School of Computing Sciences and Engineering

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PERIYAR MANIAMMAI UNIVERSITY
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DEPARTMENT OF MATHEMATICS AND COMPUTER APPLICATIONS

SOFTWARE ENGINEERING DIVISION

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

REGULATION 2017

Curriculum for M. Sc (Software Engineering)
5 Years Integrated Course [Batch: 2017 – 2022]
Regulation 2017

SEMESTER – I

COURSE CODE	COURSE TITLE	L	T	P	C	H
YSE101	Algebra, Calculus & Analytical Geometry	3	1	0	4	5
YSE102	Digital Principles	3	1	1	5	7
YSE103	Computer Fundamentals	3	1	1	5	7
YSE104	Problem Solving Techniques	3	1	0	4	5
YSE105	Study Skills	1	0	0	1	3
YUM106	Human Ethics, Values, Rights and Gender Equality(plus 2 hours self-study)	1	0	0	1	3
Total Hours: 30					**Total Credits: 20**	

SEMESTER – II

COURSE CODE	COURSE TITLE	L	T	P	C	H
YSE201	Multimedia Systems	3	1	1	5	7
YSE202	Computer Programming	3	1	1	5	7
YSE203	Physics	3	1	0	4	4
YSE204	Discrete Mathematics	3	1	0	4	5
YSE205	Computer Organization	3	0	0	3	4
YSE206	Speech Communication	1	0	0	1	3
Total Hours: 30					**Total Credits: 22**	

SEMESTER III

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

SEMESTER IV

COURSE CODE	COURSE TITLE	L	T	P	C	H
YGE401	Technical communication	1	0	2	0	3
YSE402	Programming in Java	3	1	1	5	7
YSE403	Computer Networks	3	1	0	4	4
YSE404	Software Project Management	3	0	0	3	3
YSE405	Software Measurements and Metrics	3	0	0	3	3
YSE406	Data Base Management System	3	1	1	5	7
Total Hours: 27					**Total Credits: 20**	

SEMESTER V

COURSE CODE	COURSE TITLE	L	T	P	C	H
YGE501	Business Communication	1	0	2	0	3
YSE502	**.** Net Technologies	3	1	1	5	7
YSE503	Web Technologies	3	1	1	5	7
YSEE**	Professional Elective -I	3	0	0	3	3
YSE505	Resource Management Techniques	3	1	0	4	5
YUM506	Total Quality Management	3	0	0	3	3
Total Hours: 27					**Total Credits: 20**	

SEMESTER VI

COURSE CODE	COURSE TITLE	L	T	P	C	H
YGE601	Academic Writing	1	0	2	0	3
YUM602	Environmental Studies	3	0	0	2	3
YSE603	Entrepreneurship Development and Management	3	0	0	3	3
YSEE**	Professional Elective -II	3	0	0	3	3
YSEOE1	Open Elective I	3	0	0	3	3
YSE606	Project	0	0	3	3	6
YSE607	Object Oriented Analysis and Design	3	1	1	5	7
Total Hours: 28					**Total Credits: 19**	

SEMESTER VII

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**C**	**H**
YSE701	Internship Programme	0	0	12	12	--
					Total Credits: 12	

SEMESTER VIII

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**C**	**H**
YGE801	Career Development Skills	1	0	1	0	2
YSE802	Software Testing and Quality Assurance	3	1	1	5	7
YSE803	Software Communication and Documentation	3	0	0	3	3
YSEE**	Professional Elective - III	3	0	0	3	3
YSEE**	Professional Elective-IV	3	0	0	3	3
YSEOE2	Open Elective II	3	0	0	3	3
YSE807	Data Mining and Data Warehousing	3	1	1	5	7
Total Hours: 28					**Total Credits: 22**	

SEMESTER IX

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

SEMESTER X

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**C**	**H**
YSE1001	Main Project Phase-II	0	0	16	**16**	--

Total Credits: 195

LIST OF ELECTIVES

COURSE CODE	COURSE TITLE	L	T	P	C	H
YSEE51	XML and Web services	3	0	0	3	3
YSEE52	Software Reuse	3	0	0	3	3
YSEE53	User Interface Design	3	0	0	3	3
YSEE54	Disaster Management	3	0	0	3	3
YSEE55	Software Reliability	3	0	0	3	3
YSEE61	Network Protocols	3	0	0	3	3
YSEE62	Internet of Things	3	0	0	3	3
YSEE63	Client Server Computing	3	0	0	3	3
YSEE64	Digital Image Processing	3	0	0	3	3
YSEE65	Mobile Adhoc Network	3	0	0	3	3
YSEE81	Unix and Network Programming	3	0	0	3	3
YSEE82	Cloud Computing	3	0	0	3	3
YSEE83	Pervasive Computing	3	0	0	3	3
YSEE84	E-Commerce	3	0	0	3	3
YSEE85	Advanced Data Base Management Systems	3	0	0	3	3
YSEE91	Wireless Sensor Network	3	0	0	3	3
YSEE92	Principles of Management	3	0	0	3	3
YSEE93	Enterprise Resource Planning	3	0	0	3	3
YSEE94	Advanced Computer Architecture	3	0	0	3	3
YSEE95	Big Data Analytics	3	0	0	3	3

LIST OF OPEN ELECTIVES

CODE.NO	COURSE TITLE	L	T	P	C	H
YSEOE1	Software Development Techniques	3	0	0	3	3
YSEOE2	Web Technologies	3	0	0	3	3

One Credit Course

COURSE CODE	COURSE TITLE	L	T	P	C	H
YSE507	Game Design using Python and Pygame	0	0	1	1	2
YSE608	MangoDB	0	1	1	1	2
YSE808	Software Testing Tools and Practices	0	1	1	1	2

COURSE CODE	YSE101	L	T	P	C
COURSE NAME	ALGEBRA, CALCULUS AND ANALYTICAL GEOMETRY	4	1	0	5
PREREQUISITES	Basic concepts of Matrices, Numbers and the basic formulae of Differentiation and Integration	L	T	P	H
		4	2	0	6
C:P:A	3:0:0				

