

Faculty 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



**PERIYAR
MANIAMMAI**
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University)
Established Under Sec. 3 of UGC Act, 1956 • NAAC Accredited
think • innovate • transform

Date of BOS: 15.05.2018

ACM Ref No : 29th ACM / 09.06.2018

DEPARTMENT OF SOFTWARE ENGINEERING M.Sc. Software Engineering - 5 Year Integrated Course (Semester I to X)

REGULATION 2018

Curriculum for M. Sc (Software Engineering)

5 Years Integrated Course [Batch: 2018 – 2023]

Regulation 2018

I SEMESTER

Category	Course Code	Course Name	Credits					Hours				
			L	T	P	SS	Total	L	T	P	SS	Total
AECC 1	XGL101	Communication Skills in English	2	0	0	2	2	2	0	0	2	4
LANG	XGL102A / XGL102B	Ariviyal Tamil / Comprehensive English	3	0	0	0	3	3	0	0	0	3
CC-1	YSE103	Computer Fundamentals	4	0	1	0	5	4	0	2	0	6
CC-2	YSE104	Algebra, Calculus & Analytical Geometry	4	1	0	0	5	4	1	0	0	5
CC-3	YSE105	Problem Solving Using C	3	0	2	0	5	3	0	4	0	7
UMAN-1	XUM106	Human Ethics, Values, Rights, and Gender Equality	3	0	0	0	0	3	0	0	0	3
		Total	19	1	3	2	20	19	1	6	2	28

II SEMESTER

Category	Course Code	Course Name	Credits					Hours				
			L	T	P	SS	Total	L	T	P	SS	Total
AECC-2	XGL201	English for Effective Communication	2	0	0	2	2	2	0	0	2	4
UMAN-2	XES 202	Environmental Studies	2	0	0	1	0	2	0	0	1	3
CC-4	YSE203	Discrete Mathematics	3	1	0	0	4	3	1	0	0	4
CC-5	YSE204	Data Structures and Algorithms	3	0	2	0	5	3	0	4	0	7
CC-6	YSE205	Computer Organization	3	1	0	0	4	3	1	0	0	4
CC-7	YSE206	Software Engineering	3	1	0	0	4	3	1	0	0	4
		Total	18	3	2	3	19	16	3	4	3	26

III SEMESTER

Category	Course Code	Course Name	Credits				Hours				
			L	T	P	Total	L	T	P	SS	Total
SEC-1	YSE301	Multimedia Systems	2	0	1	3	2	0	2	0	4
CC-8	YSE302	Operating System	3	1	0	4	3	1	0	0	4
CC-9	YSE303	Programming in Java	3	0	2	5	3	0	4	0	7
CC-10	YSE304	Software Design & Architecture	3	1	0	4	3	1	0	0	4
UMAN-3	XUM306	Disaster Management	3	0	0	0	3	0	0	0	3
GE1		*Open Elective - To be chosen by student	3	0	0	3	3	0	0	0	3
Minor Course * Extra Credit		Python Programming									1*
		Total	17	2	3	19	17	2	6	0	25+1*

IV SEMESTER

Category	Course Code	Course Name	Credits				Hours			
			L	T	P	Total	L	T	P	Total
SEC-2	YSE401	Software Project Management	2	1	0	3	2	1	0	3
CC-11	YSE402	Data Base Management System	3	0	1	4	3	0	2	5
CC-12	YSE403	Computer Networks	3	1	0	4	3	1	0	4
CC-13	YSE404	. Net Technologies	3	0	1	4	3	0	2	5
DSE-1	YSE405A	Enterprise Resource Planning	3	0	0	3	3	0	0	3
	YSE405B	E-Commerce	3	0	0	3	3	0	0	3
	YSE405C	Digital Image Processing	3	0	0	3	3	0	0	3
GE-2		*Open Elective - To be chosen by student	3	0	0	3	3	0	0	3
Minor Course * Extra Credit		MongoDB								1*
		Total	17	2	2	21	17	2	4	23+1*

V SEMESTER

Category	Course Code	Course Name	Credits				Hours			
			L	T	P	Total	L	T	P	Total
SEC3	YSE501	Mobile Ad hoc Networks	3	0	0	3	3	0	0	3
CC-14	YSE502	Object Oriented Analysis and Design	3	1	1	5	3	1	2	6
CC-15	YSE503	Web Technologies	3	1	1	5	3	1	2	6
CC-16	YSE504	Operation Research	3	1	0	4	3	1	0	4
DSE-2	YSE505A	Network Protocols	3	0	0	3	3	0	0	3
	YSE505B	Unix and Network Programming	3	0	0	3	3	0	0	3
	YSE505C	Wireless Sensor Network	3	0	0	3	3	0	0	3
GE-3		GE-2	3	0	0	3	3	0	0	3
Minor Course * Extra Credit		Angular JS								1*
			18	3	2	23	18	3	4	25+1*

VI SEMESTER

Category	Course Code	Course Name	Credits				Hours			
			L	T	P	Total	L	T	P	Total
SEC-4	YSE601	Requirements Engineering	2	1	0	3	2	1	0	3
CC-17	YSE602	Data Warehousing and Data Mining	3	0	1	4	3	0	2	5
SEC-5	YSE603	Software Metrics	2	1	0	3	2	1	0	3
DSE-3	YSE604A	Client Server Computing	3	0	0	3	3	0	0	3
	YSE604B	XML and Web services	3	0	0	3	3	0	0	3
	YSE604C	Advanced Data Base Management Systems	3	0	0	3	3	0	0	3
DSE-4	YSE605A	Principles of Management	3	0	0	3	3	0	0	3
	YSE605B	Total Quality Management	3	0	0	3	3	0	0	3
	YSE605C	Entrepreneurship Development and Management	3	0	0	3	3	0	0	3
DSE-5	YSE605	Project Work	0	0	4	6	0	0	8	8
			13	2	5	22	13	2	10	25

VII SEMESTER

Category	Course Code	Course Name	Credits				Hours			
			L	T	P	Total	L	T	P	Total
DSE	YSE701	Internship Programme	--	--	--	12	--	--	--	--

VIII SEMESTER

Category	Course Code	Course Name	Credits				Hours			
			L	T	P	Total	L	T	P	Total
CC-18	YSE801	Software Testing and Quality Assurance	3	0	1	4	3	0	2	5
CC-19	YSE802	Big Data Analytics using R	3	0	1	4	3	0	2	5
SEC-6	YSE803	Software Project Reports Preparation	2	1	0	3	2	1	0	3
CC-20	YSE804	Machine Learning Algorithms	3	1	0	4	3	1	0	4
DSE-5	YSE805A	Cloud Computing	3	0	0	3	3	0	0	3
	YSE805B	Pervasive Computing	3	0	0	3	3	0	0	3
	YSE805C	Advanced Computer Architecture	3	0	0	3	3	0	0	3
GE-4		Open Elective	3	0	0	3	3	0	0	3
			17	2	2	21	17	2	4	23

IX SEMESTER

Category	Course Code	Course Name	Credits				Hours			
			L	T	P	Total	L	T	P	Total
CC-21	YSE901	Mobile Application Development	3	0	1	4	3	0	2	5
CC-22	YSE902	Cyber Security	3	0	0	3	3	0	0	3
CC-23	YSE903	Software Reliability	3	0	0	3	3	0	0	3
SEC-7	YSE904	Usability Engineering	3	0	0	3	3	0	0	3
CC-24	YSE905	Internet of Things	3	1	0	4	3	1	0	4
DSE	YSE906	Project Phase I	0	0	3	3	0	0	6	6
			15	1	4	20	15	1	8	24

X SEMESTER

Category	Course Code	Course Name	Credits				Hours			
			L	T	P	Total	L	T	P	Total
DSE	YSE1001	Main Project Phase-II	--	--	--	16	--	--	--	--

Total 193 Credits

Total Number of subjects proposed with the credits is given below:

S. No.	Type of Subject	Numbers	Total Credit
1	AECC (Theory & Lab)	02	04
2	Core Course (Theory & Lab)	24	104
3	DSE (Theory & Lab)+ Project	5+4	15 +37
4	SEC	07	21
5	GE	03	09
6	UMAN	03	00
7	LANG	01	3
	Minor courses, IPT & NSS / NCC...	5*	5*
Total			193+5*

*Extra credit

COURSE CODE		XGL101			L	T	P	SS	H	C
COURSE NAME		COMMUNICATION SKILLS IN ENGLISH			2	0	0	2	4	2
C:P:A - 3:0:0										
COURSE OUTCOMES:					Domain		Level			
CO1	Explain the process of communication and its types				Cognitive		Understanding			
CO2	Recall various sounds and use it in proper context				Cognitive		Remembering			
CO3	Organise meeting events and recording it constructively				Cognitive		Applying			
CO4	Adapt methods of framing questions and using punctuations				Cognitive		Creating			
CO5	Demonstrate the basic skills at the time of interview and presentations				Cognitive		Understanding			
SYLLABUS									HOURS	
UNIT I		The Process of Communication								
Communication- the process of communication - barriers of communication - different types of communication									9	
UNIT II		Phonetics								
Pronunciation – Vowels – Consonants – Transcription of Words and Sentences									9	
UNIT III		Report Writing								
Organizing successful meeting, One to one meeting, editing, criteria for successful meetings, memo, e mails									9	
UNIT IV		Grammar								
Articles – Question Tag –Punctuation – Types of Sentences – Types of Questions, Cause and Effect.									9	
UNIT V		Presentation Skills								
Presentation skills, Importance of body language in presentations, Verbal and Non Verbal communication									9	
Total Hours									45	
Text books Sanghita Sen. Communication and Language Skills.Cambridge Press, Chennai, 2015 Sumant. Technical English.Vijay Nicole Imprints, Chennai, 2011 Dorathy adams. Everyday English. Cengage Learning, New Delhi, 2009										

Table 1: Mapping of Cos with POs:

	P O1	P O2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	2	0	0	0	0	0	2	0	1	0	0	0	0	0
CO2	2	0	0	0	0	0	2	0	1	0	0	0	0	0
CO3	1	0	0	0	0	0	1	0	1	0	0	0	0	0
CO4	2	0	0	0	0	0	1	0	1	0	0	0	0	0
CO5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	7	0	0	0	0	0	6	0	4	0	0	0	0	0
Scaled Value	2	0	0	0	0	0	2	0	1	0	0	0	0	0
	1	0	0	0	0	0	1	0	1	0	0	0	0	0

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

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

Table 2: Mapping of COs with 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
CO1	0	0	0	0	0	0	0	1	1	2	0	0
CO2	0	0	0	0	0	0	0	0	0	2	0	0
CO3	0	0	0	0	0	0	0	0	0	1	0	0
CO4	0	0	0	0	0	0	0	0	0	0	1	0
CO5	0	0	0	0	0	0	0	1	1	1	1	0
Total	0	0	0	0	0	0	0	2	2	6	2	0
Scaled	0	0	0	0	0	0	0	1	1	2	1	0

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

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

XGL102 A			mwptpay;jkpo				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2.9	0.1	0					3	0	0	3
PREREQUISITE: Nil										
COURSE OUTCOMES						DOMAIN		LEVEL		
After the completion of the course, students will be able to										
CO1	Recognize(milahsk; fhZjy;)gy;NtWmwptpay; Jiwrrhu;e;jEl;gq;fs;>fiyr; nrhy;yhf;fcj;jpfs; Nghd;wtw;iwj; jkpo;nkhop %yk; mwpe;Jnfhs;sy;.					Cognitive		Remember		
CO2	Choose (njupTnra;jy;)tlnkhopNtu;r;nrhw;fs;>Gtpapay;>epytpay; gw;wpg; goe;jkpo; ,yf;fpaq;fs; %yk; mwpe;Jnfhs;sy;.					Cognitive		Remember		
CO3	Describe(tpsf;Fjy;)njhy;fhg;gpak; %yk; mwptpay; nra;jpfisczu;jy;.					Cognitive Psychomotor		Understand Set		
CO4	Apply (gad;gLj;Jjy;)gy;NtWfy;tpj;Jiwrrhu;e;jgpupTfs;>gy;NtWfy;tp j;Jiwrrhu;e;jgpupTfs; Fwpj;JnjspTngwy;.					Cognitive		Apply		
CO5	Analyze(gFj;jy;)mwptpay; rpWfijfspd; Njhw;wk; kw;Wk; tsu;r;rpepiyehlfq;fspd; gq;FFwpj;JnjspTngWjy;.					Cognitive		Analyze		
myF– 1		mwptpay;jkpo; mwpKfk;						9		
mwptpay;jkpo; - nghwpapay;>njhopy;El;gk;>kUj;Jtk;>cotpay;. jkpopy; mwptpay; - jkpopy; El;gk;. gilg;Gg; gzp–nrhy;yhf;fcj;jpfs; - El;gkhdNtWghLfisczu;e;Jnrhy;yhf;fk; nra;jy; - fiyr;nrhw;fs; - ,e;jpankhopfSf;Fg; nghJthdfiyr; nrhw;fiscUthf;Fjy; - tlnkhopNtu;r;nrhw;fiskpFjpahff; nfhz;bUj;jiiyg; gad;gLj;Jjy;.										
myF– 2		gpwmwptpay; Jiwfs;						9		
Gtpapay;>epytpay; gw;wpgoe;jkpo; ,yf;fpak; Fwpj;gpLk; jfty;fs; - njhy;fhg;gpak; Fwpj;gpLk capupay;>kz;zpays; gw;wpambg;gilr; nra;jpfs; - jkpo; kUj;Jtf; fy;tp - mwptpay; jkpOf;F ,jopay cj;jpfs; - tsu; jkpo;.										
myF– 3		gy;NtWfifspy; mwptpay;						9		
nkhopapay; fy;tp–fl;llf; fiyf;fy;tp–rKjhaf;fy;tp–Nra;ikf;fy;tp–kz;zpays;>Gtpapay;>fzf;fpay; Mfpait;ize;jfy;tp - ,f;fhyf; fy;tpg; nghJepiy–fiy>mwptpay; - vd;gtw;wpd; tpsf;fq;fs;.										
myF– 4		mwptpay; jkpopy; rpWfijfspd; gq;F						9		
rpWfij -,yf;fzk; cUthf;Fk; cj;jpfs; - rpwe;jrpWfijfs; - rpWfij tiffs; - ey;yrpWfijcUthf;fk; - tuyhW–r%fk; - nkhopngau;g;Gkw;Wk; mwptpay; rpWfijfs;.										
myF–5		mwptpay; jkpopy; ehlfq;fspd; gq;F						9		
ehlfk; - ehlf ,yf;fzk;> ,Utifehlq;fs; - gbg;gjw;Fupaehlfk; - ebg;gjw;Fupaehlfk; - rupj;jpuehlfk;>r%fehlfk; - eifr;Ritehlq;fs; - mnkr;#u; ehlfq;fs; - njhopy;Kiwehlq;fs;.										
LECTURE			TUTORIAL			PRACTICAL		TOTAL		
45			---			---		45		

Nkw;ghu;itEhy;fs;:

1. mwptpay; jkpo; - lhf;lu; th.nr. Foe;ijr;rhkp
2. tsu; jkpo; - ,jo;fs;
3. ,yf;fpatuyhW–rpWfijgw;wpaJ
4. ,yf;fpatuyhW–GjpdK;gw;wpaJ

Table 1: CO Versus PO mapping.

