – Toasts – menus – context menus – Additional menu – pop up menu										
Lab: 1. Working with views 2. Creating Dialogs and toasts 3. Working with Pop-up Menu										
UNIT IV		ANDROID STORAGE, SQLite and NOTIFICATIONS							12	
Android storage options – File I/O – connecting to the internet – Databases in android – content providers – custom content provider – creating notifications – actions – expandable notification – layouts – priority										
Lab: 1. Quotes provider app 2. SQLite database app 3. Implement notification										
UNIT V		ANDROID ADAVANCED DEVELOPMENT							12	
Exception handling – Location based services – finding your current location using GPS										

Accessing cloud storage – Bluetooth – NFC – managing WiFi – Telephony and SMS.

Lab: 1. Working with exception handling

2. Finding your location using GPS.

3. Bluetooth communication / SMS communication..

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105
REFERENCES:			
1. Professional Android 4 Application Development, 3 <sup>rd</sup> edition, reto meier, wiley publication 2012. 2. Programming Android, 1st Edition, <u>Zigurd Mednieks</u> , <u>Laird Dornin</u> , <u>G. Blake Meike</u> , <u>Masumi Nakamura</u> , Oreilly publications, 2011.			

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO							PSO	
	1	2	3	4	5	6	7	1	2
CO1	2	1	1	1	1	2	1	1	1
CO2	3	2	2	2	2	2	2	2	1
CO3	2	2	2	2	3	2	2	2	1
CO4	3	2	2	2	2	2	2	3	1
CO5	3	3	3	3	3	3	3	3	1
Average	3	2	2	2	2	2	2	2	1

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

XUM902			CYBER SECURITY				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3

**PREREQUESTIE:**

Course Outcome		Domain	Level
After the completion of the course, students will be able to			
CO1	<i>understand</i> the Cyber Security Policy, Laws and Regulations	Cognitive	Remember
CO2	<i>discuss</i> the Cyber Security Management Concepts	Cognitive	Understand
CO3	<i>understand</i> the Cyber Crime and Cyber welfare	Cognitive	Understand
CO4	<i>discuss</i> on issues related to Information Security Concepts	Cognitive	Understand
CO5	<i>understand</i> various security threats	Cognitive	Understand

UNIT I	INTRODUCTION	9
Cyber Security – Cyber Security policy – Domain of Cyber Security Policy – Laws and Regulations – Enterprise Policy – Technology Operations – Technology Configuration - Strategy Versus Policy – Cyber Security Evolution – Productivity – Internet – E commerce – Counter Measures – Challenges		
UNIT II	CYBER SECURITY OBJECTIVES AND GUIDANCE	9
Cyber Security Metrics – Security Management Goals – Counting Vulnerabilities – Security Frameworks – E Commerce Systems – Industrial Control Systems – Personal Mobile Devices – Security Policy Objectives – Guidance for Decision Makers – Tone at the Top – Policy as a Project– Cyber Security Management – Arriving at Goals – Cyber Security Documentation – The Catalog Approach – Catalog Format – Cyber Security Policy Taxonomy.		
UNIT III	CYBER SECURITY POLICY CATALOG	9
Cyber Governance Issues – Net Neutrality – Internet Names and Numbers – Copyright and Trademarks – Email and Messaging - Cyber User Issues - Malvertising - Impersonation – Appropriate Use – Cyber Crime – Geo location – Privacy - Cyber Conflict Issues – Intellectual property Theft – Cyber Espionage – Cyber Sabotage – Cyber Welfare		
UNIT IV	INFORMATION SECURITY CONCEPTS	9
Information Security Overview: Background and Current Scenario - Types of Attacks - Goals for Security - E-commerce Security - Computer Forensics – Steganography		
UNIT V	SECURITY THREATS AND VULNERABILITIES	9
Overview of Security threats -Weak / Strong Passwords and Password Cracking - Insecure		

Network connections - Malicious Code - Programming Bugs - Cyber crime and Cyber terrorism  
- Information Warfare and Surveillance

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

#### REFERENCE BOOKS

1. Jennifer L. Bayuk, J. Healey, P. Rohmeyer, Marcus Sachs , Jeffrey Schmidt, Joseph Weiss “Cyber Security Policy Guidebook” John Wiley & Sons 2012.
2. Rick Howard “Cyber Security Essentials” Auerbach Publications 2011.
3. Richard A. Clarke, Robert Knake “Cyberwar: The Next Threat to National Security & What to Do About It” Ecco 2010
4. Dan Shoemaker Cyber security The Essential Body Of Knowledge, 1st ed. Cengage Learning 2011
5. Rhodes-Ousley, Mark, “Information Security: The Complete Reference”, Second Edition, McGraw-Hill, 2013.

#### E RESOURCES

1. <https://www.coursera.org/specializations/cyber-security>
2. [www.nptel.ac.in](http://www.nptel.ac.in)
3. <http://professional.mit.edu/programs/short-programs/applied-cybersecurity>

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1						2		3				
CO2							2		1			
CO3	3					2	3		1			
CO4										2		
CO5	3											

#### Course Outcome Versus GAs

	GA 1	GA 2	GA 3	GA 4	GA 5	GA 6	GA 7	GA 8	GA 9	GA1 0	GA1 1	GA1 2
Original Value	6					4	5	3	2	2		
Scaled Down	2					1	1	1	1	1		

YSE 906 and YSE 1001 Project Phase -1 and Phase II Course Outcomes (COs) Phase 1: L:T:P:C 0:0:2                      C:P:A = 1:0.5:0.5 Phase II : L:T:P:C 0:0:12                      C:P:A = 6:3:3			
At the end of the course, the students will be able to			
CO	Title	Domain	Level
1	Identify the Engineering Problem relevant to the domain interest.	Cog	Analyze
2	Interpret and Infer Literature survey for its worthiness.	Cog	Analyze, Apply
3	Analyse and identify an appropriate technique for solve the problem.	Cog	Analyze, Apply
4	Perform experimentation /Simulation/Programming/Fabrication, Collect and interpret data.	Psy, Cog	CoR, Create, Apply
5	Record and Report the technical findings as a document.	Cog	Remember, Understand
6	Devote oneself as a responsible member and display as a leader in a team to manage projects.	Aff, Cog	Value, Organization, Create
7	Responding of project findings among the technocrats.	Aff	Responding

#### Mapping of Course Outcomes (COs) with GAs)

##### XEE 707 –Project Phase -1 and XEE 804 Project Phase II

	CO1	CO2	CO3	CO4	CO5	CO6	CO7	Total	
GA1	3	2	1	2	1	-	1	10	2
GA2	3	2	1	2	1	-	1	10	2
GA3	-	-	1	3	1	-	-	5	1
GA4	-	1	2	3	1	2	2	11	3
GA5	-	-	2	3	1	-	-	6	2
GA6	1	-	1	1	-	3	3	10	2
GA7	1		1	1	-	1		4	1
GA8	1	-	1	1	-	3	-	6	2
GA9	-	-	-	-	2	3	1	6	2
GA10	-	-	-	-	3	3	3	9	2
GA11	-				2	2	2	6	2
GA12	1				3	3	1	8	2

1- Low relation

2 – Medium relation

3 – High relation

<b>YSEE51</b>			<b>XML AND WEB SERVICES</b>				<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
							<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>C</b>	<b>P</b>	<b>A</b>					<b>L</b>	<b>T</b>	<b>P</b>	<b>H</b>
<b>3</b>	<b>0</b>	<b>0</b>					<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>PREREQUISITE:</b> Web Technologies										
<b>Course Outcomes</b>							<b>Domain</b>		<b>Level</b>	
After the completion of the course, students will be able to										
<b>CO1</b>	<i><b>Identify</b></i> the importance of XML and Web Services.						Cognitive		Remember	
<b>CO2</b>	<i><b>Interpret</b></i> the understanding on schemas and technologies of XML.						Cognitive		Understand	
<b>CO3</b>	<i><b>Employ</b></i> the suitable protocol for the development of the web services.						Cognitive		Apply	
<b>CO4</b>	<i><b>Outline</b></i> the architecture and technologies of Web Services.						Cognitive		Remember	
<b>CO5</b>	<i><b>Distinguish</b></i> the various methods of the XML Security.						Cognitive		Understand	
<b>UNIT I</b>			<b>INTRODUCTION</b>						<b>9</b>	
Role of XML – XML and the Web – Simple Object Access Protocol – Web Services – Revolutions of XML										
<b>UNIT II</b>			<b>XML TECHNOLOGY</b>						<b>9</b>	
XML – Namespaces – Structuring with Schemas – Presentation Technologies – Transformation – XML Infrastructure Technologies										
<b>UNIT III</b>			<b>SOAP</b>						<b>9</b>	
Overview of SOAP – HTTP – XML-RPC – SOAP Protocol – Message Structure – Intermediaries – Actors – Design Patterns And Faults – SOAP with Attachments										
<b>UNIT IV</b>			<b>WEB SERVICES</b>						<b>9</b>	
Overview – Architecture – Key Technologies - UDDI – WSDL – ebXML – SOAP, Web Services and E-Commerce – Overview Of .NET And J2EE.										
<b>UNIT V</b>			<b>XML SECURITY</b>						<b>9</b>	
Security Overview – Canonicalization – XML Security Framework – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines for Signing XML Documents										
<b>LECTURE</b>			<b>TUTORIAL</b>			<b>PRACTICAL</b>			<b>TOTAL</b>	
<b>45</b>			<b>-</b>			<b>-</b>			<b>45</b>	
<b>REFERENCES:</b>										
1. Frank. P. Coyle, XML, Web Services and the Data Revolution, Pearson Education, 2002. 2. B V Kumar, S V Subrahmanya, Web Services An Introduction, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2004. 3. Gustavo Alonso, Fabio Casati, Harumi Kuno, Vijay Machiraju, Web Services Concepts, Architectures and Applications, Springer, 2004. 4. <a href="http://www.w3schools.com/xml/xml_soap.asp">www.w3schools.com/xml/xml_soap.asp</a>										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