COURSE OUTCOMES		DOMAIN	LEVEL
CO1	*Evaluate the derivatives of given functions*	Cognitive	Understand
CO2	*Calculate the definite and indefinite integrals using various techniques.*	Cognitive	Understand, Remember
CO3	*Apply basic operations on matrices to find the inverse of a matrix*	Cognitive	Understand, Apply
CO4	*Solve problems using Binomial, exponential and logarithmic series expansions.*	Cognitive	Understand
CO5	*Calculate the distance between two points and explain section formulae, slope form and intercept form.*	Cognitive	Understand

UNIT I – DIFFERENTIAL CALCULUS	12+6
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+6**
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+6**
Definition and types of matrices – Matrix Operation – Determinants – Solution of system of linear equations by Matrix method.	
UNIT IV – SERIES	**12+6**
Binomial theorem for a rational index – Exponential and Logarithmic series – Summation of the above series.	
UNIT V – TWO DIMENSIONAL ANALYTICAL GEOMETRY	**12+6**
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	30	0	90

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.Naravanan, 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

YSE 102			DIGITAL PRINCIPLES	L	T	P	C
				3	1	1	5
C	P	A		L	T	P	H
3	1	0		3	2	2	7

PREREQUISITE: NIL

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Know*** the numerical values in various number systems and perform number conversions between different number systems.	Cognitive Psychomotor	Understand
CO2	***Demonstrate*** the operation of logic gates, Boolean algebra including algebraic manipulation/simplification, application of DeMorgan's theorems and Karnaugh map reduction method.	Cognitive Psychomotor	Understand Apply
CO3	***Identify, Analyze*** and ***Design*** combinational circuits	Cognitive Psychomotor	Understand Apply
CO4	***Analyze*** and ***Design*** sequential digital circuits like flip-flops, registers, counters	Cognitive Psychomotor	Understand Apply
CO5	***Explain*** the nomenclature and technology in the area of memory devices	Cognitive	Understand

UNIT I	**NUMBER SYSTEMS AND MINIMIZATION TECHNIQUES**	**12 + 6**

Binary, Octal, Decimal, Hexadecimal-Number base conversions – complements – signed Binary numbers. Binary Arithmetic- Binary codes: Weighted –BCD – 2421 - Gray code-Excess 3 code-ASCII –Error detecting code – conversion from one code to another- Logic Gates : AND, OR, NOT, NAND, NOR, Exclusive – OR and Exclusive – NOR-Implementations of Logic Functions using gates, NAND –NOR implementations

Lab

Logic gates - verification

UNIT II	**BOOLEAN ALGEBRA & SIMPLIFICATION**	**12 + 9**

Boolean Algebra – Basic Theorems and properties – Boolean Functions – Canonical and Standard Forms – Karnaugh Map Simplification – Two, Three Variables – NAND and NOR Implementation – Don't Care Conditions – Quine McCluskey Method

Lab

Application of Boolean functions,

UNIT III	**COMBINATIONAL CIRCUITS**	**12 + 12**

Combinational Circuits – Adder - Subtractor – Design and Analysis procedures – Binary Parallel Adder – Decimal Adder – Encoder – Decoder – Multiplexer – Demultiplexer – Magnitude comparators – Read Only Memory (ROM) – Programmable Logic Array(PLA).

Lab

Applications of combinational circuits.

UNIT IV	**SEQUENTIAL CIRCUIT**	**12 + 15**

Sequential circuits – Latches – Flip-flops – Triggering of Flip-Flops – Analysis of clocked sequential circuits – State reduction and state assignment – Design procedure of clocked sequential circuits – Design of counters – Registers – Shift registers – Ripple counter and Synchronous counter.

Lab

Design and verify the circuits of Flip Flops, Registers and counters.

UNIT V	MEMORY DEVICES	12 +3

Classification of memories –RAM organization – Write operation –Read operation – Memory cycle - Timing wave forms – Memory decoding – memory expansion – Static RAM Cell-Bipolar RAM cell – MOSFET RAM cell –Dynamic RAM cell –ROM organization - PROM –EPROM –EEPROM –EAPROM –Programmable Logic Devices.

Lab

Verificationof timing waveforms

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	30	30	105

REFERENCES:

1. M. Morris Mano, "Digital Design", 3rd Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2003/Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
2. John .M Yarbrough, "Digital Logic Applications and Design", Thomson- Vikas publishing house, New Delhi, 2002.
3. S. Salivahanan and S. Arivazhagan, "Digital Circuits and Design", 2nd Edition, Vikas Publishing House Pvt. Ltd, New Delhi, 2004
4. Charles H.Roth. "Fundamentals of Logic Design", Thomson Publication Company, 2003.
5. Donald P.Leach and Albert Paul Malvino, "Digital Principles and applications", 5th Edition., Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
6. R.P.Jain, Modern "Digital Electronics", 3rd Edition., Tata McGraw–Hill publishing company limited, New Delhi, 2003.

E REFERENCES

1. www.tutorialspoint.com
2. www.nptel.com
3. www.virtuallab.ac.in

Mapping of Cos with POs

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

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

COURSE CODE	YSE103	L	T	P	C
COURSE NAME	COMPUTER FUNDAMENTALS	3	1	1	5
PREREQUISITES	Nil	L	T	P	H
C:P:A	3:1:0	3	2	2	7

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 **9+6+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 **9+6+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 **9+6+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 **9+6+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**	**9+6+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
45	**30**	**30**	**105**

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

Table 1: Mapping of COs with POs

Course Outcomes	Program Outcomes									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**PSO1**	**PSO2**
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	YSE 104	L	T	P	C
COURSE NAME	PROBLEM SOLVING TECHNIQUES	3	1	0	4
PREREQUISITE	Nil	L	T	P	H
C P A	4:0:0	3	1	0	5

COURSE OUTCOMES		DOMAIN	LEVEL
CO1	***Recognize*** the importance of algorithms.	Cognitive	Remember
CO2	***Recognize*** the basics of array techniques in order to solve the problems.	Cognitive	Remember
CO3	***Demonstrate*** the relationship between searching methods.	Cognitive	Understand
CO4	***Express*** solutions for the problems by using dynamic data structures.	Cognitive	Understand
CO5	***Illustrate*** the basics of recursive algorithms.	Cognitive	Understand