B.Sc. A & M	PO							PSO	
	1	2	3	4	5	6	7	1	2
CO1		1							
CO2		1							
CO3		1					1		
CO4	1	2	2	1		1	2		
CO5	2	2	2	2		1	2		
Total	3	7	4	3		2	5		
Scaled Value	1	1	1	1			1		

1 – 5 -> 1 6 – 10 -> 2 11 – 15 -> 3

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

COURSE CODE		YSE103	L	T	P	C
COURSE NAME		COMPUTER FUNDAMENTALS	4	0	1	5
PREREQUISITES		Nil	L	T	P	H
C:P:A		4:1:0	4	0	2	6
COURSE OUTCOME			Domain		Level	
CO1	Recognize the importance of computer system, application and practice in Libre Office (FOSS) Writer.		Cognitive Psychomotor		Understand Origination	
CO2	Identify and define basic terms and concepts in computer hardware and peripheral devices and Libre Office (FOSS) Impress.		Cognitive Psychomotor		Understand Origination	
CO3	Establish the relationship between hardware and software. Arrange data and Apply formula in Libre Office (FOSS) Calc.		Cognitive Psychomotor		Apply Origination	
CO4	Identify the IO devices. Design database using Libre Office (FOSS) Base.		Cognitive Psychomotor		Remembrance Origination	
CO5	Identify flowchart component and apply in program and design a project using Libre Office (FOSS).		Cognitive Psychomotor		Understand Apply Origination	
UNIT I - INTRODUCTION					12+6	
Introduction – Characteristics of computer – Evolution of computer - Generation of computer – classification of computer - The Computer system –Applications of computers Lab: Libre Office Writer 1. Text Processing 2. Table Creation 3. Resume Creation 4. Mail Merge						
UNIT II - COMPUTER ARCHITECTURE					12+6	
The Central processing unit (CPU) – Main Memory Unit – Interconnection Unit – Cache – Communication between various units of a computer system. Lab : Libre Office Calc 1. Worksheet Creation 2. Employee Pay Details 3. Student Result Sheet 4. Simple Charts						
UNIT III - PRIMARY AND SECONDARY MEMORY					12+6	
Primary memory : Memory representation – memory hierarchy - Random access memory – Types of Memory – Read only memory – types of ROM – Secondary Memory – Classification of secondary storage devices –Magnetic tape – Magnetic disk - Optical disk – Memory stick - Universal serial bus – Mass storage devices Lab : Libre Office Impress 1. Power Point Preparation 2. Create Text And Images With Effects 3. Create Animation And Sound Effects						
UNIT IV - INPUT AND OUT PUT DEVICES					12+6	
Input devices Types of input devices - Optical character recognition – Optical Mark						

recognition - Magnetic ink character recognition – Bar code reader – Output devices : Types of output - Classification of output devices - Terminals Lab : Libre Office Access 1. Importing Data From Data Base 2. Creating Macro 3. Result Processing			
UNIT V	COMPUTER PROGRAM AND LANGUAGES		12+6
Computer Program : Developing a program - Algorithm – flow chart - decision table – program testing and debugging- Program documentation – Programming paradigms - Characteristics of good program – Computer languages : Evolution of programming language – Classification of programming Language – Generation of a programming language – features of a good programming language Lab : Libre Office Project 1. Creating A Greeting Card 2. Creating A Cover Page Of A Project			
LECTURE	TUTORIAL	PRACTICAL	TOTAL
60	0	30	90
Text books 1. Dorling Kindersley, 2009. Introduction to Computer Science ITL Education Solutions Limited fourth Edition.			
References: 1. Roger Hunt and John Shelly, penguin Edition .,2007. Computers and common sense, (PHI) 2. Internet for everyone, Lenon & Lenon (Lenon Tech World), 2009.			
E-References: 3. http://www.nptel.ac.in 4. http://www.vlab.co.in			

Mapping of COs with POs

Course Outcomes	Program Outcomes								PSO1	PSO2
	1	2	3	4	5	6	7	8		
CO1	2	1	1	1				1		
CO2			1	1				1		
CO3	1	2	1	1	1			1		
CO4	1	2	1	1	1			2		
CO5	1	1	1	1	2	2		2	1	
Total	5	6	5	5	4	3		7	1	
Scaled Value	1	2	1	1	1	1		2	1	

1-5 → 1, 6-10 → 2, 11-15 → 3

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

COURSE CODE		YSE104		L	T	P	C
COURSE NAME		ALGEBRA, CALCULUS AND ANALYTICAL GEOMETRY		4	1	0	5
PREREQUISITES		Basic of Mathematics		L	T	P	H
				4	1	0	5
C:P:A		4:0:0					
COURSE OUTCOMES				DOMAIN		LEVEL	
CO1	<i>Evaluate the derivatives of given functions</i>			Cognitive		Understand	
CO2	<i>Calculate the definite and indefinite integrals using various techniques.</i>			Cognitive		Understand, Remember	
CO3	<i>Apply basic operations on matrices to find the inverse of a matrix</i>			Cognitive		Understand, Apply	
CO4	<i>Solve problems using Binomial, exponential and logarithmic series expansions.</i>			Cognitive		Understand	
CO5	<i>Calculate the distance between two points and explain section formulae, slope form and intercept form.</i>			Cognitive		Understand	
UNIT I – DIFFERENTIAL CALCULUS						12+3	
Derivative of a function – Various formulae – Product and quotient rule of differentiation – Differentiation of function of function (chain rule) – Trigonometric functions – Inverse trigonometric functions – Exponential function – Logarithmic functions – Logarithmic differentiation - Higher derivatives – Successive differentiation – Leibnitz theorem.							
UNIT II – INTEGRAL CALCULUS						12+3	
Constant of integration – Indefinite integral – Elementary integral formulae – Methods of integration – Integration by substitution - Integration by parts – Integration through partial fractions – Concept of definite integral – Properties of definite integral.							
UNIT III – MATRICES AND DETERMINANTS						12+3	
Definition and types of matrices – Matrix Operation – Determinants – Solution of system of linear equations by Matrix method.							
UNIT IV – SERIES						12+3	
Binomial theorem for a rational index – Exponential and Logarithmic series – Summation of the above series.							
UNIT V – TWO DIMENSIONAL ANALYTICAL GEOMETRY						12+3	
Cartesian coordinate system – Introduction to polar coordinates – Distance between two points – Section formulae – Area of triangle – Locus and its equations – Straight line: Equation of a straight line parallel to an axis – slope form –normal form – Intercept form through two point –condition of concurrency of three lines.							
	LECTURE	TUTORIAL	PRACTICAL	TOTAL			
HOURS	60	15	0	75			
TEXT BOOKS							
1. T. K. Manicavachagom Pillay, T. Natarajan, K. S. Ganapathy, Algebra, Volume I , S.Vishvanathan Printers and Publishers Pvt., Ltd, Chennai 2004. 2. S.Narayanan, T.K.Manicavachagam Pillay, S.Vishvanathan, Calculus volume I & II Printers and Publishers Pvt., Ltd, Chennai 1991.							
REFERENCES							
1. P.Kandasamy & K.Thilagavathi, B.Sc Mathematics for branch I – Vol I & Vol II, S.Chand & Co, 2004.							

E- REFERENCES

1. www.nptel.ac.in
2. Advanced Engineering Mathematics, Prof. Pratima Panigrahi, Department of Mathematics, Indian Institute of Technology, Kharagpur.

Mapping of Cos with Pos:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS8	PSO1	PSO2
CO1	3						2			
CO2	3						2			
CO3	3						2			
CO4	3						2			
CO5	3						2			
Total	15						10			
Scaled Value	3						2			

1-5→1, 6-10→2, 11-15→3

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

COURSE CODE			YSE 105	L	T	P	C
COURSE NAME			PROBLEM SOLVING USING C	3	0	2	5
PREREQUISITE			Nil	L	T	P	H
C	P	A	2.8:1:0.2	3	0	4	7
COURSE OUTCOMES				DOMAIN	LEVEL		
CO1	Recognize the importance of the Structured Programming.			Cognitive Psychomotor	Remember Perception		
CO2	Identify the needs of problem solving concepts.			Cognitive Psychomotor	Understand Perception		
CO3	Demonstrate the usage of memory management and Be Aware of the utilization of the dynamics memory allocation concepts in the real time application.			Cognitive Psychomotor Affective	Apply Perception Receive		
CO4	Illustrate the concept of sorting & searching and Contribute more in the team work towards application development.			Cognitive Psychomotor Affective	Apply Mechanism Respond		
CO5	Develop and Establish the application software in C language.			Cognitive Psychomotor	Create Origination		
UNIT I		INTRODUCTION TO C					9+6
History of C - Characteristics of C – Character set - Tokens – Identifiers – Keywords – Constants and Data Types - Operators and Expressions – Input and Output Functions – Conditional Control statements – Branching – Looping - Unconditional control structures - switch, break, continue, goto statements							
Lab:							
1. Programs using Expression Evaluation							
2. Programs using Branching Statements							
3. Programs using Looping Statement							
UNIT II		PROBLEM SOLVING					9+6
Problem solving aspect - Top -down design - Implementation of algorithms– Program verification- Efficiency-Analysis of Algorithms–Fundamental Algorithms – swapping.							
Lab:							
1. Programs Using Computational Problems.							
2. Programs Using Conditional Statements.							
UNIT III		ARRAYS AND POINTERS					9+6
Arrays: One Dimensional Array – Two Dimensional – Multi Dimensional Arrays - Storage classes: auto – extern – static. Strings: Basic operations on strings. Functions: Built in functions – User Defined Functions - Parameter passing methods - Passing arrays to functions – Recursion - Pointer concept –Pointers and Functions - Call by value - Call by Reference – Pointers and Arrays - Pointers on pointer – Dynamic memory allocation- Operations on pointers.							
Lab:							
Programs using Arrays							
Programs using Functions							
Programs using Call by reference							
Programs using dynamic memory allocation							
UNIT IV		FACTORING METHODS AND MERGING, SORTING AND SEARCHING					9+6
Finding Square Root - LCM - GCD Generation of Prime Numbers -Array Techniques – Histogramming - Minimum and Maximum numbers. Two- way Merge Sort - Selection Sort - Binary Search - Hash Search - Text Processing-Keyword Searching in text.							

Lab : Program to find LCM and GCD Programs for sorting Programs for Searching Programs using Strings			
UNIT V	STRUCTURES AND FILES		9+6
Structures and Unions -Initializing structure - Passing structure to elements to functions - Arrays of structure - Structure within a structure and Union - Pointers and structures -File management in C - Defining and opening a file - Closing a file - The getw and putw functions - The fprintf & fscanf functions - fseek function – Files and Structures -Command line arguments Lab: Programs using Structures Programs using Union Program using Files Program using Command line arguments			
LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	60	-	105
TEXT BOOKS			
Byron Gottfried, "Programming with C", III Edition, (Indian Adapted Edition), TMH publications, 2010. Yeshwant Kanethker, “Let us C”, BPB Publications, 2008 Dromey R.G, 2008. “How to Solve it by Computer” Pearson Education, 5 th edition			
REFERENCES			
Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Pearson Education Inc. (2005). Johnsonbaugh R. and Kalin M., “Applications Programming in ANSI C”, III Edition, Pearson Education India, 2003. Aho A.V. J.E. Hopcroft and J.D. Ullman., 2001. “The Design and Analysis of Computer Algorithms”, Pearson Education Delhi. Second Edition. Sara Baase and Allen Van Gelder., 2002. “Computer Algorithms - Introduction to Design and Analysis” Pearson Education Delhi.3 th Edition.			
E-REFERENCES			
http://www.comptechdoc.org/basic/basicut/index.html http://cse02-iiith.vlabs.ac.in/ http://textofvideo.nptel.iitm.ac.in/video.php?courseId=106104128 http://www.nptel.ac.in http://www.vlab.co.in			

Table 1: Mapping of Cos with POs.

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	2	2	2	2					2	1
CO2	1			2				2	2	
CO3	1		2	1						
CO4	2	1	2	3				1	2	1
CO5	2		1	3					2	
Total	8	3	7	11				3	8	2
Scaled Value	2	1	2	3				1	2	1

1 -- 5 → 1, 6 -- 10 → 2, 11--15 → 3

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

COURSE CODE		XUM106		L	T	P	C
COURSE NAME		HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALITY		3	0	0	0
PREREQUISITES		-		L	T	P	H
C:P:A		2.7:0:0.3		3	0	0	3
COURSE OUTCOMES				Domain		Level	
CO1	Relate and Interpret the human ethics and human relationships			Cognitive		Remember	
CO2	Explain and Apply gender issues, equality and violence against women			Cognitive		Understanding, Applying	
CO3	Classify and Develop the identify of human rights and their violations			Cognitive & Affective		Analyzing Receiving	
CO4	Classify and Dissect necessity of human rights and report on violations.			Cognitive		Understanding, Analyze	
CO5	List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.			Cognitive & Affective		Remember, (Respond)	
UNIT I HUMAN ETHICS AND VALUES							7
Human Ethics and values - Understanding of oneself and others- motives and needs- Social service, Social Justice, Dignity and worth, Harmony in human relationship: Family and Society, Integrity and Competence, Caring and Sharing, Honesty and Courage, WHO's holistic development - Valuing Time, Co-operation, Commitment, Sympathy and Empathy, Self respect, Self-Confidence, character building and Personality.							
UNIT II GENDER EQUALITY							9
Gender Equality - Gender Vs Sex, Concepts, definition, Gender equity, equality, and empowerment. Status of Women in India Social, Economical, Education, Health, Employment, HDI, GDI, GEM. Contributions of Dr.B.R. Ambedkar, Thanthai Periyar and Phule to Women Empowerment.							
UNIT III WOMEN ISSUES AND CHALLENGES							9
Women Issues and Challenges- Female Infanticide, Female feticide, Violence against women, Domestic violence, Sexual Harassment, Trafficking, Access to education, Marriage. Remedial Measures – Acts related to women: Political Right, Property Rights, and Rights to Education, Medical Termination of Pregnancy Act, and Dowry Prohibition Act.							
UNIT IV HUMAN RIGHTS							9
Human Rights Movement in India – The preamble to the Constitution of India, Human Rights and Duties, Universal Declaration of Human Rights (UDHR), Civil, Political, Economical, Social and Cultural Rights, Rights against torture, Discrimination and forced Labor, Rights and protection of children and elderly. National Human Rights Commission and other statutory Commissions, Creation of Human Rights Literacy and Awareness. - Intellectual Property Rights (IPR). National Policy on occupational safety, occupational health and working environment.							
UNIT V GOOD GOVERNANCE AND ADDRESSING SOCIAL ISSUES							11
Good Governance - Democracy, People's Participation, Transparency in governance and audit, Corruption, Impact of corruption on society, whom to make corruption complaints, fight against corruption and related issues, Fairness in criminal justice administration, Government system of Redressal. Creation of People friendly environment and universal brotherhood.							
				LECTURE		TOTAL	
				45		45	