<b>M.Sc. SE</b>	<b>PO</b>								<b>PSO</b>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>1</b>	<b>2</b>
<b>CO1</b>	0	1	1	1	0	1	0	1	1	1
<b>CO2</b>	1	1	2	3	1	1	1	2	2	3
<b>CO3</b>	0	1	3	2	2	0	0	2	3	2
<b>CO4</b>	1	0	2	2	1	1	0	2	2	2
<b>CO5</b>	1	1	2	2	3	1	1	1	2	2
<b>Average</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation



YSEE52			SOFTWARE REUSE				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Software engineering concepts										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Identify the importance of Software Reuse and its components						Cognitive		Remember	
CO2	Interpret the understanding of Design Patterns						Cognitive		Understand	
CO3	Clearly Understand the concepts of Structural Patterns						Cognitive		Understand	
CO4	Identify the various Behavioral Patterns and its functions						Cognitive		Remember	
CO5	Distinguish the various Architectural patterns.						Cognitive		Understand	
UNIT I		INTRODUCTION							9	
Software reuse success factors, Reuse driven software engineering business, Object oriented software engineering, applications and component sub systems, use case components, object components.										
UNIT II		DESIGN PATTERNS							9	
Design Patterns – Introduction, Creational patterns, factory, factory method, abstract factory, singleton, builder prototype.										
UNIT III		STRUCTURAL PATTERNS							9	
Structural Patterns- Adapters, bridge, composite, decorator, façade, flyweight, proxy. Behavioral Patterns – Chain of responsibility, command, interpreter.										
UNIT IV		BEHAVIORAL PATTERNS							9	
Behavioral Patterns – Iterator, mediator, memento, observer, state, strategy, template, visitor, other, design patterns- Whole part, master- slave, view handler, forwarder- receiver, client – dispatcher- server, publisher – subscriber.										
UNIT V		ARCHITECTURAL PATTERNS							9	
Architectural patterns – Layers, pipes and filters, black board, broker, model - view controller ,presentation- abstraction – control, micro kernel, reflection.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			-			-			45	
REFERENCES:										
<ol style="list-style-type: none"> <li>1. Ivar jacobson, Martin Griss, Patrick Hohson – Software Reuse. Architecture, Process and Organization for Business Success, ACM Press, 1997.</li> <li>2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides – Design Patterns- Addison, 1995, Pearson Education.</li> <li>3. Frank Buschmann etc. – Pattern Oriented Software Architecture – Volume 1, Wiley 1996.</li> <li>4. James W Cooper – Java Design Patterns, a tutorial, Addison 2000, Pearson Education.</li> </ol>										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

<b>M.Sc. SE</b>	<b>PO</b>								<b>PSO</b>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>1</b>	<b>2</b>
<b>CO1</b>	2	2	2	2	2	1	1	2	2	2
<b>CO2</b>	2	3	3	3	3	1	1	3	3	3
<b>CO3</b>	2	3	3	3	3	1	1	3	3	3
<b>CO4</b>	2	3	3	3	3	1	1	3	3	3
<b>CO5</b>	2	3	3	3	3	1	1	3	3	3
<b>Average</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSEE53			USER INTERFACE DESIGN				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Basics of windows and Multimedia concepts.										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Identify the importance Graphics Interface.						Cognitive		Remember	
CO2	Interpret the understanding on Graphics Interface with various concepts and techniques.						Cognitive		Understand	
CO3	Understand the windows concepts and Interpret it in projects						Cognitive		Understand	
CO4	Clearly understand the Multimedia components and apply it in projects						Cognitive		Remember, Apply	
CO5	Understand and Distinguish the various Test and Software tools.						Cognitive		Understand	
UNIT I		INTRODUCTION							9	
Human-Computer Interface – Characteristics Of Graphics Interface –Direct Manipulation Graphical System – Web User Interface –Popularity –Characteristic & Principles.										
UNIT II		HUMAN COMPUTER INTERACTION							9	
User Interface Design Process – Obstacles –Usability –Human Characteristics In Design – Human Interaction Speed –Business Functions –Requirement Analysis – Direct – Indirect Methods – Basic Business Functions – Design Standards – System Timings – Human Consideration In Screen Design – Structures Of Menus – Functions Of Menus– Contents Of Menu– Formatting – Phrasing The Menu – Selecting Menu Choice– Navigating Menus– Graphical Menus.										
UNIT III		WINDOWS							9	
Characteristics– Components– Presentation Styles– Types– Managements– Organizations– Operations– Web Systems– Device– Based Controls Characteristics– Screen – Based Controls – Operate Control – Text Boxes– Selection Control– Combination Control– Custom Control– Presentation Control.										
UNIT IV		MULTIMEDIA							9	
Text For Web Pages – Effective Feedback– Guidance & Assistance– Internationalization– Accesssibility– Icons– Image– Multimedia – Coloring.										
UNIT V		WINDOWS LAYOUT– TEST							9	
Prototypes – Kinds Of Tests – Retest – Information Search – Visualization – Hypermedia – WWW– Software Tools.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			-			-			45	
REFERENCES:										
1. Wilbent. O. Galitz ,“The Essential Guide To User Interface Design”, John Wiley&Sons, 2001.										
2. Ben Sheiderman, “Design The User Interface”, Pearson Education, 1998.84										
3. Alan Cooper, “The Essential Of User Interface Design”, Wiley – Dream Tech Ltd.,2002										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

<b>M.Sc. SE</b>	<b>PO</b>								<b>PSO</b>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>1</b>	<b>2</b>
<b>CO1</b>	2	2	2	2	2	1	1	1	1	1
<b>CO2</b>	2	3	3	3	3	1	1	1	1	1
<b>CO3</b>	2	3	3	3	3	1	1	1	1	1
<b>CO4</b>	2	3	3	3	3	1	1	1	1	1
<b>CO5</b>	2	3	3	3	3	1	1	1	1	1
<b>Average</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSEE54			DISASTER MANAGEMENT	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2.75	0	0.25		3	0	0	3
PREREQUISTE:							
Course Outcomes				Domain		Level	
CO1	Understand and Recognize the concepts of disaster			Cognitive		Understand Remember	
CO2	Recognize and describe the causes and effects of disaster			Cognitive		Understand Remember	
CO3	Describe the various approaches of risk reduction			Cognitive		Remember	
CO4	Demonstrate the inter-relationship between disaster and development			Cognitive		Understand	
CO5	Discuss hazard and vulnerability profile of India and respond to drills related to relief			Cognitive Affective		Remember Response	
UNIT - I		INTRODUCTION TO DISASTERS					6
Concepts and definitions- Disaster, Hazard, Vulnerability, Resilience, Risks							
UNIT - II		DISASTERS: CLASSIFICATION, CAUSES, IMPACTS					12
Differential impacts- in terms of caste, class, gender, age, location, disability Global trends in disasters, urban disasters, pandemics, complex emergencies, Climate change							
UNIT - III		APPROACHES TO DISASTER RISK REDUCTION					10
Disaster cycle - its analysis, Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, Centre, and other stake-holders.							
UNIT - IV		INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT					6
Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources							
UNIT - V		DISASTER RISK MANAGEMENT IN INDIA					11
Hazard and Vulnerability profile of India Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programmes and legislation).							
The project / fieldwork to understand vulnerabilities, work on reduction of disaster risk and build a cultural safety.							
LECTURE		TUTORIAL		PRACTICAL		TOTAL	
				45		45	

**TEXT BOOKS:**

1. Coppola P Damon, "Introduction to International Disaster Management, Butterworth-Heinemann, 2015
2. K. N. Shastri, "Disaster Management in India", Pinnacle Technology, 2012
3. Gupta Anil K, Sreeja S. Nair, "Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Lee Allyn Davis, "Natural Disasters", Infobase Publishing, 2010
5. Andharia J, "Vulnerability in Disaster Discourse", JTCDM, Tata Institute of Social Sciences Working Paper no. 8, 2008

**REFERENCES:**

1. Alexander David, Introduction in 'Confronting Catastrophe', Oxford University Press, 2000
2. Carter, Nick 1991. Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.