UNIT I	INTRODUCTION	9+6
Problem solving aspect - Top -down design - Implementation of algorithms– Program verification- Efficiency-Analysis of Algorithms–Fundamental Algorithms – swapping.		
UNIT II	**FACTORING METHODS AND ARRAY TECHNIQUES**	**9+6**
Finding Square Root - LCM - GCD Generation of Prime Numbers -Array Techniques – Histogramming - Minimum and Maximum numbers.		
UNIT III	**MERGING, SORTING AND SEARCHING**	**9+6**
Two- way Merge Sort - Selection Sort - Binary Search - Hash Search - Text Processing- Keyword Searching in text.		
UNIT IV	**DYNAMIC DATA STRUCTURE ALGORITHMS**	**9+6**
Stack Operations - Queue Operations - Linked List - Insertion Deletion and Search Operation - Binary Tree.		
UNIT V	**RECURSIVE ALGORITHMS**	**9+6**
Binary Tree Traversal - Recursive Quick Sort - Towers of Hanoi Problem.		

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	30	-	75

REFERENCES

1. Dromey R.G, 2008. "How to Solve it by Computer" Pearson Education, 5th edition
2. Aho A.V. J.E. Hopcroft and J.D. Ullman., 2001. "The Design and Analysis of Computer Algorithms", Pearson Education Delhi. Second Edition.
3. Sara Baase and Allen Van Gelder., 2002. "Computer Algorithms - Introduction to Design and Analysis" Pearson Education Delhi.3th Edition.

E-REFERENCES

1. http://www.nptel.ac.in
2. 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	YSE105	L	T	P	SS	C
COURSE NAME	STUDY SKILLS	1	0	0	2	1
PREREQUISITES	Nil	L	T	P	SS	H
C: P: A	1.8:0.6:0.6	1	0	0	2	3

COURSE OUTCOMES:		Domain	Level
CO1	***Identify*** different strategies of reading and writing skills.	Cognitive	Remember
CO2	***Revise*** the library skills in their learning process.	Affective	Internalizing Values
CO3	***Apply*** different techniques to various types of material such as a novel, newspaper, poem, drama and other reading papers.	Cognitive	Apply
CO4	***Use*** visual aids to support verbal matters into language discourse.	Cognitive	Understanding
CO5	***Prepare*** to face the written exam with confidence and without any fear or tension.	Cognitive Psychomotor	Understanding Guided Response

UNIT I - INTRODUCTION TO STUDY SKILLS	**5**
Learning Skills and Strategies of Learning - Cognitive Study skills and physical study skills, Library skills (How to use Library), familiarization of library facilities by the librarian - familiarization of basic cataloguing techniques, how to ransack the library etc.	
UNIT II - REFERENCE SKILLS	**5**
How to use the library facilities for research and to write assignments - how to find out reference books, articles, journals and other e- learning materials - how to use a dictionary and thesaurus**.**	
UNIT III - READING RELATED STUDY SKILLS	**5**
Process of reading, various types of reading materials and varied reading techniques - familiarization to materials written by various authors - features of scientific writing and familiarization to scientific writing by renowned authors - note making skills.	
UNIT IV - WRITING RELATED STUDY SKILLS	**5**
Process of writing - characteristics of writing - discourse analysis - use of visual aids, and note making and note taking skills.	
UNIT V - EXAM PREPARATION SKILLS	**5**
Anxiety reduction skills - familiarization with various types of exam / evaluation techniques etc	

Text books

Appropriate Chapters/Units from the following textbooks

1. Narayanaswamy. Strengthen Your Writing. Orient Longman. New Delhi, 2006
2. **Sasikumar, Writing with A Purpose, Champa Tickoo, Oxford University Press.2009**
3. **Freeman, Sarah: *Study Strategies*. New Delhi: Oxford University Press, New Delhi *1979*.**
4. Peter Viney. *Streamline English: Destinations*, Oxford University Press, 1992.

References

1. Susan Fawcett Evergreen: A Guide to Writing with Readings Paperback – 2013
2. ***Raymond Murphy*. English. Grammar in Use A reference and practice book *for Intermediate, Third Edition*, OUP, New Delhi, 2010**
3. Kiranmai Dutt and Geetha Rajeevan. *A Course in Listening and Speaking* I & II. New Delhi: Foundation Books, Cambridge House, 2006.
4. **David Bolton, English Grammar in Steps, Richmond Publishing, New Delhi,2000**

Mapping of Cos with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
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
Scale	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

COURSE CODE	YUM106	L	T	P	C
COURSE NAME	HUMAN ETHICS, VALUES, RIGHTS AND GENDER EQUALITY	3	0	0	3
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. Ambetkar, 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

REFERENCES

1. Aftab A, (Ed.), Human Rights in India: Issues and Challenges, (New Delhi: Raj

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

Table 1 : 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

YSE 201			**MULTIMEDIA SYSTEMS**	**L**	**T**	**P**	**C**
				3	**1**	**1**	**5**
C	**P**	**A**		**L**	**T**	**P**	**H**
2	**1**	**0**		**3**	**1**	**3**	**7**

PREREQUISITE: Computer Fundamentals

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**	**12**

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 Movie Maker

UNIT II	**Image Editing –Basics**	**12**

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 Open Source Software

UNIT III	**HTML**	**12**

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 - Working with Forms and controls.

Lab Experiments Using HTML

UNIT IV	Image and Text Editing- Layers and Effects	12

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 Open Source Software

UNIT V	2D Animation	12

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 Open Source Software

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105

REFERENCES:

1.Prabat K Andleigh and Kiran Thakrar, 2003. “Multimedia Systems and Design”, PHI Resent, 2003.