Textbook
1. Aftab A, (Ed.), Human Rights in India: Issues and Challenges, (New Delhi: Raj Publications, 2012). 2. Mani. V. S., Human Rights in India: An Overview (New Delhi: Institute for the World Congress on Human Rights, 1998). 3. Singh, B. P. Sehgal, (ed) Human Rights in India: Problems and Perspectives (New Delhi: Deep and Deep, 1999). 4. Veeramani, K. (ed) Periyar on Women Right, (Chennai: Emerald Publishers, 1996) 5. Veeramani, K. (ed) Periyar Feminism, (Periyar Maniammai University, Vallam, Thanjavur: 2010).
Reference Books
1. Bajwa, G.S. and Bajwa, D.K. Human Rights in India: Implementation and Violations (New Delhi: D.K. Publications, 1996). 2. Chatrath, K. J. S., (ed.), Education for Human Rights and Democracy (Shimala: Indian Institute of Advanced Studies, 1998). 3. Jagadeesan. P. Marriage and Social legislations in Tamil Nadu, Chennai: Elachiapen Publications, 1990). 4. Kaushal, Rachna, Women and Human Rights in India (New Delhi: Kaveri Books, 2000)
E-Reference
1. Planning Commission report on Occupational Health and Safety http://planningcommission.nic.in/aboutus/committee/wrkgrp12/wg_occup_safety.p 2. Central Vigilance Commission (Gov. of India) website: http://cvc.nic.in/welcome.html. 3. Weblink of T ransparency International: https://www.transparency.org/ 4. Weblink Status report: https://www.hrw.org/world-report/2015/country-chapters/india

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1					2	2	1			
CO2					2	2				
CO3						2				
CO4						2	1			
CO5						3				
Total					4	11	2			
Scaled Value					1	2	1			

1 – 5 → 1, 6-10 → 2, 11 – 15 → 3

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

XGL201			ENGLISH FOR EFFECTIVE COMMUNICATION				L	T	P	C
							2	0	0	2
C	P	A					L	T	P	H
1.5	0	0.5					2	0	0	4
PREREQUISITE: Nil										
COURSE OUTCOMES							DOMAIN		LEVEL	
On the successful completion of this course students would be able to										
CO1	Ability to identify the features of a technical project report and Knowledge on the linguistic competence to write a technical report						Cognitive		Creating	
CO2	Ability to integrate both technical COURSE skill and language skill to write a project.						Cognitive		Understand	
CO3	Confidence to present a project in 10 to 15 minutes						Cognitive		Create	
CO4	The learner identifies and absorbs the pronunciation of sounds in English Language and learns how to mark the stress in a word and in a sentence properly						Cognitive		Create	
CO5	The program enables the speaker speaks clearly and fluently with confidence and it trains the learner to listen actively and critically.						Psychomotor		Perception	
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 - Presentation of the written project 10 – 15 minutes										
UNIT IV										9
Sounds of English Language; vowels, consonants, diphthongs , word stress, sentence stress, intonation patterns, connected speech etc. - Vocabulary building – grammar, synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, idioms and phrases.										
UNIT V										11
Reading comprehension – reading for facts, meanings from context, scanning, skimming, inferring meaning, critical reading, active listening, listening for comprehension etc.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
30			30			-			60	
REFERENCES:										
1. Technical Writing – April, 1978, by Gordon H. Mills (Author), John A. Walter (Author)										
2. Effective Technical Communication: A guide for scientists and Engineers. Author: Barun K. Mitra, Publication: Oxford University press. 2007										
Software for lab:										
English Teaching software (Young India Films)										

XES202			ENVIRONMENTAL STUDIES	L	T	P	SS	C
				2	0	0	1	0
C	P	A		L	T	P	SS	H
1.5	0	0.5		2	0	0	1	3

PREREQUISITE : Nil

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	Describe the significance of natural resources and explain anthropogenic impacts.	Cognitive	Remember Understand
CO2	Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance.	Cognitive	Understand
CO3	Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon	Cognitive Affective	Remember Receiving
CO4	Explain the socio-economic, policy dynamics and practice 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 apply the modern technology towards environmental protection.	Cognitive	Understand Apply
UNIT I	INTRODUCTION TO ENVIRONMENTAL STUDIES AND ENERGY		12

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.

UNIT II	ECOSYSTEMS AND BIODIVERSITY	7
----------------	------------------------------------	----------

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: 30	Self-Study: 15	Practical:0	Total:45
Text book			
1. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co, USA, 2000. 2. Townsend C., Harper J and Michael Begon, Essentials of Ecology, Blackwell Science, UK, 2003			
Reference Books			
1. Trivedi R.K and P.K.Goel, Introduction to Air pollution, Techno Science Publications, India, 2003. 2. Disaster mitigation, Preparedness, Recovery and Response, SBS Publishers & Distributors Pvt. Ltd, New Delhi, 2006. 3. Introduction to International disaster management, Butterworth Heinemann, 2006. 4. Gilbert M.Masters, Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., Second Edition, New Delhi, 2004. 5. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media, India, 2009. 6. Cunningham, W.P.Cooper, T.H.Gorhani, Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001. 7. S.K.Dhameja, Environmental Engineering and Management, S.K.Kataria and Sons, New Delhi, 2012. 8. Sahni, Disaster Risk Reduction in South Asia, PHI Learning, New Delhi, 2003. 9. Sundar, Disaster Management, Sarup & Sons, New Delhi, 2007. G.K.Ghosh, Disaster Management, A.P.H.Publishers, New Delhi, 2006.			
E-references			
1. http://www.e-booksdirectory.com/details.php?ebook=10526			

2. <https://www.free-ebooks.net/ebook/Introduction-to-Environmental-Science>
3. <https://www.free-ebooks.net/ebook/What-is-Biodiversity>
4. https://www.learner.org/courses/envsci/unit/unit_vis.php?unit=4
5. <http://bookboon.com/en/pollution-prevention-and-control-ebook>
6. <http://www.e-booksdirectory.com/details.php?ebook=8557>

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

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

COURSE CODE		YSE 203	L	T	P	C
COURSE NAME		DISCRETE MATHEMATICS	3	1	0	4
PREREQUISTE		NIL	L	T	P	H
C:P:A		3:0:0	3	1	0	4
Course Outcome			Domain		Level	
CO1	Define the properties and laws of sets, relations and functions and Apply the operation of the sets using venn Diagram.		Cognitive		R,A _p	
CO2	Apply the concepts of logic and to find the normal forms. Explain the tautologies and Contradiction.		Cognitive		U,A _p	
CO3	Apply the counting principle permutation and combination and to solve the problem. Explain the pigeonhole principle.		Cognitive		U,A _p	
CO4	Explain the types of lattices and to show lattices as partially ordered sets.		Cognitive		U,A _p	
CO5	Apply the properties of semi groups and groups and Explain any set with binary operation as a semigroup and group with examples.		Cognitive		U,A _p	
UNIT I						12
Set notations – Basic definitions and set operations – Venn diagram – Algebraic laws of set theory – D Morgan’s law. Relations: Properties of relations – Types of relations – Equivalence classes. Functions: Definition – Domain – Range and types of function- Classification of function.						
UNIT II						12
Statements - Normal forms – CNF – DNF – PCNF - PDN – Tautologies - Contradictions.						
UNIT III						12
Counting principles – The Pigeonhole principle – Counting – Permutations and Combinations – Combinatorial arguments – Countable and uncountable sets.						
UNIT IV						12
Lattices as partially ordered set – Types of lattices – Lattices as algebraic system.						
UNIT V						12
Binary operations – Semi groups - Groups – Examples and elementary properties.						
LECTURE		TUTORIAL		PRACTICAL		TOTAL
45		15		--		60
TEXT BOOK						
1. Ralph. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, Fourth Edition, Pearson Education Asia, Delhi, 2002.						
2. Kenneth Levasseur and Alan Doerr, “Applied Discrete Structures, Department of Mathematical Sciences, University of Massachusetts Lowell, Version 2.0, 2013.						
REFERENCES						
1. Kenneth H.Rosen, “Discrete Mathematics and its Application”, Fifth edition, Tata McGraw-Hill Publishing company pvt.Ltd., New Delhi, 2003.						
2. Dr.M.K.Venkataaraman, Dr.N.Sridharan N.Chandrasekaran, “Discrete Mathematics”, the National Publishing Company, 2003.						
3. Veerajan T., Discrete Mathematics with Graph Theory and Combinatorics”, 10th edition,Tata McGraw Hill Companies,2010.						

E REFERENCES

www.nptel.ac.in

1. Graph Theory A NPTEL Course S.A. Choudum.
2. Graph Theory by Prof. L. Sunil Chandran Computer Science and Automation Indian Institute of Science, Bangalore.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	1				1		1
CO2	3	1	1			1		1
CO3	3		1			1		1
CO4	3					1	1	1
CO5	3					1	1	1

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

YSE204			DATA STRUCTURES AND ALGORITHMS				L	T	P	C
							3	0	2	5
C	P	A					L	T	P	H
3	2	0					3	0	4	7
PREREQUISITE: YSE105										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Observe and Explain the concept of data structures and analysis of algorithms						Cognitive Psychomotor		Understand Perception	
CO2	Choose the linear and non linear data structures for solving the problems						Cognitive		Apply	
CO3	Apply and Adapt appropriate C programming techniques such as pointers, dynamic memory allocation, structures to develop solutions for problems						Cognitive Psychomotor		Apply Adaptation	
CO4	Assess appropriate abstract data types and algorithm techniques						Cognitive		Evaluate	
CO5	Build an application using algorithm design techniques						Cognitive		Create	
UNIT I			INTRODUCTION						9+12	
Introduction to data structures - Abstract Data Type - Algorithms basic concepts - Efficiency of an algorithm - Asymptotic Notation and Analysis of algorithms										
Lab										
Analysing sorting algorithms										
Analysing searching algorithms										
UNIT II			LINEAR DATA STRUCTURES						9+12	
List – Application of List – Stacks, Implementation and Application – Queue, Implementation and Application										
Lab										
Application of list, stack and queue										
UNIT III			TREES						9+12	
Basic Tree concept - Binary trees – Tree traversals – Binary search tree, Implementation – AVL tree – Application										
Lab										
Tree Traversal										
Binary search tree application										
UNIT IV			GRAPHS						9+12	
Basic terminology – Graph traversal – Application – Networks Shortest path algorithms										
Lab										
Graph Traversal										
Applications using shortest path algorithms										
UNIT V			ALGORITHM DESIGN TECHNIQUES						9+12	
Divide and Conquer algorithms, Dynamic Programming, Greedy algorithms, Backtracking and Branch &bound.										
Lab										
Applications using algorithm design techniques										
LECTURE			TUTORIAL			PRACTICAL		TOTAL		
45			0			60		105		

Textbook:

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

E-REFERENCES:

1. www.tutorialspoint.com
2. www.nptel.com
3. www.virtuallab.ac.in
4. www.mhhe.com/engcs/compsci/forouzan/

COs versus POs mapping

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

1 -- 5 → 1, 6 -- 10 → 2, 11--15 → 3

0--No relation 1--Low relation 2--Medium relation 3--Strong relation

YSE205			COMPUTER ORGANIZATION				L	T	P	C
							3	1	0	4
C	P	A					L	T	P	H
2	1	0					3	1	0	4
PREREQUISITE: YSE103										
Course Outcomes.						Domain		Level		
After the completion of the course, students will be able to										
CO1	Recognize the operation of functional units of a computer					Cognitive Psychomotor		Knowledge		
CO2	Describe the computational operation of hardware units associated with a computing device.					Cognitive		Comprehension		
CO3	Demonstrate the operation of processing unit.					Cognitive Psychomotor		Application		
CO4	Compare the performance of different types of memory					Cognitive		Analyze		
CO5	Recognize the operation of interfacing devices.					Cognitive		Knowledge		
UNIT I		BASIC STRUCTURE OF COMPUTERS						12		
Functional Units - Bus Structures - Performance - Evolution - Machine Instructions and programs - Memory operations - Instruction and instruction sequencing - addressing modes - Basic I/O operations - stacks and queues - subroutines - Encoding of Machine instructions.										
UNIT II		ARITHMETIC UNIT						12		
Arithmetic - Design of fast adders - Binary Multiplication - Division - Floating point numbers and operations.										
UNIT III		BASIC PROCESSING UNIT						12		
Processing unit - Fundamental concepts - Execution of a complete instruction - Multiple bus organization - Hardwired control – Micro programmed control - pipelining - Basic concepts - Hazards - Inference on instruction sets. Data path and control considerations - Performance issues.										
UNIT IV		MEMORY SYSTEM						12		
RAM and ROM - Cache memories - Performance considerations - Virtual memories – secondary storage devices - Associative memories.										
UNIT V		INPUT / OUTPUT ORGANIZATION						12		
Accessing I/O devices - Interrupts - DMA - Buses - Interface circuits - standard I/O Interfaces. Case study of one RISC and one CISC processor.										
LECTURE		TUTORIAL			PRACTICAL			TOTAL		
45		15						60		
TEXT BOOK										
1. Carl Hamacher, ZvonkoUranesic, SafvatZaby., 2002. “Computer Organisation”, 5th edition, McGraw Hill. 2. John P Hayes, “Computer Architecture and Organisation”, 3rd edition, McGraw Hill .										
REFERENCES										
1. David A Patterson and John L. Hennessy, 2002. “ Computer Organization and Design The Hardware / Software Interface”, 2nd edition, Harcourt Asia, Morgan Kaufmann.										
E REFERENCES										
1. www.tutorialspoint.com/computer_logical_organization/ 2. nptel.ac.in/courses/106106092/										

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	2	1	1	1	2
CO2	3	2	2	2	2	2	2	2	1	3
CO3	2	2	2	2	3	2	2	2	1	2
CO4	3	2	2	2	2	2	2	3	1	3
CO5	3	3	3	3	3	3	3	3	1	3
Average	3	2	2	2	2	2	2	2	1	3

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

YSE206			SOFTWARE ENGINEERING				L	T	P	C
							3	1	0	4
C	P	A					L	T	P	H
2.9	0	0.1					3	1	0	4
PREREQUISITE: YSE103										
COURSE OUTCOMES							DOMAIN		LEVEL	
After the completion of the course, students will be able to										
CO1	Recognize the significance of entire Software Engineering process.						Cognitive	Remember		
CO2	Express the functionalities of Cost Estimation and Requirement Specification Techniques.						Cognitive	Understand		
CO3	Describe the concepts and guidelines of Software Design, Coding, Testing and Maintenance.						Cognitive	Understand		
CO4	Actively Participate in Choosing the appropriate techniques and methods for the real time applications as a team.						Affective Cognitive	Response Apply		
CO5	Analyze the techniques used in the various stages of Software Engineering.						Cognitive	Analyze		
UNIT I		INTRODUCTION AND PLANNING A SOFTWARE PROJECT							12	
Introduction - Definitions – Size Factors – Quality and Productivity factors – Managerial Issues. Planning a Software Project – Defining the Problem – Developing a Solution Strategy – Planning the Development Process – Planning an Organizational Structure – Other Planning Activities.										
UNIT II		COST ESTIMATION AND REQUIREMENTS SPECIFICATION							12	
Software Cost Estimation – Cost Factors – Cost Estimation Techniques – Staffing – Level Estimation – Estimating Software Maintenance Costs. Software Requirements Definition – Software Requirement Specification – Formal Specification Techniques – Language and Processors for Requirements.										
UNIT III		SOFTWARE DESIGN							12	
Software Design – Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real Time and Distributed System design – Test Plans – Milestones, Walkthroughs and Inspections – Design Guidelines.										
UNIT IV		IMPLEMENTATION							12	
Implementation Issues – Structured Coding Techniques – Coding Style – Standard and Guidelines – Documentation guidelines – Data Abstraction – Exception Handling – Concurrency Mechanisms.										
UNIT V		TESTING AND MAINTENANCE							12	
Verification and Validation Techniques – Quality Assurance – Walkthroughs and Inspections – Static Analysis – Symbolic Execution – Unit Testing and Debugging – System Testing – Formal Verification. Software Maintenance – Enhancing Maintainability during Development – Managerial aspects – Configuration Management – Source Code Metrics – Other Maintenance Tools and Techniques.										
LECTURE			TUTORIAL			PRACTICAL		TOTAL		
45			15			-		60		
TEXT BOOKS:										
Richard E.Fairley, Software Engineering Concepts, Third Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2015.										
REFERENCES:										
1. Roger.S.Pressman, Software Engineering A Practitioner’s Approach, Seventh Edition, Tata McGraw Hill Higher Education, 2015.										