**WEB SITES AND WEB RESOURCES:**

1. NIDM Publications at <http://nidm.gov.in>- Official Website of National
2. Institute of Disaster Management (NIDM), Ministry of Home Affairs,
3. <http://cwc.gov.in> , <http://ekdrm.net> , <http://www.emdat.be> ,
4. <http://www.nws.noaa.gov> , <http://pubs.usgs.gov> , <http://nidm.gov.in>
5. <http://www.imd.gov.in>

**Table 1: Mapping of CO with GA**

Course outcomes	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	1					3	2	1				1
CO2	1					3	2	1				1
CO3	1					3	2	1				1
CO4	1					3	2	1				1
CO5	1					3	2	1				1
Total	5					15	10	5				5
Scaled	1					3	2	1				1

YSEE55			SOFTWARE RELIABILITY				L	T	P	C
							3	0	0	3
							L	T	P	H
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Software Engineering										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the significance of Software Reliability.						Cognitive		Remember	
CO2	Express the knowledge on SDLC						Cognitive		Understand	
CO3	Estimate the understanding of Software Quality Management.						Cognitive		Apply	
CO4	Recognize the significance of Software Reliability Tools						Cognitive		Remember	
CO5	Express the knowledge on Software testing.						Cognitive		Understand	
UNIT I		INTRODUCTION TO SOFTWARE RELIABILITY							9	
Software Reliability Definitions - software disasters - Errors - faults - failures - different views of software reliability – software requirements specification - Causes of unreliability in software - Dependable systems: reliable, safe, secure, maintainable, and available - Software maintenance										
UNIT II		SOFTWARE RELIABILITY IMPROVEMENT							9	
The phases of a Software Project - Monitoring the development process – The software life cycle models - software engineering - Structured Analysis and structured Design - Fault tolerance - inspection - Software cost and schedule.										
UNIT III		SOFTWARE QUALITY MANAGEMENT							9	
Software quality modeling - Diverse approaches and sources of information - Fault avoidance, removal and tolerance - Process maturity levels (CMM) - Software quality assurance (SQA) - Monitoring the quality of software - Total quality management (TQA) - Measuring Software Reliability - The statistical approach - Software reliability metrics.										
UNIT IV		SOFTWARE RELIABILITY TECHNIQUES AND TOOLS							9	
Data Trends - Complete prediction Systems - overview of some software reliability models - The recalibration of the models - Analysis of model accuracy - Reliability growth models and trend analysis - Software Costs Models - Super models										
UNIT V		SOFTWARE RELIABILITY ENGINEERING PRACTICE							9	
Testing and maintaining more reliable software –logical testing – functional testing – algorithm testing – regression testing - fault tree analysis – failure mode effects and critical analysis – reusability - case studies										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			0			0			45	
REFERENCES:										
1. J.D. Musa, A. Iannino and K.Okumoto, Software Reliability, Measurement, Prediction, Application, McGraw Hill, 1990.										
2. J.D. Musa, Software Reliability Engineering, McGraw Hill, 1998.										
3. Michael R. Lyer, Handbook of Software Reliability Engineering, McGraw Hill, 1995.Xie,										
4. Software Reliability Modelling, World Scientific, London, 1991.										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

<b>M.Sc. SE</b>	<b>PO</b>								<b>PSO</b>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>1</b>	<b>2</b>
<b>CO1</b>	0	1	1	1	1	0	0	1	1	1
<b>CO2</b>	1	3	2	0	0	1	1	1	2	2
<b>CO3</b>	0	2	1	1	1	0	0	1	2	2
<b>CO4</b>	1	1	1	1	0	2	2	1	2	2
<b>CO5</b>	0	2	2	0	0	2	2	2	3	3
<b>Average</b>	0	2	2	1	0	1	1	1	2	2

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation



YSEE61			NETWORK PROTOCOLS				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3

**PREREQUISITE:** Computer Network

After the completion of the course, students will be able to

CO1	<i>Recognize</i> the foundations of Internet Protocol.	Cognitive	Remember
CO2	<i>Demonstrate</i> the idea of bootstrap and auto configuration.	Cognitive	Understand
CO3	<i>Analyze</i> the functions of file transfer protocol.	Cognitive	Analyze
CO4	<i>Manipulate</i> the issues involved in design of voice and video over IP.	Psychomotor	Guided Response
CO5	<i>Control</i> and <i>maintain</i> the internet security and firewall design.	Psychomotor	Complete overt response

<b>UNIT I</b>		<b>INTRODUCTION</b>		<b>9</b>
Internet Protocol : Routing IP Datagrams – Error and Control Messages (ICMP), Reliable Stream Transport Service (TCP) : TCP State Machine, Response to congestion – congestion, Tail Drop and TCP – Random Early Discard, Routing : Exterior Gateway Protocols and Autonomous Systems (BGP)				
<b>UNIT II</b>		<b>INTERNET MULTICASTING</b>		<b>9</b>
Internet Multicasting – Mobile IP – Bootstrap And Auto configuration (BOOTP, DHCP).				
<b>UNIT III</b>		<b>FILE TRANSFER SYSTEM</b>		<b>9</b>
The Domain Name System (DNS) – Applications : Remote Login (TELNET, Rlogin) – File Transfer and Access (FTP, TFTP, NFS).				
<b>UNIT IV</b>		<b>APPLICATIONS</b>		<b>9</b>
Applications: Electronic Mail (SMTP, POP, IMAP, MIME) – World Wide Web (HTTP) – Voice and Video over IP (RTP).				
<b>UNIT V</b>		<b>SECURITY</b>		<b>9</b>
Applications : Internet Management (SNMP) – Internet Security and Firewall Design (Ipsec) – The Future of TCP / IP (IPV6).				
<b>LECTURE</b>		<b>TUTORIAL</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
<b>45</b>		<b>-</b>	<b>-</b>	<b>45</b>

**REFERENCES:**

1. Douglas E.Comer, “Internetworking with TCP / IP – Principles, Protocols and Architectures, Fourth Edition, Prentice – Hall of India, Delhi, 2002.
2. Uyless Black, ‘Computer Networks – Protocols, Standards and Interfaces”, Second Edition, Prentice – Hall of India, Delhi, 2002.
3. Udupa, “Network Management System essentials”, McGraw Hill, 1999.

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

<b>M.Sc. SE</b>	<b>PO</b>								<b>PSO</b>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>1</b>	<b>2</b>
<b>CO1</b>	1	2	2	2	1	1	1	2	1	1
<b>CO2</b>	1	2	2	1	1	1	1	2	2	1
<b>CO3</b>	1	2	2	2	2	2	1	1	2	1
<b>CO4</b>	1	2	2	2	2	1	1	2	2	1
<b>CO5</b>	1	2	2	2	2	1	1	2	2	1
<b>Average</b>	1	2	2	2	2	1	1	2	2	1

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No Correlation

YSEE62			CLIENT SERVER COMPUTING			I	T	P	C
						3	0	0	3
						I	T	P	H
C	P	A				I	T	P	H
3	0	0				3	0	0	3
PREREQUISITE: Fundamentals of computing and Computer Networks									
Course Outcomes						Domain		Level	
After the completion of the course, students will be able to									
CO1	Understand the basics of client server computing					Cognitive		Remember	
CO2	Identify Client server architecture, elements and components of computer system. Analysis the performance of computer and efficiency of internal elements.					Cognitive		Knowledge Analysis	
CO3	Analyze the Database connectivity and support required for Client server system					Cognitive		Analysis	
CO4	recognize the application of client server computing using Visual C++.					Cognitive		Knowledge Analysis	
CO5	associate with Multiple document interface.					Cognitive		Comprehension	
UNIT I		Introduction					9		
Basic concepts of Client / Server – Upsizing Downsizing – Right sizing – Characteristics – File server – Database servers – Transactions servers – Groupware servers – Object Client/Servers – Web Servers – Middleware. Client / Server building blocks – Operating System services – Base services – External services – server scalability – Remote procedure calls – Multiservers.									
UNIT II		SERVER ARCHITECTURE					9		
SQL Database servers – server architecture – Multithread architecture – Hybrid architecture – stored Procedures – Triggers – Rules – Client / Server Transaction Processing – Transaction models – Chained and nested transactions – Transaction processing monitors – Transaction Management Standards.									
UNIT III		DATABASE CONNECTIVITY					9		
Database Connectivity solutions : ODBC – The need for Database connectivity – Design overview of ODBC – Architecture – components – Applications – Driver Managers – Drivers – Data sources – ODBC 2.5 and ODBC 3.0.									
UNIT IV		VISUAL C++					9		
Visual C++: The Windows Programming Model – GDI – resource based programming – DLL and OLE Applications – Visual C++ components – frame work / MFC class Library – basic event handling – SDI – Appwizard – ClassWizard – Model and Models dialogues – other controls – Examples.									
UNIT V		MDI					9		
Multiple Document Interface – Data Management with Microsoft ODBC – OLE client – OLE server – Client / Server Data Exchange format – Dynamic Data Exchange.									
LECTURE			TUTORIAL			PRACTICAL		TOTAL	
45			-			-		45	
REFERENCES:									
1. Robert Orfali, Dan Harkey and Jerri Edwards, Essential Client / Server Survival Guide, John Wiley and sons Inc. 1998.									
2. David J. Kruglinski, Inside Visual C++, Microsoft Press 1992.									