2.R.Lavanya, 2011” HTML 5

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-REFERENCE

1. https://www.youtube.com/watch?v=ZGXS5HoBYAQ

2. https://www.youtube.com/watch?v=spoJ7Z8LzW8

3. www.**tutorials**point.com/list**tutorials**/**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 202	L	T	P	C
Course Name	COMPUTER PROGRAMMING	3	1	1	5
Prerequisite	YSE 103	L	T	P	H
C:P:A	2.8:1:0.2	3	2	2	7

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the importance of the Structured Programming.	Cognitive Psychomotor	Remember Perception
CO2	***Identify*** the C Programming concepts and the relationships among them.	Cognitive Psychomotor	Understand Perception
CO3	***Demonstrate*** the usage of pointers 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 structures and unions 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+6

History of C - Characteristics of C – Character set - Tokens – Identifiers – Keywords – Constants and Data Types - Operators and Expressions – Simple Program Structure – Input and Output Functions – Simple computational problems - Control Structures – Conditional Control statements – Branching – Looping - Unconditional control structures - switch, break, continue, goto statements – Programs using control structures.

Lab:

1. Programs using Expression Evaluation
2. Programs using Branching Statements
3. Programs using Looping Statement.

UNIT II	ARRAYS AND FUNCTIONS	12+6+6

Arrays: One Dimensional Array – Declaration – Initialization – Accessing Array Elements – Searching – Sorting – Two Dimensional arrays - Declaration – Initialization – Matrix Operations – Multi Dimensional Arrays - Declaration – Initialization. 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 - Programs using arrays and functions.

Lab:

1. Programs using Arrays
2. Programs using Functions
3. Programs for arrays to functions
4. Programs using Recursion
5. Programs using Strings

UNIT III	POINTERS	9+6+6

Pointer concept – Declaration – Accessing variable through pointer – initializing pointer variable – Pointers and Functions - Call by value - Call by Reference – Pointers and Arrays –- Example programs using pointers with function- Pointers on pointer – Dynamic memory allocation- Operations on pointers.

Lab:

1. Programs using Call by reference
2. Programs using pointers and arrays
3. Programs using dynamic memory allocation

UNIT IV	STRUCTURES AND UNIONS	9+6+6

Structures and Unions - Giving values to members - Initializing structure - Functions and structures - Passing structure to elements to functions - Passing entire function to functions - Arrays of structure - Structure within a structure and Union - Pointers and structures

Lab:

1. Programs using Structures
2. Programs using Unions

UNIT V	FILE MANAGEMENT	6+6+6

File management in C - File operation functions 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:

1. Program using Files
2. Program using Command line arguments

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	30	30	105

TEXT BOOKS

1. Byron Gottfried, "Programming with C", III Edition, (Indian Adapted Edition), TMH publications, 2010.
2. Yeshwant Kanethker, “Let us C”, BPB Publications, 2008

REFERENCES:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Pearson Education Inc. (2005).
2. Behrouz A. Forouzan and Richard. F. Gilberg, "A Structured Programming Approach Using C", II Edition, Brooks–Cole Thomson Learning Publications, 2001.
3. Johnsonbaugh R. and Kalin M., “Applications Programming in ANSI C”, III Edition, Pearson Education India, 2003.

E- REFERENCES:

1. http://www.comptechdoc.org/basic/basictut/index.html
2. http://cse02-iiith.vlabs.ac.in/
3. http://textofvideo.nptel.iitm.ac.in/video.php?courseId=106104128

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

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

YSE203			PHYSICS	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: Students with fundamental physics knowledge in HSC or SSLC level.

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

Course Outcome		Domain	Level
CO1	***State*** the basics of acoustics and sound fields in rooms and ***identify*** how they can be controlled.	Cognitive	Knowledge ,Analyze
CO2	***Recall*** and ***distinguish*** the various laser systems and their applications.	Cognitive	Knowledge, Comprehension
CO3	***Explain*** the basic elements of optical fiber transmission system, and ***identify*** various optical fiber and source and detector.	Cognitive	Comprehension, Analysis
CO4	***Know*** about semiconductor physics, classification and applications of semiconductor.	Cognitive	Knowledge
CO5	***Construct*** various rectifiers and ***choose*** semiconductor devices for an application.	Psychomotor	Perception, Set

UNIT - I :	Acoustics	12+3

Classification of sound – Characteristics of musical sound – Loudness – Weber Fechner law – Decibel – Absorption co-efficient – Reverberation – Reverberation time – Sabine's formula(Formula only) – Factors affecting acoustics of buildings and their remedies.

UNIT - II :	Laser And It's Applications	12+3

Introduction - population inversion – pumping – laser action – Nd-YAG laser – CO2 laser – semiconductor laser – Application of lasers.

UNIT - III :	Fibre Optics	12+3

Principle and propagation of light in optical fibres – Numerical Aperture and acceptance angle – Types of optical fibres – Source & detector – LED sensor – Block diagram fibre optics communication system – Applications.

UNIT - IV :	Semiconductor	12+3

Semiconductor fundamentals – Bandgaps in semiconductors – energy-band diagram – Properties – Types of semiconductor – Hall Effect – Determination of Hall co-efficient – Hall probe.

UNIT - V :	Electronics	12+3

PN Junction diode – Rectifier – Half wave, full wave and bride rectifier – Filters – LC, RC and CLC filters – Zener diode – Its Characteristics – Voltage regulator using Zener diode – Working principle and characteristics of Transistor, FET, MOSFET and SCR.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	0	60

TEXT BOOKS:

1. Prabu P. and Gayathri P., "Applied Physics", Periyar Maniammai University press, Thanjavur, Tamilnadu, 2011.

2.	G.Nagarajan., "Electronic Devices and Circuits", Lakshmi Publications, Nagapattinam, Tamilnadu, 2005.
REFERENCE BOOKS :	
1.	Avadhanulu M.N. and Kshirsagar P.G., "A Text Book of Engineering Physics", S.Chand & Company Ltd., 7th enlarged Revised Ed., 2005.
2.	Gaur R.K. and S.L., "Engineering Physics", Dhanpat Rai Publishers, New Delhi, 2001.
3.	A. Mottershed, Semiconductor Devices and Applications, New Age Int Pub,

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

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

COURSE CODE	YSE 204	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	2	0	5

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 **15**

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 **15**

Statements - Normal forms – CNF – DNF – PCNF - PDN – Tautologies - Contradictions.

UNIT III **15**

Counting principles – The Pigeonhole principle – Counting – Permutations and Combinations – Combinatorial arguments – Countable and uncountable sets.