2. Ian Sommerville, Software Engineering, Ninth Edition, Pearson Education Inc., 2015.

E-REFERENCES:

1. <http://www.rspa.com/spi/>

2. <https://www.wiziq.com/tutorials/software-engineering>

3. <http://www.tutorialride.com/software-engineering/software-engineering-tutorial.htm>

4. https://www.tutorialspoint.com/software_engineering/software_engineering_tutorial.pdf

Mapping of COs with POs

Course Outcomes	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	3	2	2	2	2	2	2	2	3	2
CO2	2	2	2	2	2	2	2	2	3	2
CO3	2	3	3	2	2	2	2	2	3	2
CO4	2	3	3	2	2	2	2	2	3	2
CO5	2	3	3	2	3	2	2	3	3	2
Total Value	11	13	13	10	11	10	10	11	15	10
Scaled Value	3	3	3	2	3	2	2	3	3	2

1-5 → 1, 6-10 → 2, 11-15 → 3

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

YSE301			MULTIMEDIA SYSTEMS				L	T	P	C
							2	0	1	3
C	P	A					L	T	P	H
2	1	0					2	0	2	4
PREREQUISITE: YSE103										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1		Identify and describe the Multimedia components, various html tags, Image editing open source software tools					Cognitive		Understand	
CO2		Create webpage with necessary image document (text) and animation and practice in HTML.					Cognitive Psychomotor		Understand Application Set	
CO3		Gain a working knowledge and develop their skills in editing and altering photographs.					Cognitive		Understand Application	
CO4		Students can renovate the damaged photos. And export the files with various formats and printing devices.					Cognitive Psychomotor		Understand Analyze Set	
CO5		Students can draw and develop short clips and banners with animation using flash and create Audio files. Using html image editing and 2D animation software, can develop and deploy a complete web site in internet.					Cognitive Psychomotor		Understand Create Set	
UNIT I			MULTIMEDIA SYSTEMS DESIGN						6+6	
Introduction – Multimedia applications and its impact – Multimedia System Architecture – Network architecture for multimedia. Evolving technologies for Multimedia–HDTV-UDTV-3D technologies and digital signal processing. Defining objects for Multimedia systems-Text-image – Audio and Video, Audio-recording										
Lab Experiments Using Image Editing Tools										
UNIT II			Image Editing –Basics						6+6	
Introduction about Image Editor- Navigating - Menus and panels- Working with Images- Zooming &Panning an Image-Working with Multiple Images, Rulers, Guides & Grids- Undoing Steps with History- Adjusting Color with the New Adjustments Panel-The New Masks Panel - The New Note Tool & the Save for Web & Devices Interface- The New Auto-Blend & Auto-Align Layers Commands- The New 3D Commands- Resizing & Cropping Images- Understanding Pixels & Resolution-The Image Size Command-Interpolation Options-Resizing for Print & Web- Cropping & Straightening an Image- Adjusting Canvas Size & Canvas Rotation.										
Lab Experiments Using Image Editing Tools e										
UNIT III			HTML						6+6	
Introduction-webpage-Website- HTML Structure –Basic Tags: – Heading-Paragraphs-Line Breaks –HTML Elements: - Introduction to elements of HTML -Working with Text - Working with Lists, Tables and Frames - Working with Hyperlinks, Images and Multimedia										
Lab Experiments Using HTML										
UNIT IV			Image and Text Editing- Layers and Effects						6+6	
Layers -Background Layer- Creating, Selecting, Linking & Deleting Layers- Locking &Merging										

Layers-Copying Layers, Using Perspective & Layer Styles- Filling & Grouping Layers-Introduction to Blending Modes-Blending Modes, Opacity & Fill Creating & Modifying Text-**Photo Retouching** -The Red Eye Tool-The Clone Stamp Tool- The Patch Tool & the Healing Brush Tool-**Color Correction**:-Adjusting Levels-Adjust Curves-**Creating Special Effects**-Getting Started with Filters-Creating Text Effects- Applying Gradients to Text-**Exporting**- Saving with Different File Formats-Saving for Web & Devices-Printing Options

Lab Experiments Using Image Editing Tools

UNIT V	2D Animation	6+6
---------------	---------------------	------------

Exploring the 2D environment – working with images - basic drawing and selection – shapes – color – text – layers – scene and frame label – symbol and instance – animation

Lab Experiments Using 2D Animation Tools

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	-	30	60

TEXT BOOK

- 1.Prabat K Andleigh and Kiran Thakrar, “Multimedia Systems and Design”, PHI Resent, 2003.
- 2.R.Lavanya, HTML 5, Ane Books Pvt. Ltd, 2011”
- 3.Judith Jeffcoate, “Multimedia in practice technology and Applications”, PHI,1998.

REFERNCES

- 1.Adobe Photoshop CS 2 - One on One (2005 edition) by Deke McClelland
- Macromedia Flash MX 2004: The Complete Reference by Brian Underdahl
- 2.Foley, Vandam, Feiner, Huges, 2003. “Computer Graphics: Principles & Practice”, Pearson Education, second edition .
3. PhotoShopCS for digital photographers by Colin Smith Publisher: Charles River Media. 1st edition .
4. ActionScript for Flash MX: The Definitive Guide, 2nd Edition By Colin Moock.

E-REFERENCES:

1. <https://www.youtube.com/watch?v=ZGXS5HoBYAQ>
2. <https://www.youtube.com/watch?v=spoJ7Z8LzW8>
3. www.tutorialspoint.com/listtutorials/multimedia/1
4. <http://www.vlab.co.in>

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	2	2	2	2	1	1	2	2	2
CO2	2	3	2	1	1	1	1	3	2	2
CO3	2	2	3	1	2	1	1	3	3	2
CO4	2	3	1	1	1	1	1	2	2	2
CO5	2	1	1	2	2	1	1	2	2	2
Average	2	2	2	1	2	1	1	2	2	2

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

Course Code	YSE 302	L	T	P	C
Course Name	Operating Systems	3	1	0	4
Prerequisite	YSE103	L	T	P	H
C:P:A	3:0:0	3	1	0	4
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		Remember	
CO2	Ability to explain the best CPU scheduling algorithms and Calculate scheduling problems	Cognitive		Understand Apply	
CO3	Ability to <i>express various</i> memory management techniques and calculate paging problems.	Cognitive		Understand Apply	
CO4	Indicate the importance of file system various Operating Systems.	Cognitive		Understand	
CO5	Classify functionality I/O system of an operating system	Cognitive		Understand	
UNIT I	OVERVIEW OF AN OPERATING SYSTEM				9+3
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 – Interposes communication – communication in client-server systems.					
UNIT II	PROCESS SCHEDULING AND SYNCHRONIZATION				9+3
CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling –. Process Synchronization: The critical-section problem –Synchronization hardware – Semaphores – Classic problems of synchronization –critical regions –Deadlock: System model – Deadlock characterization –Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance –Deadlock detection – Recovery from deadlock.					
UNIT III	STORAGE MANAGEMENT				9+3
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..					
UNIT IV	FILE SYSTEMS				9+3
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.					
UNIT V	I/O SYSTEMS				9+3
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.					
LECTURE		TUTORIAL		PRACTICAL	
45		15		-	
Text book				TOTAL 60	
1.Harvey M. Deital.2004. Operating Systems. Third Edition.US. Pearson Education. 2.W. Stallings.2011.Operating Systems. Seventh Edition. US: Prentice Hall..					
E-References					
1. NPTEL Evidence, 2009. IISc Bangalore. [Online] Available at: http://nptel.ac.in/courses/Webcoursecontents/IIScBANG/Operating%20Systems/New_index1.html					
2. http://nptel.iitg.ernet.in/Comp_Sci_Engg/IISc%20Bangalore/Operating%20Systems.htm					

CO Versus PO mapping.

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	3	2	1					3		2
CO2	2	1	2	2			2			2
CO3	2	2	1				2			3
CO4	2	2	1							
CO5	2	1				1		3		1
Total	11	8	5	2		1	2	6		8
Scaled Value	3	2	1	1		1	1	2		2

0-No relation 1– Low relation 2- Medium relation 3- Highly relation

YSE303			PROGRAMMING IN JAVA				L	T	P	C
							3	0	2	5
C	P	A					L	T	P	H
2	2.8	0.2					3	0	4	7
PREREQUISITE: YSE105										
COURSE OUTCOMES						DOMAIN		LEVEL		
After the completion of the course, students will be able to										
CO1	Recognize the importance of the Object Oriented Programming.					Cognitive Psychomotor		Remember Perception		
CO2	Identify and Achieve the Java Programming concepts and the relationships among them.					Cognitive Psychomotor		Understand Set		
CO3	Illustrate and practice the usage of Arrays, Interface and Packages and also Be Aware of the utilization of the concepts in the real time application.					Cognitive Psychomotor Affective		Apply Guided Response Receive		
CO4	Demonstrate the concept of Multithreaded Programming and Exception Handling and Contribute more in the team work towards application development.					Cognitive Psychomotor Affective		Apply Mechanism Respond		
CO5	Develop and Maintain the Java application software.					Cognitive Psychomotor		Create Complete Overt Response		
UNIT I			INTRODUCTION					9+12		
Fundamentals of Object Oriented Programming – Java Evolution – Overview of Java Language – Constants, Variables and Data Types – Operators and Expressions – Decision Making and Branching – Decision Making and Looping										
Lab										
1. Simple Java Programs										
2. Decision Making, Branching and Looping										
UNIT II			CLASSES, OBJECTS AND METHODS					9+12		
Introduction – Defining a Class – Adding Variables – Adding Methods – Creating Objects – Accessing Class Members – Constructors – Method Overloading – Static Members – Nesting of Methods – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Finalizer Methods – Abstract Methods and Classes – Visibility Control										
Lab										
3. Constructors and Method Overloading										
4. Inheritance and Method Overriding										
UNIT III			ARRAYS, INTERFACE AND PACKAGES					9+12		
Arrays - One-Dimensional Array – Creating an array – Two-Dimensional Array – Strings – Vectors – Wrapper Classes – Interfaces: Multiple Inheritance – Packages										
Lab										
1. Arrays and Strings										
2. Interfaces and Packages										
UNIT IV			MULTITHREADED PROGRAMMING					9+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 3. Multi Threading 4. Exception Handling			
UNIT V	APPLET PROGRAMMING		9+12
Introduction – Applet Life Cycle – Creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML File – Running the Applet – Passing Parameters to Applets – Getting Input from the User - Abstract Windowing Toolkit			
Lab 9. Applet Programming 10. Event Handling			
LECTURE	TUTORIAL	PRACTICAL	TOTAL HOURS
45	-	60	105
TEXT BOOKS: 1. Herbert Schildt,“Java 2 – The Complete Reference”, Seventh Edition, Tata McGraw Hill, 2015.			
REFERENCES: 1. Rajiv Chopra, “Java Programming”, First Edition, New Age International, 2015. 2. C.Muthu,“Programming With Java”, 2nd Edition, Tata Mcgraw Hill Education Private Ltd., 2009.			
E-REFERENCES: 1. https://www.cse.iitb.ac.in/~nlp-ai/javalect_august2004.html 2. http://www.tutorialspoint.com/java/ 3. http://www.w3schools.in/java/ 4. http://beginnersbook.com/java-tutorial-for-beginners-with-examples/			

Mapping of COs with POs

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	3				1					
CO2	2	3								
CO3	1	3	3	2	2					
CO4	1	3	3	2	2	3	2	1		
CO5		3	3	3	2	3	2	1	2	3
Total	7	12	9	7	7	6	4	2	2	3
Scaled Value	2	3	2	2	2	2	1	1	1	1

1-5 → 1, 6 -10 → 2, 11 -15 → 3

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

COURSE CODE	YSE304	L	T	P	C
COURSE NAME	SOFTWARE DESIGN AND ARCHITECTURE	3	1	0	4
PREREQUISITE	YSE206	L	T	P	H
C:P:A	3:0:0	3	1	0	4
COURSE OUTCOMES		DOMAIN		LEVEL	
After the completion of the course, students will be able to					
CO1	<i>Describe</i> the aids of software Design in different stages of the software lifecycle	Cognitive		Understand	
CO2	<i>Apply</i> Unified modelling language to document software Design.	Cognitive		Apply	
CO3	<i>Analyze, Apply and Evaluate</i> design patterns to enhance the software quality.	Cognitive		Analyze, Apply, Evaluate	
CO4	<i>Design</i> and <i>understand</i> software architecture for large scale software systems.	Cognitive		Design Understand	
CO5	<i>Recognize</i> major software architectural styles, and design patterns.	Cognitive		Remember	
UNIT I - INTRODUCTION TO DESIGN PRINCIPLES					12
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					12
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					12
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					12
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					12
Introduction – Data flow styles – Call-return styles – Shared Information styles – Event styles – Case studies for each style					
	LECTURE	TUTORIAL	PRACTICAL	TOTAL	
HOURS	45	15	0	60	
TEXTBOOKS					
1. David Budgen, "Software Design", 2nd Edtion, Addison Wesley, 2003					

2. Eric Gamma et al., "Design Patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley Professional, 1994.
3. David Garlan and Mary Shaw, "Software architecture: Perspectives on an emerging discipline", Prentice Hall, 1996.

REFERENCES:

4. Kathy sierra, Bert Bates, "Head First Design Pattern", Oreilly publications,
5. Anthony J Lattanze, "Architecting Software Intensive System. A Practitioner's Guide", Auerbach Publications, 2010.

Mapping of COs with POs

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

1 -- 5 → 1, 6 -- 10 → 2, 11--15 → 3

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

XUM306			DISASTER MANAGEMENT				L	T	P	C
							3	0	0	0
C	P	A					L	T	P	H
2.75	0	0.25					3	0	0	3
PREREQUISTE: XES202										
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.