3. Boar, B.H., Implementing Client / Server Computing ; A Strategic Perspectre, McGraw Hill, 1993.
4. Bouce Elbert, Client / Server Computing, Artech. Press, 1994.
5. Alex Berson, Client / Server Architecture, McGraw Hill, 1996.

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	1	1	2	1	1	1	1	2	2	1
<b>CO2</b>	1	2	1	1	1	1	1	2	2	1
<b>CO3</b>	1	1	2	1	1	1	1	2	2	1
<b>CO4</b>	1	2	1	1	1	1	1	2	1	1
<b>CO5</b>	1	1	3	2	1	1	2	2	1	1
<b>Average</b>	1	1	2	1	1	1	1	2	2	1

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSEE63			WIRELESS SENSOR NETWORK				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Computer Networks										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Understand the basics of wireless sensor network.						Cognitive		Understand	
CO2	Demonstrate the idea behind in physical layer issues, medium Access control Protocols						Cognitive		Understand	
CO3	Analyze the network layer characteristics and protocols						Cognitive		Analyze	
CO4	Indicate the transport layer issues and protocols.						Cognitive		Understand	
CO5	Control and maintain the network management and Middleware services						Psychomotor		Complete overt response	
UNIT I		INTRODUCTION								9
Introduction to wireless sensor networks - Challenges and Constraints - Application of sensor networks – Node architecture - Operating System - Fundamental aspects.										
UNIT II		PHYSICAL LAYER AND MEDIUM ACCESS LAYER								9
Basic architectural framework – Physical layer – source encoding –channel encoding – modulation – Medium access control - Wireless MAC protocols – Characteristics of MAC protocols in sensor networks – Contention free MAC protocols - traffic adaptive medium access - Low-Energy Adaptive Clustering Hierarchy – Contention based protocols - Power Aware Multi-Access with Signaling – Data-Gathering MAC - Receiver-Initiated MAC.										
UNIT III		NETWORK LAYER AND TRANSPORT LAYER								9
Routing metrics – Data centric Routing - Proactive routing – OLSR – Reactive Routing – AODV – Location Base Routing - Traditional Transport Control Protocols - TCP (RFC 793) - UDP (RFC 768) - Mobile IP - Feasibility of Using TCP or UDP for WSNs – Transport Protocol Design Issues – Examples of Existing Transport Control Protocols- CODA (Congestion Detection and Avoidance).										
UNIT IV		NETWORK MANAGEMENT								9
Power Management - Local Power Management Aspects - Processor Subsystem – Communication Subsystem – Active Memory - Power Subsystem - Dynamic Power Management - Dynamic Operation Modes – Time Synchronization – Clocks and the Synchronization Problem – Time Synchronization in Wireless Sensor Networks - Reasons for Time Synchronization - Challenges for Time Synchronization.										
UNIT V		BASICS OF TIME SYNCHRONIZATION								9
Synchronization Messages - Non determinism of Communication Latency -Time Synchronization Protocols – Lightweight Tree - Based Synchronization - Timing-sync Protocol for Sensor Networks Localization - Ranging Techniques - Time of Arrival - Time Difference of Arrival - Angle of Arrival – Received Signal Strength - Range - Based Localization - Triangulation - Range- Free Localization – Ad Hoc Positioning System.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			-			-			45	
REFERENCES:										
1. Dr.Xerenium, Shen, Dr. Yi Pan , “Fundamentals of Wireless Sensor Networks, Theory and Practice”,Wiley Series on wireless Communication and Mobile Computing, 1st Edition, 2010.										
2. Kazem Sohraby, Daniel Manoli, “Wireless Sensor networks- Technology, Protocols and Applications”. Wiley Inter Science Publications, 2007.										

3. Bhaskar Krishnamachari , “*Networking Wireless Sensors*”, Cambridgeuniversity press, 2005.

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	1	2	2	2	2	1	1	2	2	1
<b>CO2</b>	1	2	3	3	3	1	1	3	3	1
<b>CO3</b>	1	3	2	2	3	1	1	2	3	1
<b>CO4</b>	1	3	2	3	3	1	1	3	3	1
<b>CO5</b>	1	2	3	3	3	1	1	3	2	1

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No Correlation

YSEE64			PERVASIVE COMPUTING				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Computer Networks										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Understand the basics of pervasive computing						Cognitive		Understand	
CO2	Design web based applications using XML, WAP and WML						Cognitive		Create	
CO3	Apply the pervasive computing techniques for speech based applications						Cognitive		Apply	
CO4	Describe the PDA characteristics and standards						Cognitive		Understand	
CO5	Analyze the issues in the pervasive computing						Cognitive		Analyze	
UNIT I			INTROCUCTION					9		
Pervasive Computing Application - Pervasive Computing devices and Interfaces -Device technology trends, Connecting issues and protocols										
UNIT II			WEB BASED APPLICATIONS					9		
Pervasive Computing and web based Applications - XML and its role in Pervasive Computing - Wireless Application Protocol (WAP) Architecture and Security – Wireless Mark-Up language (WML) – Introduction										
UNIT III			SPEECH APPLICATIONS					9		
Voice Enabling Pervasive Computing - Voice Standards - Speech Applications in Pervasive Computing and security										
UNIT IV			PDA STANDARDS					9		
PDA in Pervasive Computing – Introduction - PDA software Components, Standards, emerging trends - PDA Device characteristics - PDA Based Access Architecture										
UNIT V			APPLICATIONS					9		
User Interface Issues in Pervasive Computing, Architecture - Smart Card- based Authentication Mechanisms - Wearable computing Architecture										
LECTURE			TUTORIAL			PRACTICAL		TOTAL		
45			-			-		45		
REFERENCES:										
1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec & Klaus Rindtorff. Pervasive Computing Technology and Architecture of Mobile Internet Applications, Addison Wesley, Reading, 2012.										
2. Uwe Ha nsman, Lothat Merk, Martin S Nicklous & Thomas Stober: Principles of Mobile Computing, Springer- Verlag, New Delhi, 2011.										
3. Rahul Banerjee: Internetworking Technologies: An Engineering Perspective, Prentice –Hall of India, New Delhi, 2003. (ISBN 81-203-2185-5)										
4. Rahul Banerjee: Lecture Notes in Pervasive Computing, Outline Notes,										

BITS-Pilani, 2003.

5. <https://www.youtube.com/watch?v=bS6XqjBO99Q>

6. [seminarprojects.com/.../npTEL-lecture-notes-for-mobile-and-pervasive-computing](https://seminarprojects.com/.../npTEL-lecture-notes-for-mobile-and-pervasive-computing)

7. <https://www.csd.cs.cmu.edu/research.../mobile-and-pervasive-computing>

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	1	1	2	1	1	1	2	2	2	1
<b>CO2</b>	1	2	1	2	1	2	2	1	2	1
<b>CO3</b>	1	2	2	1	1	1	2	2	2	1
<b>CO4</b>	1	2	1	1	1	2	1	1	1	1
<b>CO5</b>	1	1	3	2	1	2	2	2	1	1
<b>Average</b>	1	2	2	2	1	2	2	2	1	1