UNIT IV **15**

Lattices as partially ordered set – Types of lattices – Lattices as algebraic system.

UNIT V **15**

Binary operations – Semi groups - Groups – Examples and elementary properties.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	30	--	75

TEXT

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.Venkataraman, 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

YSE 205			COMPUTER ORGANIZATION	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2	1	0		3	0	0	3

PREREQUISITE: Computer fundamentals.

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	9

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	9

Arithmetic - Design of fast adders - Binary Multiplication - Division - Floating point numbers and operations.

UNIT III	BASIC PROCESSING UNIT	9

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	9

RAM and ROM - Cache memories - Performance considerations - Virtual memories – secondary storage devices - Associative memories.

UNIT V	INPUT / OUTPUT ORGANIZATION	9

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			45

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 REFERENCE

1. www.**tutorials**point.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			SPEECH COMMUNICATION	L	T	P	SS	C
				1	0	0	2	1
C	P	A		L	T	P	SS	H
1.6	1	0.4		1	0	0	2	3

PREREQUISTE :

\Course Outcomes		Domain	Level
CO1	I***dentify*** different styles to various forms of public speaking skills and presentation skills.	Cognitive	Remember
CO2	***Understand*** and identify the proper tone of language required in writing and speaking.	Cognitive	Understand
CO3	***Adapting*** the speech structures and developing the speech outline.	Psychomotor	Apply
CO4	Ability to ***communicate*** and develop presentation skills	Affective	Remember
CO5	**Calibrates** the speaker to face the audience without any anxiety.	Psychomotor	Remember

UNIT I	INTRODUCTION TO PUBLIC SPEAKING	9

Functions of oral communication; skills and competencies needed for successful speech making; importance of public speaking skills in everyday life and in the area of business, social, political and all other places of group work

UNIT II	TYPES OF SPEECH	9

Manuscript, impromptu, rememorized and extemporaneous speeches; analyzing the audience and occasion; developing ideas; finding and using supporting materials.

UNIT III	ORGANIZATION OF SPEECH	9

Introduction, development and conclusion; language used in various types of speeches; Adapting the speech structures to the Audience; paralinguistic features

UNIT IV	BASIC TIPS	9

How to present a paper/assignment etc; using visual aids to the speeches; using body language to communicate.

UNIT V	SPEECH ANXIETY	9

Public speaking and speech anxiety, public speaking and critical listening Speech practice (4-6 speeches per student)

LECTURE	SELF STUDY	PRACTICAL	TOTAL
15	30	--	45

Text books

1. Gordon H. Mills Technical Writing –Oxford Press, 1978
2. Barun K. Mitra, Effective Technical Communication: A guide for scientists and Engineers. Author, Publication: Oxford University press. 2007

Mapping of COs with GAs:

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

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

Course Code	YSE 301	L	T	P	C
Course Name	Operating Systems	3	1	0	4
Prerequisite	YSE103	L	T	P	H
C:P:A	2.7:0.3:0	3	2	0	5

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Identifying*** thefunctional 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 ***express various*** 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+6

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+6

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+6

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+6

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+6

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	TOTAL
45	30	-	75

REFERENCES:

1/Harvey M. Deital.2004. Operating Systems. Third Edition.US. Pearson Education.

2.W. Stallings.2011.Operating Systems. Seventh Edition. US: Prentice Hall.

3,NPTEL Evidence, 2009. *IISc Bangalore*. [Online] Available at:
http://nptel.ac.in/courses/Webcoursecontents/IIScBANG/Operating%20Systems/New_index1.html
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

COURSE CODE	YSE302	L	T	P	C
COURSE NAME	MICROPROCESSORS AND MICRO CONTROLLERS	3	1	1	5
PREREQUISITE	Digital principles	L	T	P	H
C:P:A	2.8:1:0.2	3	2	2	7

COURSE OUTCOMES		DOMAIN	LEVEL
CO1	***Recognize*** the importance of the functional components of 8085 Microprocessors.	Cognitive Psychomotor	Remember Perception
CO2	***Identify*** the 8085 Programming concepts and the relationships among them.	Cognitive Psychomotor	Understand Perception
CO3	***Demonstrate*** the usage of interfacing concepts of 8085 and ***develop*** simple programs and practice	Cognitive Psychomotor Affective	Understand, Apply Perception Receive
CO4	***Illustrate*** the interfacing of microcontrollers and ***Contribute*** more in the team work towards control system application development.	Cognitive Psychomotor Affective	Understand, Apply Mechanism Respond
CO5	***Develop*** and ***Establish*** the application software in assembly language	Cognitive Psychomotor	Create Origination

UNIT I - 8085 Introduction to 8-bit Microprocessor **9+6+4**

History of Microprocessor, 8085 Microprocessor architecture, buses, register, flags, 8085 pin configuration and function of each pin. Fetch, decode and execute operations. Op-code fetch, execute cycle, T state, Machine cycle. Addressing modes of 8085.

Lab : 1. Familiarization with 8085 trainer kit.

UNIT II - 8085 Microprocessor Instruction Set and Programming **12+6+8**

Data transfer, Arithmetic, Logical, Rotate, Branch and machine control instructions. Development of 8085 assembly language programs, time delays. 8085 interrupts, RST, SIM, RIM instructions. Subroutine and conditional call instruction.

Lab : 1. Verification of assembly language programs using the trainer kit.

UNIT III - I/O INTERFACING **9+6+6**

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications

Lab : 1. Verification of logic gates and sub programming concepts.
2. Interfacing With 8085 To 8255

UNIT IV - 8051 MICROCONTROLLER **9+6+6**

8051 Micro controller hardware – I/O pins, ports and circuits – External memory – Counters and Timers – Serial Data I/O – Interrupts – Interfacing to external memory and 8255.

Lab : 1. 8051 Microcontroller Based Experiments.