E- RESOURCES:

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

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

			PYTHON PROGRAMMING				L	T	P	C
							0	0	1	1
							L	T	P	H
C	P	A					1	0	1	2
0.5	0.4	0.1								
PREREQUISITE: Nil										
COURSE OUTCOMES:										
COURSE OUTCOMES							DOMAIN		LEVEL	
After the completion of the course, students will be able to										
CO1	Recognize the significance of Python						Cognitive Psychomotor		Remember Perception	
CO2	Express the knowledge on events and functions of Python						Cognitive		Understand	
CO3	Employ the understanding of the Python and Establish a application programme on their own and actively participate in the teams for designing various projects						Cognitive Psychomotor Affective		Apply Set Respond	
Introduction - History - Features - Setting up path - Working with Python - Basic Syntax - Variable and Data Types - Operator - Conditional Statements - Looping - Control Statements - String Manipulation - Lists - Tuple - Functions - Modules - Input-Output - Exception Handling - Database										
Lab:										
1. Obtaining user data										
2. Using conditionals										
3. Using Random numbers										
4. Using Iteration										
5. Using Tuples										
6. Using Functions										
LECTURE			TUTORIAL			PRACTICAL		TOTAL		
15			-			15		30		
TEXT BOOKS:										
Problem Solving and Python Programming Paperback – 2017 by Kulkarni, YesDee Publication										
REFERENCES:										
1. David Beazley and Brian K.Jones,”Python Cookbook”, Third Edition, O’Reilly Media, Inc.,CA, 2013.										
2. Mark Lutz, “Learning Python”, Fifth Edition, O’Reilly Media, Inc.,CA, 2013.										
E-REFERENCES:										
1. https://docs.python.org/3/tutorial/										
2. https://www.tutorialspoint.com/python/										
3. https://www.learnpython.org/										
4. https://www.javatpoint.com/python-tutorial										
5. http://thepythonguru.com/										

YSE 401			SOFTWARE PROJECT MANAGEMENT				L	T	P	C
							2	1	0	3
							L	T	P	H
C	P	A					L	T	P	H
2	0	0					2	1	0	3
PREREQUISITE: YSE206										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize and Express the importance of project evaluation and planning.						Cognitive		Remember Understand	
CO2	Describe and Select the appropriate project approach and effort estimation techniques.						Cognitive		Remember Understand	
CO3	Define and Defend the project activity planning and risk management.						Cognitive		Remember Understand	
CO4	Describe and Classify the project monitoring, control and managing contracts.						Cognitive		Remember Understand	
CO5	Define and Defend the managing people in software environments.						Cognitive		Remember Understand	
UNIT I			PROJECT EVALUATION AND PROJECT PLANNING						6+3	
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 programme Management – Stepwise Project Planning.										
UNIT II			PROJECT LIFE CYCLE AND EFFORT ESTIMATION						6+3	
Software processes and Process Models – Choice of Process models – Incremental delivery– Rapid Application development – Agile methods – Extreme Programming – Scrum Model – Managing interactive processes – Basics of Software estimation – Software effort estimation techniques – COSMIC Full function points – COCOMO II: A Parametric Productivity Model – Staffing Pattern.										
UNIT III			ACTIVITY PLANNING AND RISK MANAGEMENT						6+3	
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 – Management – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules.										
UNIT IV			PROJECT MONITORING AND CONTROL						6+3	
Creation of Framework – Collection of data – Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis – Change control- Software Configuration Management – Managing contracts – Contract Management.										
UNIT V			STAFFING IN SOFTWARE PROJECTS						6+3	
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	
30			15			-			45	
TEXT BOOKS										
1. Bob Hughes and Mike Cotterell, 2011 “Software Project Management “ 5 th 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 402			DATA BASE MANAGEMENT SYSTEM				L	T	P	C
							3	0	1	4
C	P	A					L	T	P	H
2.5	0.5	0					3	0	2	5
PREREQUISITE: YSE103										
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							9+6
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							9+6
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							9+6
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							9+6
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			9+6
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	-	30	75	
TEXTBOOK				
1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, 2011.“Database System Concepts”, Sixth Edition, Tata McGraw Hill. 2. Ramez Elmasri, Shamkant B. Navathe., 2008. “Fundamentals of Database Systems”, Fifth Edition , Pearson. 3. Raghu Ramakrishnan., 2010. “Database Management Systems”, Fourth Edition, Tata McGraw Hill. 4. G.K.Gupta, 2011.”Database Management Systems”, Tata McGraw Hill.				

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	0	1	2	0	1	0	0	1	3	3
CO2	0	1	1	1	0	0	0	0	1	1
CO3	1	3	1	1	1	0	0	1	3	3
CO4	1	3	2	1	1	1	1	1	3	3
CO5	3	3	2	2	1	1	1	2	3	2
Average	1	2	2	1	1	0	0	1	3	2

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

COURSE CODE		YSE 403	L	T	P	C
COURSE NAME		COMPUTER NETWORKS	3	1	0	4
PREREQUISITES		YSE202	L	T	P	H
C:P:A		2.8 : 0.2 :0	3	1	0	4
COURSE OUTCOMES			DOMAIN		LEVEL	
CO1	Recognize the importance of computer networks and explain the network models, media, layering.		Cognitive		Remember	
			Psychomotor		Guided	
CO2	Describe the functionalities of layer and indicate the various network connecting devices.		Cognitive		Understand	
CO3	Demonstrate the unicast and multicast routing.		Cognitive Psychomotor		Understand Response	
CO4	Match and Show the protocol for real time applications.		Cognitive Psychomotor		Remember Set	
CO5	Analyze the protocols of application layer and Design a simple networks.		Cognitive Psychomotor		Analyze Origination	
UNIT I		NETWORK FUNDAMENTALS AND PHYSICAL LAYER				9+3
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				9+3
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				9+3
Introduction to Network Layer – Network Layer Protocols – Unicast Routing – Multicast Routing						
UNIT IV		TRANSPORT LAYER				9+3
Introduction to Transport Layer – Transport Layer Protocols – User Datagram Protocol – Transmission Control Protocol – SCTP						
UNIT V		APPLICATION LAYER AND SECURITY				9+3
Introduction to Application Layer – Standard Client Server Protocols – Multimedia – WWW and HTTP – FTP – Electronic Mail – TELNET - DNS						
LECTURE		TUTORIAL		PRACTICAL		TOTAL HOURS
45		15		-		60
TEXT BOOKS						
1. Behrouz A.Forouzan, “Data Communications and Networking”, Fifth Edition, McGraw Hill Education, 2013.						
REFERENCES						
1. Achyut S Godbole,Atul Hahate, “ Data Communications and Networks”, Second Edition, New Delhi : Tata McGraw-Hill Education, 2011.						
2. Andrew S. Tanenbaum, David J. Wetherall “Computer Networks”, Fifth Edition, Pearson Education Inc., 2013.						
3. William Stallings, “Data and Computer Communications”, Tenth Edition, Pearson Education, 2014.						
E-REFERENCES						
1. Video Lecture Link:						

http://media.pearsoncmg.com/ph/streaming/esm/tanenbaum5e_videonotes/tanenbaum_videonotes.html

2. Lecture Slides, Multiple Choice Questions, Animations Link:

http://highered.mheducation.com/sites/0072967757/student_view0/index.html

3. 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

YSE404			.NET TECHNOLOGIES				L	T	P	C
							3	0	1	4
C	P	A					L	T	P	H
2.8	1	0.2					3	0	2	5
PREREQUISITE: YSE303										
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	Express and relate decision and iteration control structures to implement programs						Cognitive Psychomotor	Understand Perception		
CO3	Predict and Create database connection and manipulate the data source						Cognitive Psychomotor	Understand Create Guided Response		
CO4	Choose and Apply controls and reproduce well-structured .NET applications						Cognitive Psychomotor	Remember Apply Guided Response		
CO5	Construct and demonstrate various real-world applications in ASP.NET with C#						Cognitive Psychomotor Affective	Create Mechanism Valuing		
UNIT I		INTRODUCTION TO .NET FRAMEWORK							7+6	
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 C#.NET							11+6	
Variables and constants – data types – declaration. Operators – types – precedence. Expressions. Program flow – Decision statements – Loop statements – Value data types – Structures, Enumerations. Reference data types- Single dimensional – Multi-dimensional arrays – jagged arrays – dynamic arrays Windows programming – creating windows Forms – windows controls –Events. 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							9+6	
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		INTRODUCTION TO ASP.NET							9+6	

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

UNIT V	APPLICATIONS OF ASP.NET WITH C#	9+6
---------------	--	------------

Windows Application: Creation of Media Player. Web Applications: Job Portal, E-mail and SMS Server, Online food ordering System.

Lab:

Real Time Projects

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	30	75

TEXT BOOKS:

1. David Chappell, "Understanding .NET", 2nd Edition, Addison-Wesley Professional, 2006.
2. Andrew Troelsen, Phil Japikse, "Pro C# 7 With .NET and .NET Core", Apress, 2017.
3. Matthew Macdonald, "ASP.NET: The Complete Reference", McGraw Hill Education, 2017.

REFERENCES:

1. Herbert Schildt, "C# 4.0 The Complete Reference", McGraw-Hill Education, 2010.
2. Marino Posadas, "Mastering C# and .NET Framework", Packt Publishing, 2016.
3. Paul Deitel and Harvey Deitel, "Visual C# How to Program", Prentice Hall; Pearson Education Limited; 6th edition (2017).

E-REFERENCES

1. www.tutorialspoint.com
2. www.microsoft.com/net
3. www.w3schools.com/aspnet

COs versus POs mapping

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	3				1		1			
CO2	2	2	1	2	3	0	2	1	1	
CO3	2	3	2	2	3	1	2	1	2	
CO4	2	3	2	2	3	0	2	1	2	3
CO5	1	3	3	2	3	1	2	1	3	2
Total	10	11	8	10	13	2	9	4	8	5
Scaled Value	2	3	2	2	3	1	2	1	2	1

1-5 → 1, 6-10 → 2, 11-15 → 3

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

YSE405A			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: YSE402														
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					
TEXTBOOK														
1. Alexis Leon, “ERP DEMYSTIFIED”, Tata McGraw Hill, Second Edition, 2008.														
REFERENCES:														
1. Mary Sumner, “Enterprise Resource Planning”, Pearson Education, 2007.														
2. Jim Mazzullo,”SAP R/3 for Everyone”, Pearson,2007														
3. Jose Antonio Fernandz, “ The SAP R /3 Handbook”, Tata McGraw Hill, 1998.														
4. Biao Fu, “SAP BW: A Step-by-Step Guide”, First Edition, Pearson Education, 2003.														
E-REFERENCES														

1. www.netsuite.com/portal/products/netsuite/erp.shtm
2. go.sap.com/product/enterprise-management/erp.html
3. www.epicor.com/solutions/erp.aspx

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	2	1	2	1	2	1	2	1
CO2	1	2	1	2	1	2	1	1	1	2
CO3	2	1	2	1	1	2	1	0	0	2
CO4	2	1	1	2	0	0	1	0	0	0
CO5	1	1	2	1	1	2	0	0	1	2
Average	2	1	2	1	1	2	1	0	1	2

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

YSE405B			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: YSE403										
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		
TEXTBOOK										
1. David Whiteley “E-commerce: Strategy, Technologies and Applications” Tata McGraw-Hill Publications, 2011.										
REFERENCE										
1. Efraim Turvan J.Lee, David kug and chung, “Electronic commerce” Pearson Education Asia 2001.										
2. Manlyn Greenstein and Miklos “Electronic commerce” McGraw-Hill, 2002										

E-Reference

1. https://www.tutorialspoint.com/e_commerce/
2. <https://www.thecounty.ca/media/pe-county/documents/.../aWhatisE-Commerce.pdf>
3. https://www.youtube.com/watch?v=7uzKi_4WMLo

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	0	0	1	1	0	0	0	1	2	2
CO2	0	1	0	1	0	1	1	1	2	2
CO3	0	2	2	1	1	2	2	2	2	1
CO4	0	1	1	1	0	1	1	1	2	2
CO5	0	1	1	1	0	1	1	1	3	3
Average	0	1	1	1	1	1	1	1	2	2

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

YSE405C			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: Nil										
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	

TEXTBOOK
1. Digital Image Processing by S.Jayaraman, S.Esakirajan, T.Veerakumar, published by Tata McGraw Hill Education private ltd,3 rd reprint 2010.
REFERENCES
1. Fundamentals of Digital Image processing by Anil K.Jain published by Prentice-hall of India pvt ltd, 3 rd reprint 2004. 2. Digital Image Processing by Rafael C.Gonzalez, Richard E.Woods, published by Pearson Prentice Hall,3 rd Edn. 3. Milan Sonka, Vaclav Hlavac and Roger Boyle,“Image Processing, Analysis and 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
CO1	3	2	3	2	2	1	1	1	1	3
CO2	2	3	2	3	1	1	1	1	2	3
CO3	3	2	3	2	2	2	1	1	2	3
CO4	3	2	2	3	1	1	1	1	1	3
CO5	2	3	2	2	2	2	1	1	2	3

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

			MongoDB				L	T	P	C
							0	0	1	1
							L	T	P	H
C	P	A								
0.5	0.5	0								
PREREQUISITE: Nil										
COURSE OUTCOMES:										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1: Recognize the basics of MongoDB Management System.							Cognitive		Remember	
CO2: Express the knowledge on Creating, Updating, Deleting Querying Indexing, Aggregation and Replication							Cognitive Psychomotor		Understand Guided Response	
Introduction - Collections - Databases - Data Types - Using the MongoDB Shell - Creating, Updating, and Deleting Documents - Querying - Query Criteria - Type-Specific Queries - Cursors - Introduction to Indexing - Types of Indexing - Special Index and Collection Types - Aggregation - aggregation framework - MapReduce support - Aggregation Commands - Replication - Components of a Replica Set - Connecting to a Replica Set from Your Application.										
Lab										
Perform all the basic CRUD operations on documents in your new database.										
Use various types of queries.										
Create a collection for for a new database.										
Populate your new collection with documents.										
Create and use indexes.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
0			7			8			15	
Text Book:										
1. Kristina Chodorow “MongoDB: The Definitive Guide” O`reilley 2 nd edition 2010.										
2. David Hows, Eelco Plugge, and Peter Membrey "MongoDB Basics" Apress, 1st Edition, 2014.										
e-Reference										
1. https://university.mongodb.com/										

YSE501			MOBILE AD HOC NETWORKS				L	T	P	C
							3	0	0	3
							C	P	A	L
3	0	0					3	0	0	3
PREREQUISITE: YSE403										
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	
TEXTBOOK										
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.										
Reference Book										
1. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobilead hoc networking, Wiley-IEEE press, 2004.										
2. Mohammad Ilyas, The handbook of adhoc wireless networks, CRC press, 2002.										
E-Reference										
1. https://www.it.iitb.ac.in/~sri/talks/manet.pdf										
2. https://pdfs.semanticscholar.org/.../8470bb1660d56e53b2a64279aa89ab874055.pdf										

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	0	1	1	2	1	0	1	0	0
CO2	1	2	2	2	1	0	1	2	1	0
CO3	1	1	2	1	1	1	1	2	1	0
CO4	0	1	2	2	1	1	0	2	2	0
CO5	1	1	1	1	2	1	1	3	1	0
Average	1	1	2	1	1	1	1	2	1	0

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

YSE502			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	2	6
PREREQUISITE : YSE303							
After the completion of the course, students will be able to							
CO1	Recognize the difference between various objects and their relationships			Cognitive	Remember		
CO2	Express and Choose appropriate notation associated with each model			Cognitive Psychomotor	Understand Choose		
CO3	Design and Explain CASE TOOLS for the construction of UML Models			Cognitive Psychomotor	Analyze Set		
CO4	Construct various UML Models			Cognitive	Create		
CO5	Show the importance of System Analysis and Design in solving complex problems			Cognitive	Apply		
UNIT I		OBJECT MODELLING				9+3+6	
Object Oriented Philosophy – Object – Object State, behaviors and methods. Encapsulation and information hiding - Class Relationship among classes -polymorphism, aggregation and object containment, Meta classes.							
Lab: Problem Analysis and Project Planning Thorough study of the problem – Identify project scope, Objectives, infrastructure.							
UNIT II		OBJECT ORIENTED METHODOLOGIES				9+3+6	
Booch methodology- OMT- Coad/Yourdon approach- Shalear/ Mellor’s approach- OOSE- Comparative study.							
Lab: Software Requirement Analysis Describe the individual Phases/ modules of the project, Identify deliverables.							
UNIT III		UML AND USE CASE MODELLING				9+3+6	
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.							
Lab: 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				9+3+6	

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	9+3+6
---------------	----------------------------	--------------

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:30	Total:90
--------------------	--------------------	---------------------	-----------------