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No relation



YSEE65			MOBILE AD HOC NETWORKS				L	T	P	C
							3	0	0	3
							L	T	P	H
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Computer Networks										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Define the scenario of Mobile Ad hoc Networks in the world of Computer Networks.						Cognitive		Remember	
CO2	Classify the design issues and goals of MAC Protocols.						Cognitive		Understand	
CO3	Distinguish the Routing Protocols in the MANET.						Cognitive		Understand	
CO4	Compare the classifications of Multicast Protocols.						Cognitive		Analyze	
CO5	Demonstrate the recent trends in the Wireless Networks.						Cognitive		Apply	
UNIT I			INTRODUCTION						9	
Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio Propagation Mechanisms – Characteristics of the Wireless Channel – Modulation Techniques – Multiple Access Techniques – Ad hoc Wireless Networks										
UNIT II			MAC PROTOCOLS						9	
Introduction – Issues in designing a MAC Protocol – Design Goals – Classifications – Contention based protocols – with Reservation Mechanisms – with Scheduling Mechanisms										
UNIT III			ROUTING PROTOCOLS						9	
Introduction - Issues in designing a Routing Protocol – Classifications – Table Driven Routing Protocols – On-Demand Routing Protocols – Hybrid Routing Protocols										
UNIT IV			MULTICAST ROUTING						9	
Introduction - Issues in designing a Multicast Routing Protocol – Classifications – Tree-Based Multicast Routing Protocols - Mesh-Based Multicast Routing Protocols										
UNIT V			RECENT ADVANCES IN WIRELESS NETWORKS						9	
Introduction – Ultra-Wide-Band Radio Communication – Wireless Fidelity Systems – Optical Wireless Networks – The Multimode 802.11 – IEEE 802.11a/b/g										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			-			-			45	
REFERENCES:										
1. C. Siva Ram Murthy and B. S. Manoj, Ad hoc Wireless Networks Architectures and protocols, Pearson Education, 2004.										
2. Charles E. Perkins, Ad hoc Networking, Pearson Education, 2001.										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

<b>M.Sc. SE</b>	<b>PO</b>								<b>PSO</b>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>1</b>	<b>2</b>
<b>CO1</b>	2	0	1	1	2	1	0	1	0	0
<b>CO2</b>	1	2	2	2	1	0	1	2	1	0
<b>CO3</b>	1	1	2	1	1	1	1	2	1	0
<b>CO4</b>	0	1	2	2	1	1	0	2	2	0
<b>CO5</b>	1	1	1	1	2	1	1	3	1	0
<b>Average</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>0</b>

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSEE81			INTERNET OF THINGS				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2.5	0.5	0					3	0	0	3
PREREQUISITE: Computer Networks										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Identify the components of IOT and learn the basic issues, policy and challenges in the Internet						Cognitive Psychomotor		Remember Perception	
CO2	Design the portable device , program the sensors and microcontrollers						Cognitive		Create	
CO3	Perceive the significance of building the software agents in the real time environments						Cognitive Psychomotor		Create Perception	
CO4	Formulate and Establish the cloud based communication through wifi/ Bluetooth						Cognitive Psychomotor		Create Set	
CO5	Combine the needed internet resources and implement in the business model						Cognitive		Analyze	
UNIT I			INTRODUCTION						9	
Definition – phases – Foundations – Policy– Challenges and Issues - identification - security – privacy. Components in internet of things: Control Units – Sensors – Communication modules – Power Sources – Communication Technologies – RFID – Bluetooth – Zigbee – Wifi – Rflinks – Mobile Internet – Wired Communication										
UNIT II			PROGRAMMING THE MICROCONTROLLER FOR IOT						9	
Basics of Sensors and actuators – examples and working principles of sensors and actuators – Cloud computing and IOT – Arduino/Equivalent Microcontroller platform – Setting up the board - Programming for IOT – Reading from Sensors Communication: Connecting microcontroller with mobile devices – communication through bluetooth and USB – connection with the internet using wifi / ethernet										
UNIT III			IOT PROTOCOLS						9	
Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus – KNX – Zigbee Architecture – Network layer – APS layer – Security										
UNIT IV			WEB OF THINGS						9	
Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and Cloud Computing – Cloud Middleware – Cloud Standards – Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture										
UNIT V			INTERNET OF EVERYTHING						9	
Differences Internet of Things and Internet of Everything – IoE at a glance –Internet of Everything: Data, Networks and opportunities-Application - IoE for cities connecting people, process and data										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45									45	
REFERENCES:										
1. Charalampos Doukas , Building Internet of Things with the Arduino, Create space, April 2002										

2. Dieter Uckelmann et.al, “Architecting the Internet of Things”, Springer, 2011
3. Luigi Atzori et.al, “The Internet of Things: A survey, “, Journal on Networks, Elsevier Publications, October, 2010
4. Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles- (Eds.) – Springer – 2011
5. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press - 2010 4.
- 6.The Internet of Things: Applications to the Smart Grid and Building Automation by - Olivier Hersent, Omar Elloumi and David Boswarthick - Wiley -2012
7. Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key applications and Protocols”, Wiley, 2012
8. <http://postscapes.com/>
9. <http://www.theinternetofthings.eu/what-is-the-internet-of-things>

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	1	2	2	1	1	0	0	1	1	2
<b>CO2</b>	1	3	1	2	2	0	1	2	2	2
<b>CO3</b>	0	3	1	2	2	1	1	2	2	2
<b>CO4</b>	0	3	0	2	2	0	1	2	2	2
<b>CO5</b>	0	3	2	1	3	1	1	2	3	2
<b>Average</b>	1	2	1	2	2	1	1	2	2	2

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSEE82			CLOUD COMPUTING				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2.5	0.5	0					3	0	0	3
PREREQUISITE: Computer Networks										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the importance of cloud computing behind all communications and day to day life activities.						Cognitive Psychomotor	Remember Perception		
CO2	Express the functionalities of each cloud services and aware of the various cloud service providers						Cognitive	Understand		
CO3	Employ the understanding of the various scheduling activities and actively participate in terms for the creation of various cloud services.						Cognitive	Apply Respond		
CO4	Utilize the cloud services tools effectively in the real world applications.						Cognitive	Apply		
CO5	Design and Establish the cloud services and cloud storage						Cognitive Psychomotor	Create Set		
UNIT I			UNDERSTANDING CLOUD COMPUTING					9		
Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Need for Cloud Computing – Advantages and Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services.										
UNIT II			DEVELOPING CLOUD SERVICES					9		
Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine –IBM Clouds										
UNIT III			USING CLOUD SERVICES					9		
Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing – Collaborating on Databases – Storing and Sharing Files.										
UNIT IV			OUTSIDE THE CLOUD					9		
Evaluating Web Mail Services – Evaluating Instant Messaging – Evaluating Web Conference Tools– Creating Groups on Social Networks – Evaluating on Line Groupware – Collaborating via Blogs and Wikis										
UNIT V			STORING AND SHARING					9		
Understanding Cloud Storage – Evaluating on Line File Storage – Exploring on Line Book Marking Services – Exploring on Line Photo Editing Applications – Exploring Photo Sharing Communities– Controlling it with Web Based Desktops.										
LECTURE			TUTORIAL			PRACTICAL		TOTAL		
45			--			--		45		

<b>REFERENCES:</b>		
1. Michael Miller, —Cloud Computing, Pearson Education, New Delhi, 2009. 2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008. 3. <a href="http://www.cloudbus.org/cloudsim">www.cloudbus.org/cloudsim</a> 4. <a href="https://cloudacademy.com">https://cloudacademy.com</a>		

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	2	2	2	2	2	1	1	2	2	2
<b>CO2</b>	2	3	3	3	3	1	1	3	3	2
<b>CO3</b>	2	3	3	3	3	1	1	3	3	2
<b>CO4</b>	2	3	3	3	3	1	1	3	3	2
<b>CO5</b>	2	3	3	3	3	1	1	3	3	2
<b>Average</b>	2	3	3	3	3	1	1	3	3	2

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No Correlation

YSEE83			DISTRIBUTED COMPUTING				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Computer Network										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the foundations of Distributed Systems.						Cognitive		Remember	
CO2	Demonstrate the idea of middleware and related issues.						Cognitive		Understand	
CO3	Analyze the system levels and support required for distributed system						Cognitive		Analyze	
CO4	Describe the synchronization and replication						Cognitive		Remember	
CO5	Determine the issues involved in design of distributed algorithms.						Cognitive		Evaluate	
UNIT I		INTRODUCTION							9	
Introduction – Examples of Distributed Systems–Trends in Distributed Systems – Focus on resource sharing – Challenges. <b>Case study:</b> World Wide Web.										
UNIT II		COMMUNICATION IN DISTRIBUTED SYSTEM							9	
System Model – Inter process Communication - the API for internet protocols – External data representation and Multicast communication. <b>Network virtualization:</b> Overlay networks. <b>Case study:</b> MPI										
UNIT III		REMOTE METHOD INVOCATION AND OBJECTS							9	
Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation. <b>Case study:</b> Java RMI - Group communication - Publish-subscribe systems - Message queues – Shared memory approaches -Distributed objects - Case study: CORBA -from objects to components.										
UNIT IV		PEER TO PEER SERVICES AND FILE SYSTEM							9	
Peer-to-peer Systems – Introduction - Napster and its legacy - Peer-to-peer –Middleware - Routing overlays. <b>Overlay case studies:</b> Pastry, Tapestry- Distributed File Systems –Introduction - File service architecture – Andrew File system.										
UNIT V		SYNCHRONIZATION AND REPLICATION							9	
Introduction - Clocks, events and process states - Synchronizing physical clocks - Logical time and logical clocks - Global states – Coordination and Agreement – Introduction - Distributed mutual exclusion – Elections – Transactions and Concurrency Control– Transactions -Nested transactions – Locks – Optimistic concurrency control - Timestamp ordering -Distributed deadlocks – Replication – Case study – Coda.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			-			-			45	
REFERENCES:										
<ol style="list-style-type: none"> <li>George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design” Fifth edition – 2011- Addison Wesley.</li> <li>Tanenbaum A.S., Van Steen M., “ Distributed Systems: Principles and Paradigms” , Pearson Education ,2007.</li> <li>Liu M.L., “Distributed Computing, Principles and Applications”, Pearson and education, 2004.</li> </ol>										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