UNIT V-8051 PROGRAMMING AND APPLICATIONS **6+6+6**

8051 instruction set – Addressing modes – Assembly language programming – I/O port programming – Timer and counter programming – Serial Communication – Interrupt programming – 8051 Interfacing: Sensors

Lab : Microcontroller Based Experiments-Simple Control Applications.			
LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
45	**30**	**30**	**105**

Text books:

1. Microprocessor Architecture, Programming & Applications with 8085 4th edition Ramesh Gaonkar, PHI.
2. Kenneth J Ayala, "The 8051 Micro Controller Architecture, Programming and Applications", Thomson Publishers, 2nd Edition.

References:

1. Microprocessors and Interfacing, Douglas V Hall, Mc–Graw Hill, 2 nd Edition.
2. Microprocessor & Microcontroller; A.P. Godse, D.A. Godse; Technical Publication Pune.

Web Reference:

1. http://www.mhhe.com/engcs/compsci/forouzan/

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

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

YSE 303	OBJECT ORIENTED PROGRAMMING	L	T	P	C
		3	1	0	4

C	P	A		L	T	P	H
2.5	0	0.5		3	1	0	4

PREREQUISITE: Computer Programming

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the importance of object oriented programming	Cognitive Psychomotor	Remember Perception
CO2	***Memorize*** the knowledge of data abstraction, encapsulation and inheritance.	Cognitive Affective	Understand Receive
CO3	***Develop*** the solution to the Complex problems.	Cognitive	Analyze
CO4	***Implement*** good programming design methods for program development.	Cognitive Affective	Apply Respond
CO5	***Recognize*** the consequence of exception handling.	Cognitive Psychomotor	Understand Set

UNIT I	INTRODUCTION	12

Principles of Object Oriented Programming - Object Oriented Programming paradigm - Basic concepts of Object Oriented Programming - Benefits of OOP - Object Oriented languages - applications of OOP - Beginning with C++ - Tokens, Variables, Identifiers, Expressions and Control Structure – Branch and loop.

UNIT II	FUNCTIONS	12

Functions in C++ - Function Prototyping - Call by Reference - Return by Reference - Inline Functions – Default Arguments – Arrays in function - Function Overloading – Friend and virtual Functions – Console Input/Output – Programmer define functions – Scope rules.

UNIT III	CONSTRUCTORS AND DESTRUCTORS OPERATOR OVERLOADING	12

Constructors and Destructors – Introduction – Constructors- Copy Constructor, Dynamic Constructors - Destructors. Introduction – Defining Operator Overloading - Overloading Unary Operators - Overloading Binary Operators.

UNIT IV	CLASSES AND OBJECTS, INHERITANCE AND POLYMORPHISM	12

Classes and Objects - Inheritance: Introduction - Defining Derived Classes - Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance - Virtual Base Classes - Abstract Classes, Constructors in Derived Classes - Member Classes: Nesting of Classes. Pointers to Objects – Pointers to Derived Classes – Virtual Functions - Polymorphism

UNIT V	EXCEPTION HANDLING AND FILES	12

Exception Handling: Introduction – Basics of exception Handling –Exception Handling Mechanism – Throwing and Catching Mechanism – Rethrowing an Exceptions – Specifying Exceptions – Files – Operation on files.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	0	60

REFERENCES:

Ira Pohl, 2004 "Object Oriented Programming using C++", 2nd Edition Reprint, Pearson Education.

Stroustrup,B.,2004."The C++ Programming language", 3rd edition, Pearson Education.

Absolute C++.

A.B. KarthickAnandBabu, D. Maghesh Kumar, 2013 "Object oriented Programming".

Table 1.Mapping of CO's with PO's

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

YSE 304			DATA STRUCTURES AND ALGORITHMS	L	T	P	C
				3	1	1	5
C	P	A		L	T	P	H
3	1	0		3	1	3	7

PREREQUISITE: Computer Programming

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+6+6

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+6+6

List – Application of List – Stacks, Implementation and Application – Queue, Implementation and Application

Lab

Application of list, stack and queue

UNIT III	TREES	9+6+6

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+6+6

Basic terminology – Graph traversal – Application – Networks Shortest path algorithms

Lab

Graph Traversal

Applications using shortest path algorithms

UNIT V	ALGORITHM DESIGN TECHNIQUES	9+6+6

Divide and Conquer algorithms, Dynamic Programming, Greedy algorithms, Backtracking and Branch &bound.

Lab

Applications using algorithm design techniques

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105

REFERENCES:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2007.
2. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, "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/

Table 1: 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

Course Code	YSE 305	L	T	P	C
Course Name	SOFTWARE ENGINEERING	3	0	0	3
Prerequisite	Computer Fundamentals	L	T	P	H
C:P:A	2.9:0:0.1	3	0	0	3

Course Outcome		Domain	Level
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	9

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	9

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	9

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	9

Implementation Issues – Structured Coding Techniques – Coding Style – Standard and Guidelines – Documentation guidelines – Data Abstraction – Exception Handling – Concurrency Mechanisms.

UNIT V	TESTING AND MAINTENANCE	9

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	-	-	45

TEXT BOOKS:

Richard E.Fairley, Software Engineering Concepts, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2008.

REFERENCES:

1. Roger.S.Pressman, Software Engineering A Practitioner's Approach, Sixth Edition, Tata McGraw Hill Higher Education, 2010.
2. Ian Sommerville, Software Engineering, Ninth Edition, Pearson Education Inc., 2012.

WEBSITES:

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

Table 1: 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

COURSE CODE	YSE306	L	T	P	C
COURSE NAME	SOFTWARE DESIGN AND ARCHITECTURE	3	0	0	3
PREREQUISITE	Software Engineering	L	T	P	H
C:P:A	3:0:0	3	0	0	3

COURSE OUTCOMES		DOMAIN	LEVEL
After the completion of the course, students will be able to			
CO1	***Describe*** the aids of software Design in different stages of the software lifecycle	Cognitive	Understand
CO2	***Apply*** Unified modelling language to document software Design.	Cognitive	Apply
CO3	***Analyze, Apply and Evaluate*** design patterns to enhance the software quality.	Cognitive	Analyze, Apply, Evaluate
CO4	***Design*** and ***understand*** software architecture for large scale software systems.	Cognitive	Design Understand
CO5	***Recognise*** major software architectural styles, and design patterns.	Cognitive	Remember