TEXTBOOK

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

REFERENCE

1. Fowler, “Analysis Patterns”, Addison Wesley, USA, 1996.
2. Erich Gamna, “Design Patterns”, Addison Wesley, USA, 1994.

E-REFERENCES

1. https://www.tutorialspoint.com/object_oriented_analysis_design/
2. <https://www.wisdomjobs.com/e.../object-oriented-analysis-and-design-tutorial-2107.ht...>

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	2	1	1	1	1	1	1	1	1
CO2	2	1	3	2	2	1	0	1	1	0
CO3	1	2	2	0	1	3	1	2	1	1
CO4	2	2	2	2	2	1	1	1	1	0
CO5	2	2	2	1	2	3	1	3	1	0

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

YSE503			WEB TECHNOLOGIES				L	T	P	C	
							3	1	1	5	
C	P	A					L	T	P	H	
2.8	1	0.2					3	1	2	6	
PREREQUISITE: YSE103, YSE301											
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 and PHP in Web Design.					Cognitive		Understand			
CO3	Employ the understanding of the Client and Server side scripts and actively participate 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						9+3+6			
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 Lab:1. Formatting tags, ordered list and unordered list. 2.Tables, frame, image map and hyperlink.											
UNIT II		CSS & JAVASCRIPT						9+3+6			
CSS Basics – Texts and Fonts – Links, Lists and Tables – Border and Outline – Position – Dimension and Display - Java Script Basics – Functions – Events – Conditional and Looping Statements – Forms Lab:1.Font, color and style 2. Background and Links 3.Form Validation 4.Looping and Conditional Statements											
UNIT III		PHP BASIC CONCEPTS						9+3+6			
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 Lab:1. Strings and Operators 2.Flow of controls and Arrays 3.PHP Forms 4.PHP Functions											
UNIT IV		PHP ADVANCED CONCEPTS						9+3+6			
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						9+3+6			

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

Lab:PHP with MySQL

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	30	90

TEXT BOOKS:

1. AchyutS.Godbole, AtulKahate, “Web Technologies TCP/IP To Internet Application Architectures”, First Edition, Tata McGraw-Hill Publishing Company Limited, 2003.
2. Elizabeth Castro, Bruce Hyslop, “HTML 5 and CSS 3”, Eight Edition, Peachpit Press, 2015.
3. Thomas A. Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Second Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2008.
4. Kevin Tatroe, Peter MacIntyre and RasmusLerdorf, “Programming PHP”, Third Edition, O’Reilly Media, Inc., 2015.

REFERENCES:

3. N.P. Gopalan, J.Akilandeswari, “Web Technology: A Developer’s Perspective”, Second Edition, PHI Learning Private Limited, 2014.
4. Thomas A. Powell, “HTML & CSS: The Complete Reference”, Fifth Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2010.

E-REFERENCES:

1. www.php.net/manual/en/intro-what-is.php
2. www.w3schools.com
3. www.tutorialspoint.com

Table 1: Mapping of COs with POs

Course Outcomes	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	2	0	1	1	0	1	0	1	1	2
CO2	2	2	2	1	1	0	1	1	2	3
CO3	1	2	2	1	2	1	1	2	2	3
CO4	0	1	2	2	2	1	0	1	2	3
CO5	1	2	3	2	3	2	1	1	3	3
Average	1	1	2	1	2	1	1	1	2	3

1-5 → 1, 6 -10 → 2, 11 -15 → 3

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

YSE 504			OPERATION RESEARCH				L	T	P	C
							3	1	0	4
C	P	A					L	T	P	H
3	0	0					3	1	0	4
PREREQUISITE: Nil										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Explain the basic concepts of optimization and to formulate and Solve Linear programming problems.						Cognitive		Understand Apply	
CO2	Explain and Apply the concepts of Transportation problem and Assignment Problem.						Cognitive		Understand Apply	
CO3	Explain and Apply the concepts of sequencing problem						Cognitive		Understand Apply	
CO4	Explain and Demonstrate the basic concepts of PERT-CPM and their applications in product planning control.						Cognitive		Understand	
CO5	Solve the Minimal Spanning Tree Problem, Shortest Route Problem.						Cognitive		Apply	
UNIT I		Linear Models							12	
Linear Programming Problem – Formulation, Graphical solution of two variables canonical & standard form of LPP, Simplex method.										
UNIT II		Transportation and Assignment Problems							12	
Transportation algorithm - Unbalanced Transportation problem- Assignment algorithm- Unbalanced assignment problem.										
UNIT III		Sequencing Problem							12	
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							12	
Network - Fulkerson's rule- Measure of activity- PERT computation- CPM computation- Resource scheduling.										
UNIT V		Network Models							12	
Network definition- Minimal spanning tree problem- Shortest route problem.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			15			--			60	
TEXT BOOKS:										
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 2. Fundamentals of Operations Research , Advanced Operations Research, 3. Prof.G. Srinivasan, Department of Management Studies, Indian Institute of Technology, Madras.										

CO Vs PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3					1		1
CO2	3					1		1
CO3	3					1		1
CO4	3					1		1
CO5	3					1		1

0 – No relation

1- Low relation

2- Medium relation

3 – High relation

YSE505A			NETWORK PROTOCOLS				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2	1	0					3	0	0	3
PREREQUISITE: YSE403										
After the completion of the course, students will be able to										
CO1	Recognize the foundations of Internet Protocol.					Cognitive	Remember			
CO2	Demonstrate the idea of bootstrap and auto configuration.					Cognitive	Understand			
CO3	Analyze the functions of file transfer protocol.					Cognitive	Analyze			
CO4	Manipulate the issues involved in design of voice and video over IP.					Psychomotor	Guided Response			
CO5	Control and maintain the internet security and firewall design.					Psychomotor	Complete overt response			
UNIT I		INTRODUCTION							9	
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)										
UNIT II		INTERNET MULTICASTING							9	
Internet Multicasting – Mobile IP – Bootstrap And Auto configuration (BOOTP, DHCP).										
UNIT III		FILE TRANSFER SYSTEM							9	
The Domain Name System (DNS) – Applications : Remote Login (TELNET, Rlogin) – File Transfer and Access (FTP, TFTP, NFS).										
UNIT IV		APPLICATIONS							9	
Applications: Electronic Mail (SMTP, POP, IMAP, MIME) – World Wide Web (HTTP) – Voice and Video over IP (RTP).										
UNIT V		SECURITY							9	
Applications : Internet Management (SNMP) – Internet Security and Firewall Design (Ipsec) – The Future of TCP / IP (IPV6).										
LECTURE			TUTORIAL			PRACTICAL		TOTAL		
45			-			-		45		
TEXTBOOKS										
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										
REFERENCES:										
1. Udupa, “Network Management System essentials”, McGraw Hill, 1999.										
E-REFERENCES										
1. https://www.tutorialspoint.com › Internet Technologies › Internet Protocols 2. https://www.digitalocean.com/.../tutorials/an-introduction-to-networking-terminology-..										

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	2	2	2	1	1	1	2	1	1
CO2	1	2	2	1	1	1	1	2	2	1
CO3	1	2	2	2	2	2	1	1	2	1
CO4	1	2	2	2	2	1	1	2	2	1
CO5	1	2	2	2	2	1	1	2	2	1
Average	1	2	2	2	2	1	1	2	2	1

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

YSE505B			UNIX AND NETWORK PROGRAMMING				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: YSE403										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the basics of UNIX operating system						Cognitive		Remember	
CO2	Discuss various methods to handle signals and exceptions within a process and to control processes						Cognitive		Understand	
CO3	Describe how UNIX OS can support effective and efficient an interprocess communication						Cognitive		Understand	
CO4	Compare the Characteristics of TCP and UDP sockets						Cognitive		Analysis	
CO5	Create sockets to implement simple client server applications						Cognitive		Synthesis	
UNIT I		INTRODUCTION & FILE SYSTEM							9	
Overview of UNIX OS - File I/O – File Descriptors – File sharing - Files and directories – File types - File access permissions – File systems – Symbolic links - Standard I/O library – Streams and file objects – Buffering - System data files and information - Password file – Group file – Login accounting – system identification.										
UNIT II		PROCESSES							9	
Environment of a UNIX process – Process termination – command line arguments - Process control – Process identifiers - Process relationships terminal logins – Signals -threads.										
UNIT III		INTERPROCESS COMMUNICATION							9	
Introduction - Message passing (SVR4)- pipes – FIFO – message queues - Synchronization (SVR4) – Mutexes – condition variables – read – write locks – file locking – record locking – semaphores –Shared memory(SVR4).										
UNIT IV		SOCKETS							9	
Introduction – transport layer – socket introduction - TCP sockets – UDP sockets - raw sockets – Socket options - I/O multiplexing - Name and address conversions.										
UNIT V		APPLICATIONS							9	
Debugging techniques - TCP echo client server - UDP echo client server - Ping - Trace route - Client server applications like file transfer and chat.										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45									45	
TEXTBOOKS										
1. W.Richard Stevens, Advanced programming in the UNIX environment, Third Edition Addison Wesley, 2013.										
2. W. Stevens, Bill Fenner, Andrew Rudoff, "Unix Network Programming", Volume 1,The Sockets Networking API,3rd Edition, Pearson education, Nov 2003.										
REFERENCES:										
1. Meeta Gandhi,Tilak Shetty and Rajiv Shah – The ‘C’ Odyssey Unix –The open Boundless C , 1 st Edition , BPB Publications 1992										
E-REFERENCES										
1. www.tutorialspoint.com/unix_sockets/										
2. www.unixnetworkprogramming.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
CO1	3	2	3	2	2	2	1	1	1	3
CO2	2	3	2	3	1	2	1	1	2	3
CO3	3	2	3	2	2	2	1	1	2	3
CO4	2	3	2	3	1	1	1	1	1	2
CO5	2	3	2	2	2	2	1	1	2	3
Average	2	3	3	3	2	2	1	1	2	3

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

YSE505C			WIRELESS SENSOR NETWORK		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: YSE403								
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		
TEXTBOOKS								
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								

<i>Applications</i> ”, Wiley Inter Science Publications, 2007.
REFERENCES:
1. Bhaskar Krishnamachari , “ <i>Networking Wireless Sensors</i> ”, Cambridgeuniversity press, 2005.
E-REFERENCES:
1. www.ewh.ieee.org/r2/baltimore/Chapter/Comm/WSN-IEEE-Nov2005-v2.ppt
2. www.di.unipi.it/~bonucce/sensori.pdf

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	2	2	2	2	1	1	2	2	1
CO2	1	2	3	3	3	1	1	3	3	1
CO3	1	3	2	2	3	1	1	2	3	1
CO4	1	3	2	3	3	1	1	3	3	1
CO5	1	2	3	3	3	1	1	3	2	1

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

			Angular JS				L	T	P	C
							0	0	1	1
							C	P	A	L
0.5	0.5	0					0	1	1	2
PREREQUISITE: Nil										
COURSE OUTCOMES:										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1: Recognize the fundamentals and techniques of Angular JS.							Cognitive		Remember	
CO2: Express the knowledge on Invoking, MVC, Validation, Communication over http, cookies and file upload in AngularJS							Cognitive Psychomotor		Understand Guided Response	
Introduction to AngularJS - Invoking Angular - Model View Controller - Formatting Data with Filters - Changing Views with Routes and \$location - Validating User Input - Project Organization - Tools - Running Your Application - Testing with AngularJS - Relationship Between Model, Controller, and Template - Communicating Over \$http - Directives and HTML Validation - API Overview - Communicating Between Scopes with \$on, \$emit, and \$broadcast - Cookies - Internationalization and Localization - Wrapping a jQuery Datepicker - File Upload in AngularJS										
Lab:										
Create single page web applications using the MVC pattern of AngularJS										
Understand the programming model provided by the AngularJS framework										
Define Angular controllers and directives										
Control Angular data bindings										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
0			7			8			15	
TEXTBOOKS										
1. Brad Green, Shyam Seshadri "AngularJS", O'Reilly Media, 2013.										
2. Ken Williamson "Learning AngularJS: A Guide to AngularJS Development" O`reilly Media, 2015.										
REFERENCES										
1. Diego Netto,Valeri Karpov Professional Angularjs : A Concise Approach Wiley 2015										
E-REFERENCES										
1. https://www.w3schools.com/angular/										
2. www.tutorialsteacher.com/angularjs/angularjs-tutorials										

COURSE CODE			YSE601	L	T	P	C
COURSE NAME			REQUIREMENTS ENGINEERING	2	1	0	3
PREREQUISITE			YSE301	L	T	P	H
C	P	A	3:0:0	2	1	0	3
COURSE OUTCOMES				DOMAIN		LEVEL	
CO1	<i>Identify</i> the importance Graphics Interface.			Cognitive		Remember	
CO2	<i>Interpret</i> the understanding on Graphics Interface with various concepts and techniques.			Cognitive		Understand	
CO3	<i>Understand</i> the windows concepts and <i>Interpret</i> it in projects			Cognitive		Understand	
CO4	Clearly <i>understand</i> the Multimedia components and <i>apply</i> it in projects			Cognitive		Remember, Apply	
CO5	<i>Understand and Distinguish</i> 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 – Accessibility – 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	
30		15		0		45	
TEXTBOOKS:							
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							
REFERENCES :							
1. Alan Cooper, “The Essential Of User Interface Design”, Wiley – Dream Tech Ltd.,2002							
E- REFERENCES:							
1. http://nptel.ac.in/courses/106105087/20							
2. http://iitg.vlab.co.in/?sub=72&brch=170&sim=1359&cnt=1							

COs versus POs mapping

M.Sc. SE	PO								PSO	
	1	2	3	4	5	6	7	8	1	2
CO1	2	2	2	2	2	1	1	1	1	1
CO2	2	3	3	3	3	1	1	1	1	1
CO3	2	3	3	3	3	1	1	1	1	1
CO4	2	3	3	3	3	1	1	1	1	1
CO5	2	3	3	3	3	1	1	1	1	1
Total	10	14	14	14	14	5	5	5	5	5
Scaled Value	2	3	3	3	3	1	1	1	1	1

1 -- 5 → 1, 6 -- 10 → 2, 11--15 → 3

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

YSE 602			DATA WAREHOUSING AND DATA MINING				L	T	P	C
							3	0	1	4
C	P	A								
2.5	0.25	0.25					L	T	P	H
							3	0	2	5
PREREQUISITE: YSE402										
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						9+6	
Introduction, Fundamentals of data mining, Data Mining Functionalities, Data Preprocessing : Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction										
Lab:										
- Perform Data Preprocessing using tool - Perform Visualization of data using tool										
UNIT II			DATA WAREHOUSING						9+6	
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						9+6	
Mining Association Rules in Large Databases, Association Rule Mining, Apriori Algorithm and Frequent pattern growth algorithm										
Lab:										
- Classification, Association and Clustering algorithms using tool - Implement Apriori algorithm to generate frequent Item Sets										
UNIT IV			CLASSIFICATION						9+6	
Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining										
Lab:										
Implement the following classification algorithms										

i.Decision Tree Induction ii.KNN			
UNIT V	CLUSTERING		9+6
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: - Implement the following clustering algorithms - i.K-means - ii.K-mediods			
LECTURE	TUTORIAL	PRACTICAL	TOTAL
45		30	75
TEXTBOOKS:			
1. Data Mining – Concepts And Techniques - Jiawei Han & Micheline Kamber Harcourt India.			
REFERENCES:			
1. Data Mining Introductory And Advanced Topics –Margaret H Dunham, Pearson Education 2. Data Mining Techniques – Arun K Pujari, University Press. 3. Data Warehousing In The Real World – Sam Anahory & Dennis Murray. Pearson Edn Asia. 4. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley Student Edition. 5. The Data Warehouse Life Cycle Tool Kit – Ralph Kimball Wiley Student Edition.			
E-REFERENCES:			
1. http://www.tutorialspoint.com/data_mining 2. http://www.dataminingconsultant.com/resources.html			

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	3	2	3	2	2	1	1	1	1	3
CO2	2	3	2	3	1	1	1	1	2	3
CO3	3	2	3	2	2	2	1	1	2	3
CO4	3	2	2	3	1	1	1	1	1	3
CO5	2	3	2	2	2	2	1	1	2	3

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

YSE 603			SOFTWARE METRICS				L	T	P	C
							2	1	0	3
C	P	A					L	T	P	H
3	0	0					2	1	0	3
PREREQUISITE: YSE206										
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	
30			15			0			45	
TEXTBOOKS										
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.										