<b>M.Sc. SE</b>	<b>PO</b>								<b>PSO</b>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>1</b>	<b>2</b>
<b>CO1</b>	2	1	1	1	1	1	1	1	1	1
<b>CO2</b>	1	2	1	1	1	1	1	1	1	1
<b>CO3</b>	2	1	1	1	1	1	1	0	0	1
<b>CO4</b>	1	1	1	1	0	0	1	0	0	0
<b>CO5</b>	1	1	1	1	1	1	0	0	1	1
<b>Average</b>	1	1	1	1	1	1	1	0	1	1

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation



YSEE84			ADVANCED DATABASE MANAGEMENT SYSTEM				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Database Management System										
Course Outcomes						Domain		Level		
After the completion of the course, students will be able to										
CO1	Recognize the basics architectures and distributed database concepts.					Cognitive		Remember		
CO2	Demonstrate features of relational and object oriented database.					Cognitive		Understand		
CO3	Analyze the different database and implement spatial database					Cognitive		Analyze		
CO4	Differentiate various data models					Cognitive		Analyze		
CO5	Examine the cloud database and Big data storage analytics					Cognitive		Analyze		
UNIT I		PARALLEL AND DISTRIBUTED DATABASES						9		
Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Design of Parallel Systems- Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Case Studies.										
UNIT II		OBJECT AND OBJECT RELATIONAL DATABASES						9		
Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems: Object Relational features in SQL/Oracle – Case Studies.										
UNIT III		INTELLIGENT DATABASES						9		
Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- Taxonomy- Applications- Design Principles for Active Rules- Temporal Databases: Overview of Temporal Databases- TSQL2- Deductive Databases: Logic of Query Languages – Datalog- Recursive Rules- Syntax and Semantics of Datalog Languages- Implementation of Rules and Recursion- Recursive Queries in SQL- Spatial Databases- Spatial Data Types- Spatial Relationships- Spatial Data Structures-Spatial Access Methods- Spatial DB Implementation.										
UNIT IV		ADVANCED DATA MODELS						9		
Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Multimedia Databases- Information Retrieval- Data Warehousing- Data Mining- Text Mining.										
UNIT V		EMERGING TECHNOLOGIES						9		
XML Databases: XML-Related Technologies-XML Schema- XML Query Languages- Storing XML in Databases-XML and SQL- Native XML Databases- Web Databases- Geographic Information Systems- Biological Data Management- Cloud Based Databases: Data Storage Systems on the Cloud- Cloud Storage Architectures-Cloud Data Models- Query Languages- Introduction to Big Data-Storage-Analysis.										
LECTURE		TUTORIAL			PRACTICAL			TOTAL		
45		0			0			45		

**REFERENCES:**

1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education, 2007.
3. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", Fifth Edition, McGraw Hill, 2006.
4. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
5. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, Third Edition 2004
6. Abraham Silberschatz, Henry F.Korth and S.Sudarshan, "Database System Concepts", Fourth Edition, McGraw Hill, 2002.
7. Ramez Elmasri and Shamkant B.Navathe, "Fundamentals of Database Systems", Pearson Education Delhi, 2002.

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	1	1	1	1	2	1	1	0	0	1
CO2	1	1	1	1	1	1	1	0	1	1
CO3	1	1	1	1	1	1	1	1	0	1
CO4	1	1	1	1	1	1	1	1	0	1
CO5	1	1	1	1	1	1	1	1	1	3
Average	1	1	1	1	1	1	1	1	0	1

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSEE85			ADVANCED COMPUTER ARCHITECTURE				I	T	P	C				
							3	0	0	3				
C	P	A									I	T	P	H
3	0	0									3	0	0	3
PREREQUISITE:														
1. Fundamentals of computing and Programming														
2. Computer organization and architecture														
3. Microprocessor and Microcontroller														
Course Outcomes						Domain		Level						
After the completion of the course, students will be able to														
CO1	Understand the basic and advanced level of architecture and elements of computer system					Cognitive		Remember						
CO2	Analysis the performance of computer and efficiency of internal elements.					Cognitive		Analysis						
CO3	identify multiprocessor architecture, elements and components of computer system.					Cognitive		Knowledge Analysis						
CO4	recognize the application of microprocessor in different applications.					Cognitive		Knowledge Analysis						
CO5	associate with modern architecture.					Cognitive		Comprehension						
UNIT I		COMPUTER ORGANIZATION						9						
Basic concepts of computer organization, stored program model, Classes of computer architecture, Processor vs. System architecture, Elements of computer systems – processors, memories, I/Os, disks, buses														
UNIT II		PERFORMANCE ANALYSIS OF COMPUTER ARCHITECTURE						9						
Goals of computer architecture – performance, throughput, latency, power, cost. Processor performance vs. system performance, Comparison of various platforms in terms of performance and efficiency internal elements and architecture of processors, Instruction execution, Instruction set architectures, CISC vs. RISC architectures.														
UNIT III		MULTIPROCESSOR ARCHITECTURE						9						
Bus architecture, Multi Processor architecture, Memories and Caches, Cache coherency, Pipelining and data path elements System architecture elements, H/W component selection and datasheet analysis, Bill of Materials, IP selection and System on Chip integration, Standard interfaces and I/Os, Analog and Mixed signal element integration. Reset and clocking elements														
UNIT IV		APPLICATION OF MULTIPROCESSOR						9						
Multi processor system Application specific processors, Packet processing, Microcontrollers, Network controllers, DSP and Multimedia processors, GPU elements.														
UNIT V		MODERN ARCHITECTURES						9						
An overview of the latest Intel, ARM, TI, SPARC and Power PC architectures as modern SOC architectural elements														
LECTURE			TUTORIAL			PRACTICAL		TOTAL						
45			-			-		45						
REFERENCES:														
1. V.C. Hamacher,Z.G.Vranesic, S.G. Zaky. “Computer Organization”. 5th Edition. “Peter”														
2. David A. Patterson and John L. Hennessy.														
3. Computer Organization and Design, Revised Printing, Third Edition, Andrew S. Tanenbaum.														

Structured Computer Organization Prentice Hall; 5th Edition. 2005. 800p.

4. W. Stallings. "Computer Organization and Architecture. Designing and Performance". 7<sup>th</sup> Edition. Prentice Hall. 2005.
5. J.L. Hennessy, D.A. Patterson. "Computer architecture: A Quantitative Approach", 4th Edition. Morgan Kaufmann, 2006.

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	1	1	2	1	1	1	1	2	2	1
<b>CO2</b>	1	2	1	1	1	1	1	2	2	1
<b>CO3</b>	1	1	2	1	1	1	1	2	2	1
<b>CO4</b>	1	2	1	1	1	1	1	2	1	1
<b>CO5</b>	1	1	3	2	1	1	2	2	1	1
<b>Average</b>	1	1	2	1	1	1	1	2	2	1

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSEE91			ENTERPRISE RESOURCE PLANNING				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Computer fundamentals and DBMS										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Identify the factors that lead to the development and implementation of ERP systems						Cognitive		Remember	
CO2	Discuss the advantages and disadvantages of implementing an ERP system						Cognitive		Understand	
CO3	Describe how an integrated information system can support effective and efficient business processes						Cognitive		Understand	
CO4	Create process models that assist with process improvement and ERP implementation						Cognitive		Create	
CO5	Study, analyze and Report future trends of ERP						Cognitive		Analyze	
UNIT I		ERP AND TECHNOLOGY							9	
Introduction – Related Technologies – Business Intelligence – E-Commerce and E-Business – Business Process Reengineering – Data Warehousing – Data Mining – OLAP – Product life Cycle management – SCM – CRM										
UNIT II		ERP IMPLEMENTATION							9	
Implementation Challenges – Strategies – Life Cycle – Pre-implementation Tasks – Requirements Definition – Methodologies – Package selection – Project Teams – Process Definitions – Vendors and Consultants – Data Migration – Project management – Post Implementation Activities.										
UNIT III		ERP IN ACTION AND BUSINESS MODULES							9	
Operation and Maintenance – Performance – Maximizing the ERP System – Business Modules – Finance – Manufacturing – Human Resources – Plant maintenance – Materials Management – Quality management – Marketing – Sales, Distribution and service.										
UNIT IV		ERP MARKET							9	
Marketplace – Dynamics – SAP AG – Oracle – PeopleSoft – JD Edwards – QAD Inc – SSA Global – Lawson Software – Epicor – Intuitive.										
UNIT V		FUTURE TRENDS							9	
Enterprise Application Integration – ERP and E-Business – ERP II – Total quality management – Future Directions – Trends in ERP.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45									45	
REFERENCES:										
1. Alexis Leon, “ERP DEMYSTIFIED”, Tata McGraw Hill, Second Edition, 2008. 2. Mary Sumner, “Enterprise Resource Planning”, Pearson Education, 2007. 3. Jim Mazzullo,”SAP R/3 for Everyone”, Pearson,2007 4. Jose Antonio Fernandz, “ The SAP R /3 Handbook”, Tata McGraw Hill, 1998. 5. Biao Fu, “SAP BW: A Step-by-Step Guide”, First Edition, Pearson Education, 2003. 6. <a href="http://www.netsuite.com/portal/products/netsuite/erp.shtm">www.netsuite.com/portal/products/netsuite/erp.shtm</a> 7. <a href="http://go.sap.com/product/enterprise-management/erp.html">go.sap.com/product/enterprise-management/erp.html</a> 8. <a href="http://www.epicor.com/solutions/erp.aspx">www.epicor.com/solutions/erp.aspx</a>										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