UNIT I - INTRODUCTION TO DESIGN PRINCIPLES	**9**
Introduction – Nature of Design process – The role of design activity - Software Design Process building models – Transferring design knowledge – Design in the software development process – A context for design – Linear development processes – Incremental development processes – Design qualities – the quality concept – Assessing quality concept.	
UNIT II - OO DESIGN	**9**
Object model – Classes and objects – Object oriented analysis – Key abstractions and mechanisms – Object oriented design – Identifying design elements - Design and Information flow – design process considerations – transform flow – transaction flow – transform analysis – transaction analysis.	
UNIT III - DESIGN PATTERN	**9**
Introduction to Design patters - Design context – Reusable solutions – Documenting reusable solutions– The Observer pattern – the Decorator pattern – the factory pattern – the singleton pattern – the command pattern – The adaptor and façade pattern – The template method pattern – other patterns	
UNIT IV - SOFTWARE ARCHITECTURE	**9**
Introduction – Software Architecture – Why Software architecture is important? – Quality Attributes: Understanding quality attributes – availability – interoperability – Modifiability – Performance – Security – Testability – Usability – other quality attributes – Architectural patterns – designing an architecture – Architecture in cloud – Architecture in edge.	
UNIT V - SOFTWARE ARCHITECTURE STYLES	**9**
Introduction – Data flow styles – Call-return styles – Shared Information styles – Event styles – Case studies for each style	

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
HOURS	45	0	0	45

REFERENCES:

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. Kathy sierra, Bert Bates, “Head First Design Pattern”,Oreilly publications,
4. David Garlan and Mary Shaw, “Software architecture: Perspectives on an emerging discipline”, Prentice Hall, 1996.
5. Anthony J Lattanze, “Architecting Software Intensive System. A Practitioner's Guide”, Auerbach Publications, 2010.

Table 1: 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

COURSE CODE	YSE307	L	T	P	SS	C
COURSE NAME	INTERPERSONAL COMMUNICATION	0	0	0	2	0
		L	T	P	SS	H
C:P:A	0.9:1.1:0	0	0	0	2	2

COURSE OUTCOMES		DOMAIN	LEVEL
CO1	***Recognize*** culture and a need for interpersonal communication.	Cognitive	Remember
CO2	***Explain*** the need for effective communication between two people.	Cognitive	Understand
CO3	***Analyze***family and social relationships and need for socialization.	Cognitive	Understand
CO4	***Follow***the IP principles as to how to reduce and repair conflict in interpersonal relationships.	Psychomotor	Imitation
CO5	***Execute*** theeffective language of communication at various interpersonal situations to avoid conflict.	Psychomotor	Manipulate

UNIT I - UNIVERSALS OF INTERPERSONAL COMMUNICATIONS	5
Axioms of interpersonal Communication - culture in interpersonal communication and the self in interpersonal communication.	
UNIT II - APPREHENSION AND ASSERTIVENESS	5
Aggressiveness and assertiveness - perception in interpersonal communication - listening in interpersonal communication**.**	
UNIT III - VERBAL AND NON VERBAL MESSAGES	5
Relationship and involvement - relationship maintenance and repair.	
UNIT IV - POWER IN INTERPERSONAL RELATIONSHIP	5
Conflict in interpersonal relationship - friends and relatives - primary and family relationships.	
UNIT V – SOCIALIZATION	10
Need for socialization and benefits of socialization among students.	

	Self-Study	TOTAL
	30	30

TEXT BOOKS

1. *DeVito, Joseph*, The *Interpersonal Communication* Book, 13th Edition -,Published by *Longman* Pub Group, Updated in its *13th edition*,2000
2. Kathleen S. Verderber, Inter-Act: Interpersonal Communication Concepts, Skills and Contexts, Rudolph F. Verderber, 2000

REFERENCES

1. Clifford Whitcomb, Effective Interpersonal and Task Communication Skills for Engineers, Atlantic Publishers.2010

Table:1 Mapping of CO's with GA's:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	2	0	0	0	0	0	0	0	0	0	0	0
CO2	0	0	0	0	0	0	0	0	0	0	0	3
CO3	0	0	0	0	0	3	0	0	0	0	0	0
CO4	0	0	0	3	0	0	0	0	0	0	0	0
CO5	0	0	0	0	0	0	0	0	0	2	0	0
Total	**2**	**0**	**0**	3	**0**	**3**	**0**	**0**	**0**	2	0	0
Scaled to 0,1,2,3 scale	**1**	**0**	**0**	1	**0**	**1**	**0**	**0**	**0**	1	0	0

YGE401			TECHNICAL COMMUNICATION	L	T	P	C
				1	0	2	0
C	P	A		L	T	P	H
3	1	1		1	0	2	3

PREREQUISITE: Speech Communication

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Understand*** the nature and purpose of Technical Communication	Cognitive	Remembering
CO2	***Identify*** the techniques used in technical communication	Cognitive	Understanding
CO3	Ability to ***integrate*** both technical subject skill and language skill to write a project	Cognitive	Understanding
CO4	***Knowledge*** on the linguistic competence to write a technical report	Cognitive	Guided response
CO5	***plan*** and ***organize*** a technical project report ***and*** Confidence to present a project in 10 to 15 minutes	Psychomotor Affective	Apply

UNIT I	**9**
Basic principles of good technical writing, Style in technical writing, out lines and abstracts, language used in technical writing : technical words, jargons etc	
UNIT II	**9**
Special techniques used in technical writing: Definition, description of mechanism, Description of a process, Classifications, division and interpretation	
UNIT III	**9**
Report/ project layout The formats: chapters, conclusion, bibliography, annexure and glossary, Graphics aids etc	
UNIT IV	**18**
Presentation of the written project 10 – 15 minutes,	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	0	30

REFERENCES:

1. **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.