REFERENCES:

1. Roger S.Pressman, Software Engineering – A Practitioners approach, 2010, Tenth Edition, McGraw-Hill Publications.

E-REFERENCES:

1. <https://stackify.com/track-software-metrics/>
2. sunnyday.mit.edu/16.355/metrics.pdf

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	3	1	1	1	1	1	1	1	0	0
CO2	1	1	1	1	0	1	0	1	0	0
CO3	1	1	0	1	0	2	2	1	1	0
CO4	1	1	1	1	0	1	0	1	0	0
CO5	1	1	0	0	1	2	1	1	1	1
Average	1	1	1	1	0	1	1	1	0	0

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

YSE604A			CLIENT SERVER COMPUTING				I	T	P	C				
							3	0	0	3				
C	P	A									I	T	P	H
3	0	0									3	0	0	3
PREREQUISITE: YSE103, YSE402														
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						
TEXTBOOKS:														
1. Robert Orfali, Dan Harkey and Jerri Edwards, Essential Client / Server Survival Guide, John Wiley and sons Inc. 1998.														
REFERENCES:														

1. David J. Kruglinski, Inside Visual C++, Microsoft Press 1992.
2. Boar, B.H., Implementing Client / Server Computing ; A Strategic Perspectre, Mcraw Hill, 1993.
3. Bouce Elbert, Client / Server Computing, Artech. Press, 1994.
4. Alex Berson, Client / Server Architecture, McGraw Hill, 1996.

E-REFERENCES:

1. fivedots.coe.psu.ac.th/~suthon/csw/01%20-%20Client%20Server%20Computing.pdf
2. www.bcanotes.com/Download/DBMS/Rdbms/Client_Server%20Computing.pdf

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	2	1	1	1	1	2	2	1
CO2	1	2	1	1	1	1	1	2	2	1
CO3	1	1	2	1	1	1	1	2	2	1
CO4	1	2	1	1	1	1	1	2	1	1
CO5	1	1	3	2	1	1	2	2	1	1
Average	1	1	2	1	1	1	1	2	2	1

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

YSE604B			XML AND WEB SERVICES				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: YSE503										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Identify the importance of XML and Web Services.						Cognitive		Remember	
CO2	Interpret the understanding on schemas and technologies of XML.						Cognitive		Understand	
CO3	Employ the suitable protocol for the development of the web services.						Cognitive		Apply	
CO4	Outline the architecture and technologies of Web Services.						Cognitive		Remember	
CO5	Distinguish the various methods of the XML Security.						Cognitive		Understand	
UNIT I		INTRODUCTION							9	
Role of XML – XML and the Web – Simple Object Access Protocol – Web Services – Revolutions of XML										
UNIT II		XML TECHNOLOGY							9	
XML – Namespaces – Structuring with Schemas – Presentation Technologies – Transformation – XML Infrastructure Technologies										
UNIT III		SOAP							9	
Overview of SOAP – HTTP – XML-RPC – SOAP Protocol – Message Structure – Intermediaries – Actors – Design Patterns And Faults – SOAP with Attachments										
UNIT IV		WEB SERVICES							9	
Overview – Architecture – Key Technologies - UDDI – WSDL – ebXML – SOAP, Web Services and E-Commerce – Overview Of .NET And J2EE.										
UNIT V		XML SECURITY							9	
Security Overview – Canonicalization – XML Security Framework – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines for Signing XML Documents										
LECTURE			TUTORIAL			PRACTICAL			TOTAL	
45			-			-			45	
TEXTBOOKS:										
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.										
REFERENCES:										
1. Gustavo Alonso, Fabio Casati, Harumi Kuno, Vijay Machiraju, Web Services Concepts, Architectures and Applications, Springer, 2004										
E-REFERENCES:										
1. www.w3schools.com/xml/xml_soap.asp										

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	0	1	1	1	0	1	0	1	1	1
CO2	1	1	2	3	1	1	1	2	2	3
CO3	0	1	3	2	2	0	0	2	3	2
CO4	1	0	2	2	1	1	0	2	2	2
CO5	1	1	2	2	3	1	1	1	2	2
Average	1	1	2	2	1	1	1	2	2	2

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

YSE604C			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: YSE402										
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
TEXTBOOKS:			
1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education/Addison Wesley, 2007.			
REFERENCES:			
1. Thomas Cannolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2007. 2. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Fifth Edition, McGraw Hill, 2006. 3. C.J.Date, A.Kannan and S.Swamynathan, ”An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006. 4. Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, McGraw Hill, Third Edition 2004 5. Abraham Silberschatz, Henry F.Korth and S.Sudarshan, “Database System Concepts”, Fourth Edition, McGraw Hill, 2002.			
E-REFERENCES:			

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

YSE605A			PRINCIPLES OF MANAGEMENT				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
2.5	0.25	0.25					3	0	0	3
PREREQUISITE: Nil.										
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	
TEXTBOOKS:										
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.										

REFERENCES:

1. Hellriegel, Slocum & Jackson, ' Management - A Competency Based Approach', Thomson South Western, 10th edition, 2007.

E-REFERENCES:

1. <https://www.pearsonhighered.com>
2. 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
CO1	0	0	1	1	0	0	0	1	2	2
CO2	0	1	0	1	0	1	1	1	2	2
CO3	0	2	2	1	1	2	2	2	2	1
CO4	0	1	1	1	0	1	1	1	2	2
CO5	0	1	1	1	0	1	1	1	3	3
Average	0	1	1	1	1	1	1	1	2	2

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

COURSE CODE	YSE605B	L	T	P	C
COURSE NAME	TOTAL QUALITY MANAGEMENT	3	0	0	3
PREREQUISITES	NIL	L	T	P	H
C:P:A	2.76:0:0.24	3	0	0	3
COURSE OUTCOMES		DOMAIN		LEVEL	
CO1	<i>Explain</i> the basic concepts of quality management with effective leadership.	Cognitive		Understand	
CO2	<i>Describe</i> and <i>Identify</i> the Continuous process improvement	Cognitive Affective		Understand Receive	
CO3	<i>Relate</i> and <i>Use</i> the old and new seven management tools for statistical process control	Cognitive Affective		Understand Receive	
CO4	<i>Distinguish</i> the concept of total productive Maintenance with Continuous process improvement.	Cognitive		Understand	
CO5	<i>Explain</i> the different methods ISO	Cognitive		Understand	
UNIT I INTRODUCTION				09	
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				09	
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)				09	
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				09	
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 DEPRECIATION				09	
NeedforISO9000 and Other Quality Systems, ISO9000:2000 Quality System Elements, Implementation of Quality System, Documentation, Quality Auditing, TS16949,ISO14000– Concept, Requirements and Benefits.					
		LECTURE	TUTORIAL	TOTAL	
HOURS		45	0	45	
TEXT BOOKS					
1. Dale H.Besterfiled,etal.,“TotalQualityManagement”,PearsonEducation,Inc.2004. (ISBN 81-297-0260-6).					

2. James R. Evans & William M. Lindsay, "The Management and Control of Quality", Fifth Edition, South-Western, 2002. (ISBN 0-324-06680-5).

REFERENCES:

1. Feigenbaum, A. V. "Total Quality Management", McGraw-Hill, 1991.
2. Oakland, J. S. "Total Quality Management", Butterworth-Heinemann Ltd., 1989.
3. Narayana V. and Sreenivasan, N. S. "Quality Management – Concepts and Tasks", New Age International 1996.
4. Zeiri, "Total Quality Management for Engineers", Wood Head Publishers, 1991.

E-REFERENCES

1. <https://www.radio-electronics.com/info/.../tqm-total-quality-management-basics.php>
2. <https://www.tutorialspoint.com › Management Concepts › Total Quality Management>

Mapping of CO's with GAs

	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁₀	PO ₁₁	PO ₁₂
CO1	1	2	0	1	0	0	1	1	1	2	2	3
CO2	2	2	1	2	0	0	2	1	1	2	3	3
CO3	2	2	1	3	0	0	2	2	1	2	2	3
CO4	1	2	1	2	0	0	0	1	1	1	2	3
CO5	1	2	0	1	0	0	1	1	0	1	2	3
Scaled	1	2	1	2	0	0	1	1	1	2	2	3

0 – No relation

1- Low relation

2- Medium relation 3 – High relation

YSE605C			ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2.5	0	0.5		3	0	0	3
PREREQUISITE :							
Course Outcome				Domain		Level	
After the completion of the course, students will be able to							
CO1	<i>Recognize</i> and <i>describe</i> the personal traits of an entrepreneur.			Affective Cognitive		Receiving Understand	
CO2	<i>Determine</i> the new venture ideas and <i>analyze</i> the feasibility report.			Cognitive		Understand Analyse	
CO3	<i>Develop</i> the business plan and <i>analyze</i> the plan as an individual or in team.			Affective Cognitive		Receiving Analyse	
CO4	<i>Describe</i> various parameters to be taken into consideration for launching and managing small business.			Cognitive		Understand	
CO5	<i>Describe</i> 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
TEXTBOOKS:			
1. Hisrich, 2016, <i>Entrepreneurship</i> , Tata McGraw Hill, New Delhi. 2. S.S.Khanka, 2013, <i>Entrepreneurial Development</i> , S.Chand and Company Limited, New Delhi.			
REFERENCES			
1. Mathew Manimala, 2005, <i>Entrepreneurship Theory at the Crossroads, Paradigms & Praxis</i> , Biztrantra, 2nd Edition. 2. Prasanna Chandra, 2009, <i>Projects – Planning, Analysis, Selection, Implementation and Reviews</i> , Tata McGraw-Hill. 3. P.Saravanavel, 1997, <i>Entrepreneurial Development</i> , Ess Pee kay Publishing House, Chennai. 4. Arya Kumar, 2012, <i>Entrepreneurship: Creating and Leading an Entrepreneurial Organisation</i> , Pearson Education India. 5. Donald F Kuratko, T.V Rao, 2012, <i>Entrepreneurship: A South Asian perspective</i> , Cengage Learning India.			
E-REFERENCES			
1. Dinesh Awasthi, Raman Jaggi, V.Padmanand, <i>Suggested Reading / Reference Material for Entrepreneurship Development Programmes (EDP/WEDP/TEDP)</i> , EDI Publication, Entrepreneurship Development Institute of India, Ahmedabad. Available from: http://www.ediindia.org/doc/EDP-TEDP.pdf 2. Jeff Hawkins, “ Characteristics of a successful entrepreneur”, ALISON Online entrepreneurship courses, “ https://alison.com/learn/entrepreneurial-skills 3. 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					

YSE801			SOFTWARE TESTING AND QUALITY ASSURANCE				L	T	P	C
							3	0	1	4
C	P	A					L	T	P	H
2.5	0.5	0					3	0	2	5
PREREQUISITE: YSE206										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Recognize the software quality assurance plan						Cognitive		Remember	
CO2	Demonstrate the software Testing concepts.						Cognitive		Understand	
CO3	Analyze the different testing strategies and methods for test case design.						Cognitive		Analyze	
CO4	Identify the levels of testing and management.						Psychomotor		Perception	
CO5	Describe various test process.						Psychomotor		Perception	
UNIT I			INTRODUCTION TO SOFTWARE QUALITY ASSURANCE PLAN						9+6	
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.										
Lab: 1. Preparation of project management plan. 2. Preparation of Requirement Management plan using any case tools.										
UNIT II			INTRODUCTION TO SOFTWARE TESTING						9+6	
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.										
Lab: 1. Case study preparation of cost estimation model.										
UNIT III			STRATEGIES AND METHODS FOR TEST CASE DESIGN						9+6	
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										
Lab : 1. Test case generation manually for real time application. 2. Practice function testing using manual testing. 3. Practice black box testing concepts manually.										
UNIT IV			LEVELS OF TESTING AND MANAGEMENT						9+6	
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										
Lab : 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										
UNIT V			CONTROLLING AND MONITORING THE TEST PROCESS						9+6	
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		30	75
TEXTBOOKS			
1. Ilene Burnstein, “Practical Software Testing “, Springer International Edition, Chennai 2003.			
REFERENCES:			
1. Renu Rajani and Pradeep Oak “ Software Testing – Effective Methods, Tools and Techniques” Tata McGraw Hill Publications New Delhi 2007. 2. Elfriede Dustin, “Effective Software Testing “Pearson Education, New Delhi, 2003. 3. Glenford J. Myers, John Wiley & Sons "The Art of Software Testing," Hoboken, New Jersey, 2004. 4. Edward Kit, “Software Testing in the Real World - Improving the Process”, Pearson Education, New Delhi, 1995.			
E-REFERENCES			
1. https://www.w3schools.in/category/software-testing/ 2. https://www.testingexcellence.com/istqb-tutorial/			

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

YSE802			BIG DATA ANALYTICS USING R				L	T	P	C
							3	0	1	4
C	P	A					L	T	P	H
3	0	0					3	0	2	5
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+6		
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										
Lab:										
- Installing and configuring R Studio. - Program to create a vector.										
UNIT II			NO SQL MANAGEMENT					9+6		
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										
Lab:										
- Program to create a Simple Functions - Program to create Data frame										
UNIT III			BASICS OF HADOOP					9+6		
Introduction to Hadoop - Hadoop Architecture- Map Reduce in Hadoop - Data format – analyzing data with Hadoop - Design of Hadoop distributed file system (HDFS) – HDFS concepts										
Lab:										
- Program to create list - Program to create array - Program to create time series										
UNIT IV			MAP REDUCE APPLICATIONS					9+6		
Classic Map-reduce – YARN – failures in classic Map-reduce and YARN – job scheduling – shuffle and sort – task execution – MapReduce types – input formats – output formats										
Lab:										
- Producing Frequency Distributions - Creating a Charts - Creating a Histogram in R										
UNIT V			HADOOP RELATED TOOLS					9+6		

Hbase – data model and implementations –Cassandra – cassandra data model – cassandra examples –Hadoop integration. Pig – pig data model Hive – data types and file formats – HiveQL			
Lab:			
• Generating Measures of Central Tendency • Calculating a One-sample t-test in R			
LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	30	75
TEXTBOOKS			
1. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.			
REFERENCES:			
1. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012. 2. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012. Eric Sammer, "Hadoop Operations", O'Reilley, 2012. 3. E. Capriolo, D. Wampler, and J. Rutherglen, "Programming Hive", O'Reilley, 2012. 4. Lars George, "HBase: The Definitive Guide", O'Reilley, 2011. 5. Eben Hewitt, "Cassandra: The Definitive Guide", O'Reilley, 2010. 6. Alan Gates, "Programming Pig", O'Reilley, 2011.			
E-REFERENCES			
1. https://www.tutorialspoint.com/big_data_analytics/ 2. https://pdfs.semanticscholar.org/d392/0f02dbb15da19b04d782fc0546ef113e0bf7.pdf 3. https://www.guru99.com/bigdata-tutorials.html 4. https://www.statmethods.net/r-tutorial/index.html 5. www.r-tutor.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
CO1	3	2	3	2	2	1	1	1	1	3
CO2	2	3	2	3	1	1	1	1	2	3
CO3	3	2	3	2	2	1	1	1	2	3
CO4	3	2	2	3	1	1	1	1	1	3
CO5	2	3	2	2	2	1	1	1	2	3