<b>M.Sc. SE</b>	<b>PO</b>								<b>PSO</b>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>1</b>	<b>2</b>
<b>CO1</b>	2	1	2	1	2	1	2	1	2	1
<b>CO2</b>	1	2	1	2	1	2	1	1	1	2
<b>CO3</b>	2	1	2	1	1	2	1	0	0	2
<b>CO4</b>	2	1	1	2	0	0	1	0	0	0
<b>CO5</b>	1	1	2	1	1	2	0	0	1	2
<b>Average</b>	2	1	2	1	1	2	1	0	1	2

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation

YSEE92			E-COMMERCE				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2.75	0	.25					3	0	0	3
PREREQUISITE: Computer Network										
Course Outcomes						Domain		Level		
After the completion of the course, students will be able to										
CO1	Recognize and Discuss the scope of e-commerce					Cognitive		Remember Understand		
CO2	Sketch and Develop various Business strategies					Cognitive		Apply Analyze		
CO3	Survey and Identify the importance and future of e market and EDI					Cognitive		Analyze		
CO4	Justify and Explain the usage of Internet in e-commerce and various types of e-commerce					Cognitive		Evaluate Valuing		
CO5	Practice and Perform Various on line transactions					Affective		Responding to a phenomena		
UNIT I			Introduction to E-Commerce						9	
Introduction - the scope of e-commerce – definition - electronic markets -electronic data interchange – internet commerce – the value chain – supply chain										
UNIT II			Business Strategy in an Electronic Age						9	
Business Strategy – introduction to business strategy – strategic implications of IT – Technology – Business environment – business capability – existing business strategy – strategy formulation and implementation planning										
UNIT III			Business to Business Electronic Commerce						9	
Electronic markets – Markets – usage of electronic markets – advantages and disadvantages – future of electronic markets – electronic data interchange – introduction – EDI definition – the benefits of EDI – EDI technology – EDI standards – EDI communications										
UNIT IV			Business to Consumer Electronic Commerce						9	
Consumer trade transaction – the e-shop – advantages and disadvantages of consumer e-commerce – the internet – the development of internet – TCP/IP – internet components – uses of internet										
UNIT V			Elements of e-commerce and e-business						9	
Elements – e-Visibility – the e-shop – online payments – delivering the goods – after sales service – internet e-commerce security – e-business – internet bookshops – grocery supplies – software supplies and support – electronic news paper – internet banking										
LECTURE			TUTORIAL			PRACTICAL		TOTAL		
45			0			0		45		
REFERENCES:										
1. David Whiteley “E-commerce: Strategy, Technologies and Applications” Tata McGraw-Hill Publications, 2011. 2. Efraim Turvan J.Lee, David kug and chung, “Electronic commerce” Pearson Education Asia 2001. 3. Manlyn Greenstein and Miklos “Electronic commerce” McGraw-Hill, 2002										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	0	0	1	1	0	0	0	1	2	2
<b>CO2</b>	0	1	0	1	0	1	1	1	2	2
<b>CO3</b>	0	2	2	1	1	2	2	2	2	1
<b>CO4</b>	0	1	1	1	0	1	1	1	2	2
<b>CO5</b>	0	1	1	1	0	1	1	1	3	3
<b>Average</b>	0	1	1	1	1	1	1	1	2	2

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation



YSEE93			PRINCIPLES OF MANAGEMENT				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2.75	0.25	.25					3	0	0	3
PREREQUISITE: Basic principles in an organization.										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the significance of Management Principle.						Cognitive Psychomotor	Remember Perception		
CO2	Express the understanding of the concept of planning the events in organization.						Cognitive	Understand		
CO3	Employ the understanding of the various scheduling activities and actively participate in terms for the organizing of various events in organization.						Cognitive Affective	Apply Respond		
CO4	Utilize the directing effectively in the real world class room management.						Cognitive	Apply		
CO5	Design and Establish the principles of management concept in day to day activities.						Cognitive Psychomotor	Create Set		
UNIT I		OVERVIEW OF MANAGEMENT							9	
Definition - Management - Role of managers - Evolution of Management thought-Organization and the environmental factors – Trends and Challenges of Management in Global Scenario.										
UNIT II		PLANNING							9	
Nature and purpose of planning - Planning process - Types of plans –Objectives - Managing by objective (MBO) Strategies - Types of strategies - Policies - Decision Making - Types of decision Decision Making Process - Rational Decision Making Process - Decision Making under different conditions										
UNIT III		ORGANIZING							9	
Nature and purpose of organizing - Organization structure - Formal and informal groups organization - Line and Staff authority - Departmentation - Span of control - Centralization and Decentralization - Delegation of authority - Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - -Performance Appraisal.										
UNIT IV			DIRECTING					9		
Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Leadership theories - Communication - Barriers to effective communication - Organization Culture - Elements and types of culture - Managing cultural diversity.										
UNIT V			CONTROLLING					9		
Process of controlling - Types of control - Budgetary and non-budgetary control techniques - Managing Productivity - Cost Control - Purchase Control - Maintenance Control - Quality Control - Planning operations.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			--			--			45	
REFERENCES:										
1. Stephen P. Robbins and Mary Coulter, 'Management', Prentice Hall of India,8th edition.										

2. Charles W L Hill, Steven L McShane, 'Principles of Management', Mcgraw Hill Education, Special Indian Edition, 2007.
3. Hellriegel, Slocum & Jackson, ' Management - A Competency Based Approach', Thomson South Western, 10th edition, 2007.
4. <https://www.pearsonhighered.com>
5. [www.miracleworx.com](http://www.miracleworx.com)

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	0	0	1	1	0	0	0	1	2	2
<b>CO2</b>	0	1	0	1	0	1	1	1	2	2
<b>CO3</b>	0	2	2	1	1	2	2	2	2	1
<b>CO4</b>	0	1	1	1	0	1	1	1	2	2
<b>CO5</b>	0	1	1	1	0	1	1	1	3	3
<b>Average</b>	0	1	1	1	1	1	1	1	2	2

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No Correlation

YSEE94			DIGITAL IMAGE PROCESSING				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Digital Principles										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Understand image formation and the role human visual system plays in perception of gray and color image data.						Cognitive	Understand		
CO2	Use of various applications of image processing in industry, medicine, and defense.						Cognitive	Apply		
CO3	Relate the signal processing algorithms and techniques in image enhancement and image restoration.						Cognitive	Remember		
CO4	Acquire an appreciation for the image processing issues and techniques and be able to apply these techniques to real world problems.						Cognitive	Apply		
CO5	Study independent study and analysis of image processing problems and techniques.						Cognitive	Remember		
UNIT I		INTRODUCTION TO IMAGE PROCESSING SYSTEM							9	
Introduction to image processing system-image sampling-quantization-resolution-human visual system-classification of digital images-image types-elements of an image processing system-image file formats-application of digital image processing. Image transforms-Need for transform-image transforms-Fourier transform-DCT-DFT.										
UNIT II			IMAGE ENHANCEMENT					9		
Introduction-image enhancement in spatial domain-enhancement through point operation-types of point operation-histogram manipulation-linear gray-level transformation-nonlinear gray level transformation-local or neighborhood operation-median filter-spatial domain high-pass filtering or image sharpening-bit-plane slicing-image enhancement in the frequency domain-homomorphic filter-zooming operation.										
UNIT III			IMAGE RESTORATION AND DENOISING					9		
Introduction-image degradation-types of image blur-classification of image-restoration techniques-image-restoration model-linear image restoration techniques-Non-linear image restoration techniques-image denoising-classification of noise in image-Median filtering-Trimmed average filter-performance metrics in image restoration-applications of digital image restoration.										
UNIT IV			IMAGE SEGMENTATION					9		
Introduction-classification of image –segmentation techniques-region approach to image segmentation-clustering techniques-image segmentation based on thresholding-edge based segmentation-classification of edges-edge detection-edge linking-hough transform-active contour-Watershed transformation-shape representation-classification of shape representation techniques.										
UNIT V			OBJECT RECOGNITION					9		
Introduction-need for an object recognition system-automated object recognition system-patterns and pattern class-selection of measurement parameters-relationship between image processing and object recognition-approaches to object recognition –template matching based object recognition-structural pattern recognition-applications of object recognition. Case study implementation of Matlab in image processing.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			-			-			45	