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

YSE 803			SOFTWARE PROJECT REPORT PREPARATION				L	T	P	C
							2	1	0	3
C	P	A					L	T	P	H
2.0	0.75	0.25					2	1	0	3
PREREQUISITE: Nil										
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		
30			15			-		45		
TEXTBOOKS										
1. M. Ashraf Rizvi Effective Technical Communication, McGraw Hill Publication, Second Edition										
REFERENCES:										
1. Day –to –day English Part I - Prof.Dr.V.R. Angapan ,2010, 7 th edition										

E-REFERENCES

1. https://en.wikiversity.org/wiki/Technical_writing_Types_of_User_Documentation
2. https://en.wikipedia.org/wiki/Software_documentation

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	0	0	0	0	0	3	3	0	1	1
CO2	0	1	0	0	0	3	3	0	0	0
CO3	0	1	0	0	0	3	3	0	1	1
CO4	0	1	0	0	0	3	3	0	1	1
CO5	1	1	0	0	0	1	1	1	1	1
Average	0	1	0	0	0	3	3	0	1	1

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

YSE804			MACHINE LEARNING ALGORITHMS				L	T	P	C
							3	1	0	4
C	P	A								
3	0	0					L	T	P	H
							3	1	0	4
PREREQUISITE: YSE602										
Course Outcomes						Domain		Level		
After the completion of the course, students will be able to										
CO1		Understand the supervised, unsupervised and semi-supervised learning				Cognitive		Remember		
CO2		Apply the apt machine learning strategy for any given problem				Cognitive		Apply		
CO3		Identify supervised, unsupervised or semi-supervised learning algorithms for any given problem				Cognitive		Knowledge Analysis		
CO4		Recognize the systems design that uses the appropriate graph models of machine learning				Cognitive		Knowledge Analysis		
CO5		Modify the existing machine learning algorithms to improve classification efficiency				Cognitive		Create		
UNIT I		INTRODUCTION						9+3		
Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.										
UNIT II		LINEAR MODELS						9+3		
Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines										
UNIT III		TREE AND PROBABILISTIC MODELS						9+3		
Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map										
UNIT IV		DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS						9+3		
Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process										
UNIT V		GRAPHICAL MODELS						9+3		
Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods										
LECTURE				TUTORIAL			PRACTICAL		TOTAL	
45				15			-		60	

REFERENCES:		
TEXT BOOKS: 1. Stephen Marsland, —Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014. 2. Tom M Mitchell, —Machine Learning, First Edition, McGraw Hill Education, 2013.		
REFERENCES: 1. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Data, First Edition, Cambridge University Press, 2012. 2. Jason Bell, —Machine learning – Hands on for Developers and Technical Professionals, First Edition, Wiley, 2014 3. Ethem Alpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014		
E-REFERENCES: https://www.toptal.com/machine-learning/machine-learning-theory-an-introductory-primer https://machinelearningmastery.com/start-here/		

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	2	1	1	1	1	2	2	1
CO2	1	2	1	1	1	1	1	2	2	1
CO3	1	1	2	1	1	1	1	2	2	1
CO4	1	2	1	1	1	1	1	2	1	1
CO5	1	1	3	2	1	1	2	2	1	1
Average	1	1	2	1	1	1	1	2	2	1

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

YSE805A			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: YSE403										
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		

TEXTBOOKS		
1. Michael Miller, —Cloud Computing, Pearson Education, New Delhi, 2009.		
REFERENCES:		
1. 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.		
E-REFERENCES		
1. www.cloudbus.org/cloudsim		
2. https://cloudacademy.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
CO1	2	2	2	2	2	1	1	2	2	2
CO2	2	3	3	3	3	1	1	3	3	2
CO3	2	3	3	3	3	1	1	3	3	2
CO4	2	3	3	3	3	1	1	3	3	2
CO5	2	3	3	3	3	1	1	3	3	2
Average	2	3	3	3	3	1	1	3	3	2

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

YSE805B			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: YSE403										
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	
TEXTBOOKS										
1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec & Klaus Rindtorff. Pervasive Computing Technology and Architecture of Mobile Internet Applications, Addision Wesley, Reading, 2012.										
REFERENCES:										
1. Uwe Ha nsman, Lothat Merk, Martin S Nicklous & Thomas Stober: Principles of Mobile Computing, Springer- Verlag, New Delhi, 2011.										

2. Rahul Banerjee: Internetworking Technologies: An Engineering Perspective, Prentice – Hall of India, New Delhi, 2003. (ISBN 81-203-2185-5)
3. Rahul Banerjee: Lecture Notes in Pervasive Computing, Outline Notes, BITS-Pilani, 2003.

E-REFERENCES

1. <https://www.youtube.com/watch?v=bS6XqjBO99Q>
2. seminarprojects.com/.../nptel-lecture-notes-for-mobile-and-pervasive-computing
3. <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
CO1	1	1	2	1	1	1	2	2	2	1
CO2	1	2	1	2	1	2	2	1	2	1
CO3	1	2	2	1	1	1	2	2	2	1
CO4	1	2	1	1	1	2	1	1	1	1
CO5	1	1	3	2	1	2	2	2	1	1
Average	1	2	2	2	1	2	2	2	1	1

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

YSE805C			ADVANCED COMPUTER ARCHITECTURE				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: YSE205										
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		
TEXTBOOKS										
1. V.C. Hamacher,Z.G.Vranesic, S.G. Zaky. “Computer Organization”. 5th Edition. “Peter” 2. David A. Patterson and John L. Hennessy.										
REFERENCES:										

1. Computer Organization and Design, Revised Printing, Third Edition, Andrew S. Tanenbaum. Structured Computer Organization Prentice Hall; 5th Edition. 2005. 800p.
2. W. Stallings. "Computer Organization and Architecture. Designing and Performance". 7th Edition. Prentice Hall. 2005.
3. J.L. Hennessy, D.A. Patterson. "Computer architecture: A Quantitative Approach", 4th Edition. Morgan Kaufmann, 2006.

E-REFERENCES

1. cs.baylor.edu/~maurer/aida/courses/archintro.pdf
2. <https://archive.org/details/advancedcomputer00agra>

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	2	1	1	1	1	2	2	1
CO2	1	2	1	1	1	1	1	2	2	1
CO3	1	1	2	1	1	1	1	2	2	1
CO4	1	2	1	1	1	1	1	2	1	1
CO5	1	1	3	2	1	1	2	2	1	1
Average	1	1	2	1	1	1	1	2	2	1

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

YSE901			MOBILE APPLICATION DEVELOPMENT				L	T	P	C
							3	0	1	4
C	P	A					L	T	P	H
2.5	0.25	0.25					3	0	2	5
PREREQUISITE: YSE303, YSE503										
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						9+6		
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						9+6		
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						9+6		
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						9+6		
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						9+6		

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	0	30	75
TEXTBOOKS			
1. Professional Android 4 Application Development, 3 rd edition, reto meier, wiley publication 2012.			
REFERENCES:			
1. Programming Android, 1st Edition, Zigurd Mednieks , Laird Dornin , G. Blake Meike , Masumi Nakamura , Oreilly publications, 2011.			
E-REFERENCES			
1. https://www.tutorialspoint.com/mobile_development_tutorials.htm			
2. https://www.theserverside.com/tutorial/Mobile-application-development-tutorial			

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

YSE902			CYBER SECURITY				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: YSE403										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1	Describe the importance of information systems and Classify the threats and attacks in networks.						Cognitive		Remember Understand	
CO2	Describe and Defend the concepts of information security.						Cognitive		Remember Understand	
CO3	Define and Defend the project activity planning and risk management.						Cognitive		Remember Understand	
CO4	Predict and Apply the appropriate biometric system for security.						Cognitive		Understand Apply	
CO5	Identify and Apply the perfect law and Act in real life.						Cognitive		Remember Apply	
UNIT I			INTRODUCTION AND THREATS TO INFORMATION SYSTEMS						9	
History of Information Systems and its Importance, basics, Changing Nature of Information Systems, Need of Distributed Information Systems, Role of Internet and Web Services, Information System Threats and attacks, Classification of Threats and Assessing Damages. Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices ,authentication Service Security, Security Implication for organizations, Laptops Security Concepts. Brief review of Internet Protocols-TCP/IP, IPV4, IPV6. Functions of various networking components-routers, bridges, switches, hub, gateway and Modulation Techniques.										
UNIT II			BUILDING BLOCKS OF INFORMATION SECURITY						9	
Basic Principles of Information Security, Confidentiality, Integrity, Availability and other terms in Information Security, Information Classification and their Roles. Security Threats to E Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards.										
UNIT III			PHYSICAL AND BIOMETRIC BASED SECURITY						9	
Physical Security - Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control- Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics application, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges. Models for Information Security- ISO 27001, SSE-CMM, Information Security Vs Privacy.										
UNIT IV			CRYPTOGRAPHY, FIREWALLS, NETWORK SECURITY, INTRUSION DETECTION AND VPN						9	
Cryptography- Applications and its roles, Digital Signature. Firewalls – need, proxy servers, Design and Implementation Issues, Policies. Network Security- Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection. Virtual Private Networks- Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN.										
UNIT V			LAW, LEGAL FRAMEWORK AND ETHICS						9	
Cyber Crime, Information Security and Law, Types & overview of Cyber Crimes, Cyber Law Issues in E-Business Management, Overview of Indian IT Act, Ethical Issues in Intellectual property rights, Copy Right, Patents, Data privacy and protection, Domain Name, Software piracy, Plagiarism, Issues in ethical hacking.										

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45			45
TEXT BOOKS			
4. Nina S.Godbole, 2009. “ <i>Information Systems Security</i> ”, John wiley & sons India Private Limited, 5. Mark Merkow, Jim Breithaupt, “ <i>Information Security</i> ”, Pearson Education. 6. Yadav, D S., 2001. “ <i>Foundations of Information Technology</i> ”, New Age International 7. publisher, Delhi.			
REFERENCES:			
1. Corey Schou, Daniel Shoemaker, 2006. “ <i>Information Assurance for the Enterprise</i> ”, Tata McGraw Hill. 2. Vivek Sood, 2001. “ <i>Cyber Laws Simplified</i> ”, Mc Graw Hill Education private Limited. 3. Steven M. Furnell, 2005 ., “ <i>Computer Insecurity</i> ”, Springer Publisher.			
E – REFERENCES:			
1. https://www.cryptool.org/en/ 2. https://www.metasploit.com/ 3. http://sectools.org/tool/hydra/ 4. http://www.hping.org/ 5. http://www.winpcap.org/windump/install/ 6. http://www.tcpdump.org/ 7. https://www.wireshark.org/ 8. https://ettercap.github.io/ettercap/ 9. https://www.concise-courses.com/hacking- tools/top-ten/ 10. https://www.cirt.net/Nikto2 11. http://sqlmap.org/			

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

YSE903			SOFTWARE RELIABILITY				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: YSE206										
COURSE OUTCOMES:										
Course Outcomes							Domain		Level	
After the completion of the course, students will be able to										
CO1: <i>Recognize</i> the significance of Software Reliability.							Cognitive		Remember	
CO2: <i>Express</i> the knowledge on SDLC							Cognitive		Understand	
CO3: <i>Estimate</i> the understanding of Software Quality Management.							Cognitive		Apply	
CO4: <i>Recognize</i> the significance of Software Reliability Tools							Cognitive		Remember	
CO5: <i>Express</i> 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	
TEXTBOOKS										
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.										

REFERENCES:										
1. Michael R. Lyer, Handbook of Software Reliability Engineering, McGraw Hill, 1995.Xie,										
2. Software Reliability Modelling, World Scientific, London, 1991.										
E-REFERENCES										
1. https://users.ece.cmu.edu/~koopman/des_s99/sw_reliability/presentation.pdf										
2. https://www.slideshare.net/AnandKumar87/software-reliability-11841804										

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	0	1	1	1	1	0	0	1	1	1
CO2	1	3	2	0	0	1	1	1	2	2
CO3	0	2	1	1	1	0	0	1	2	2
CO4	1	1	1	1	0	2	2	1	2	2
CO5	0	2	2	0	0	2	2	2	3	3
Average	0	2	2	1	0	1	1	1	2	2

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

YSE904			USABILITY ENGINEERING				L	T	P	C
							3	0	0	3
C	P	A					L	T	P	H
3	0	0					3	0	0	3
PREREQUISITE: YSE205										
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, stazte, 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	
TEXTBOOKS										
- Ivar jacobson, Martin Griss, Patrick Hohson – Software Reuse. Architecture, Process and Organization for Bussiness Success, ACM Press, 1997. - Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides – Design Patterns- Addison, 1995, Pearson Education.										
REFERENCES:										
- Frank Buschmann etc. – Pattern Oriented Software Architecture – Volume 1, Wiley 1996. - James W Cooper – Java Design Patterns, a tutorial, Addison 2000, Pearson Education										
E-REFERENCES										
https://dl.acm.org/citation.cfm?id=60341 www.cs.toronto.edu/~yijun/ece450h/handouts/lecture8x4.pdf										

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	2	2	2	2	1	1	2	2	2
CO2	2	3	3	3	3	1	1	3	3	3
CO3	2	3	3	3	3	1	1	3	3	3
CO4	2	3	3	3	3	1	1	3	3	3
CO5	2	3	3	3	3	1	1	3	3	3
Average	2	3	3	3	3	1	1	3	3	3

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

YSE905			INTERNET OF THINGS				L	T	P	C
							3	1	0	4
C	P	A					L	T	P	H
2.5	0.5	0					3	1	0	4
PREREQUISITE: YSE403										
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+3	
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+3	
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+3	
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+3	
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+3	
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			15						60	
TEXTBOOKS										
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										

REFERENCES:										
1.	Luigi Atzori et.al,	“The Internet of Things: A survey,	“,	Journal on Networks,	Elsevier Publications,	October,	2010			
2.	Architecting the Internet of Things -	Dieter Uckelmann;	Mark Harrison;	Florian Michahelles-	(Eds.) –	Springer –	2011			
3.	Networks, Crowds, and Markets: Reasoning About a Highly Connected World -	David Easley and Jon Kleinberg,	Cambridge University Press -	2010	4.					
4.	6.The Internet of Things: Applications to the Smart Grid and Building Automation by -	Olivier Hersent, Omar Elloumi and David Boswarthick -	Wiley -	2012						
5.	7. Olivier Hersent, David Boswarthick, Omar Elloumi ,	“The Internet of Things – Key applications and Protocols”,	Wiley,	2012						
E-REFERENCES										
1.	http://postscapes.com									
2.	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
CO1	1	2	2	1	1	0	0	1	1	2
CO2	1	3	1	2	2	0	1	2	2	2
CO3	0	3	1	2	2	1	1	2	2	2
CO4	0	3	0	2	2	0	1	2	2	2
CO5	0	3	2	1	3	1	1	2	3	2
Average	1	2	1	2	2	1	1	2	2	2

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