<b>REFERENCES:</b>		
1. Digital Image Processing by S.Jayaraman, S.Esakkirajan, T.Veerakumar, published by Tata McGraw Hill Education private ltd,3 <sup>rd</sup> reprint 2010. 2. Fundamentals of Digital Image processing by Anil K.Jain published by Prentice-hall of India pvt ltd, 3 <sup>rd</sup> reprint 2004. 3. Digital Image Processing by Rafael C.Gonzalez, Richard E.Woods, published by Pearson Prentice Hall,3 <sup>rd</sup> Edn. 4. Milan Sonka, Vaclav Hlavac and Roger Boyle,“Image Processing, Analysis and 5. Machine Vision”,Second Edition, Thomson Learning, 2001.		

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	3	2	3	2	2	1	1	1	1	3
<b>CO2</b>	2	3	2	3	1	1	1	1	2	3
<b>CO3</b>	3	2	3	2	2	2	1	1	2	3
<b>CO4</b>	3	2	2	3	1	1	1	1	1	3
<b>CO5</b>	2	3	2	2	2	2	1	1	2	3

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No relation

YSEE95			BIG DATA ANALYTICS				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: Data Mining and Data warehousing										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Analyze the HADOOP and Map Reduce technologies associated with big data analytics Explore on Big Data applications Using NOSQL, Pig and Hive						Cognitive		Analyze	
CO2	Design efficient algorithms for mining the data from large volumes.						Cognitive		Create	
CO3	Understand the fundamentals of various big data analysis techniques						Cognitive		Understand	
CO4	Apply the big data analytic techniques for useful business applications.						Cognitive		Apply	
CO5	Relate to Work with big data analytic platform						Cognitive		Remember	
UNIT I			UNDERSTANDING BIG DATA					9		
What is big data – Big data Analytics-Characteristics of Big data- why big data – unstructured data – industry examples of big data – Big data and Marketing – Fraud and Big data- Risk and Big data- Big data advances in Health care – Cloud and Big data										
UNIT II			NO SQL MANAGEMENT					9		
Introduction to NoSQL – Difference between SQL and NoSQL-Types of NOSQL Databases- NOSQL Data model-relational vs aggregate data models – schemaless map-reduce – partitioning and combining – composing map-reduce calculations										
UNIT III			BASICS OF HADOOP					9		
Introduction to Hadoop - Hadoop Architecture- Map Reduce in Hadoop - Data format – analyzing data with Hadoop - Design of Hadoop distributed file system (HDFS) – HDFS concepts										
UNIT IV			MAP REDUCE APPLICATIONS					9		
Classic Map-reduce – YARN – failures in classic Map-reduce and YARN – job scheduling – shuffle and sort – task execution – MapReduce types – input formats – output formats										
UNIT V			HADOOP RELATED TOOLS					9		
Hbase – data model and implementations –Cassandra – cassandra data model – cassandra examples –Hadoop integration. Pig – pig data model Hive – data types and file formats – HiveQL.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			-			-			45	
REFERENCES:										
<ol style="list-style-type: none"> <li>1. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.</li> <li>2. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.</li> <li>3. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.</li> <li>4. E. Capriolo, D. Wampler, and J. Rutherglen, "Programming Hive", O'Reilley, 2012.</li> <li>5. Lars George, "HBase: The Definitive Guide", O'Reilley, 2011.</li> <li>6. Eben Hewitt, "Cassandra: The Definitive Guide", O'Reilley, 2010.</li> </ol>										

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
<b>CO1</b>	3	2	3	2	2	1	1	1	1	3
<b>CO2</b>	2	3	2	3	1	1	1	1	2	3
<b>CO3</b>	3	2	3	2	2	1	1	1	2	3
<b>CO4</b>	3	2	2	3	1	1	1	1	1	3
<b>CO5</b>	2	3	2	2	2	1	1	1	2	3

3–Strong Correlation, 2–Medium Correlation, 1–Low Correlation, 0–No relation

YSEOE1			Software Development Techniques			I	T	P	C
						3	0	0	3
						C	P	A	I
3	0	0				3	0	0	3
PREREQUISITE: Computer programming and OOPS									
Course Outcomes					Domain	Level			
After the completion of the course, students will be able to									
CO1	Apply software development techniques with reference to model driven software development.				Cognitive	Remembering Understanding, Applying			
CO2	Identify verification and translation of specifications.				Cognitive	Remembering Understanding, Applying			
CO3	Design and implement the practical application of domain-specific modeling language.				Cognitive	Remembering Understanding			
CO4	Analyze emerging model-driven development techniques.				Cognitive	Remembering Understanding, Analyzing			
CO5	Identify the risk and assure the quality standards				Cognitive	Remembering Understanding, Analyzing			
UNIT I			INTRODUCTION TO SOFTWARE ENGINEERING				9		
The evolving role of software, Changing Nature of Software, legacy software, Software myths. A Generic view of process: Software engineering - A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.									
UNIT II			SOFTWARE REQUIREMENTS				9		
Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. System models: Context Models, Behavioral models, Data models, Object models, structured methods.									
UNIT III			DESIGN ENGINEERING				9		
Design process and Design quality, Design concepts, the design model, pattern based software design. Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into software architecture									
UNIT IV			TESTING STRATEGIES				9		
A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging. Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance. Metrics for Process and Products: Software Measurement, Metrics for software quality									
UNIT V			MANAGEMENT OF SOFTWARE				9		
Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk									

identification, Risk projection, Risk refinement, RMMM, RMMM Plan. **Quality Management:** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	-	45

**Text Books:**

1. Software Engineering: A practitioner's Approach, Roger S Pressman, sixth edition. McGraw Hill International Edition, 2005
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education, 2004.

**REFERENCES:**

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.



YSE OE2			WEB TECHNOLOGY				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2.5	0.5	0.5					3	0	0	3
PREREQUISITE: Computer Programming										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the significance of Web Technology.						Cognitive Psychomotor		Remember Perception	
CO2	Express the knowledge on HTML, CSS and JavaScript in Web Design.						Cognitive		Understand	
CO3	Employ the understanding of the Client side scripts and actively participate in teams for the creation of static web pages.						Cognitive Affective		Apply Respond	
CO4	Utilize the web designing tools effectively in the real world applications.						Cognitive		Apply	
CO5	Design and Establish the Website.						Cognitive Psychomotor		Create Set	
UNIT I			INTRODUCTION TO WEB TECHNOLOGY						9	
Basics of Internet – World Wide Web – Web Server – Proxy Server – Web Browsers – IP Address – Domain Name – HTTP – Uniform Resource Locator – Concept of Tier – Web Pages – Static Web Pages – Dynamic Web Pages – Search Engine – Search Tools										
UNIT II			HTML						9	
HTML Basics – HTML Editor – HTML CSS – Links – Images – Tables – Lists - Frames - HTML forms and Input tags										
UNIT III			CSS						9	
CSS Basics – Texts and Fonts – Links, Lists and Tables – Background, Border and Outline – Position – Dimension and Display										
UNIT IV			JAVASCRIPT						9	
Java Script Basics – Functions – Objects – Events – Scope – Strings – Numbers – Date – Arrays – Conditional and Looping Statements - Forms										
UNIT V			WEB APPLICATIONS						9	
Free Website Creation – Getting Server Space - Case Studies: College Website – Blog Creation – Online Education – Career Guidance										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			-			-			45	
REFERENCES:										
<ol style="list-style-type: none"> <li>1. Achyut S.Godbole, Atul Kahate, “Web Technologies TCP/IP To Internet Application Architectures”, First Edition, Tata McGraw-Hill Publishing Company Limited, 2003.</li> <li>2. N.P. Gopalan, J.Akilandeswari, “Web Technology: A Developer’s Perspective”, Second Edition, PHI Learning Private Limited, 2014.</li> <li>3. Thomas A. Powell, “HTML &amp; CSS: The Complete Reference”, Fifth Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2010.</li> <li>4. Thomas A. Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Second Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2008.</li> <li>5. <a href="http://www.w3schools.com">www.w3schools.com</a></li> <li>6. <a href="http://www.tutorialspoint.com">www.tutorialspoint.com</a></li> </ol>										