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

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

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

YSE402			PROGRAMMING IN JAVA	L	T	P	C
				3	1	1	5
C	P	A		L	T	P	H
2.8	1	0.2		3	2	2	7

PREREQUISITE: YSE202, YSE303

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

	COURSE OUTCOMES	DOMAIN	LEVEL
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 ***BeAware***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+6+6**

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+6+6**

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+6+6**

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+6+6**

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+6+6**

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	**30**	**30**	**105**

TEXT BOOKS:

1. Herbert Schildt, Dale Skrien, 2013, "Java Fundamentals – A Comprehensive Introduction", Tata McGraw Hill

REFERENCES:

1. C. Xavier, 2011, "Java Programming: A Practical Approach", Tata McGraw Hill.
2. John Dean, Raymond Dean, 2012, "Introduction to Programming with JAVA – A Problem Solving Approach", Tata McGraw Hill.
3. Ralph Bravaco, Shai Simonson, 2012 ,"Java Programming : From the Ground Up", Tata McGraw Hill Edition.
4. C.Muthu,2009,Programming With Java 2nd Edition, Tata Mcgraw Hill Education private ltd.

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

YSE 403			COMPUTER NETWORKS	L	T	P	C
				3	1	0	4
C	P	A		L	T	P	H
2	0.5	0.5		3	1	0	4

PREREQUISITE: Computer Fundamentals

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the importance of computer networks behind business communications and day to day life activities.	Cognitive Psychomotor	Remember Perception
CO2	***Express*** the functionalities of each layer and ***aware*** of the various protocols in different layers.	Cognitive Affective	Understand Receive
CO3	***Describe*** the wired/wireless technologies and ***achieve*** the knowledge of transmission medium.	Cognitive Psychomotor	Understand Set
CO4	***Choose*** the required routing mechanisms and ***contribute*** the appropriate one for the given application.	Cognitive Affective	Apply Respond
CO5	***Analyze*** the addressing format and techniques of the networks.	Cognitive	Analyze

UNIT I	**NETWORK FUNDAMENTALS AND PHYSICAL LAYER**	**12**
Introduction – Data Communications – Networks – Network Types – Internet History – Standards and Administration - Network Models – Protocol Layering – TCP/IP Protocol Suite – The OSI Model – Transmission Media – Switching		
UNIT II	**DATA LINK LAYER**	**12**
Introduction to Data Link Layer – Link Layer Addressing - Error Detection and Error Correction - Data Link Control - MAC – Wired LANs: Ethernet - Wireless LANs – Other Wireless Networks - Connecting Devices and Virtual LANs		
UNIT III	**NETWORK LAYER**	**12**
Introduction to Network Layer – Network Layer Protocols – Unicast Routing – Multicast Routing		
UNIT IV	**TRANSPORT LAYER**	**12**
Introduction to Transport Layer – Transport Layer Protocols – User Datagram Protocol – Transmission Control Protocol - SCTP		
UNIT V	**APPLICATION LAYER AND SECURITY**	**12**
Introduction to Application Layer – Standard Client Server Protocols – Multimedia – WWW and HTTP – FTP – Electronic Mail – TELNET - DNS		

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	-	60

REFERENCES:

1. Behrouz A.Forouzan, “Data Communications and Networking”, Fifth Edition, McGraw Hill Education, 2013.
2. Achyut S Godbole,Atul Hahate, “ Data Communications and Networks”, Second Edition, New Delhi : Tata McGraw-Hill Education, 2011.
3. Andrew S. Tanenbaum, David J. Wetherall “Computer Networks”, Fifth Edition, Pearson Education Inc., 2013.
4. William Stallings, “Data and Computer Communications”, Tenth Edition, Pearson Education, 2014.

5. Video Lecture Link: http://media.pearsoncmg.com/ph/streaming/esm/tanenbaum5e_videonotes/tanenbaum_videoNotes.html
6. Lecture Slides, Multiple Choice Questions, Animations Link: http://highered.mheducation.com/sites/0072967757/student_view0/index.html
7. Lecture Slides : http://www.mhhe.com/engcs/compsci/forouzan/

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

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

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

YSE 404			SOFWARE PROJECT MANAGEMENT	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2	0	1		3	0	0	3

PREREQUISITE: Software Engineering

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the importance of object oriented programming	Cognitive Psychomotor	Remember Perception
CO2	***Memorize*** the knowledge of data abstraction, encapsulation and inheritance.	Cognitive Affective	Understand Receive
CO3	***Recognize*** the consequence of exception handling.	Cognitive Psychomotor	Understand Set
CO4	***Implement*** good programming design methods for program development.	Cognitive Affective	Apply Respond
CO5	***Implement*** the staffing in software projects.	Cognitive Affective	Apply Respond

UNIT I	**PROJECT EVALUATION AND PROJECT PLANNING**	**9**

Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II	**PROJECT LIFE CYCLE AND EFFORT ESTIMATION**	**9**

Software process and Process Models – Choice of Process models – mental delivery– Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points – COCOMO II A Parametric Productivity Model – Staffing Pattern.

UNIT III	**ACTIVITY PLANNING AND RISK MANAGEMENT**	**9**

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules.

UNIT IV	**PROJECT MANAGEMENT AND CONTROL**	**9**

Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.

UNIT V	**STAFFING IN SOFTWARE PROJECTS**	**9**

Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45			45

REFERENCES:

1. Bob Hughes and Mike Cotterell, 2002 " Software Project Management "2nd edition , Tata McGraw Hill Publishing Company , New Delhi.
2. Walker Royce: "Software Project Management"- Addison-Wesley, 1998.

3. Gopalaswamy Ramesh, “Managing Global Software Projects” – McGraw Hill Education (India), Fourteenth Reprint 2013.

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

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

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

YSE 405			SOFTWARE MEASUREMENT AND METRICS	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Software Engineering

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the fundamentals of measurement and experimentation	Cognitive	Understand
CO2	***Examine*** various methods of software metrics	Cognitive	Analyze
CO3	***Differentiate*** software measurement data	Cognitive	Analyze
CO4	***Demonstrate*** the various methods of software reliability	Cognitive	Apply
CO5	***Classify*** the possible tools to manage software metrics	Cognitive	Analyze

UNIT I	FUNDAMENTALS OF MEASUREMENT AND EXPERIMENTATION	9

Measurement: what is it and why do it-Measurement in everyday life-Measurement in software engineering-The scope of software metrics -The representational theory of measurement-Measurement and models-Measurement scales and scale types-Meaningfulness in measurement.

UNIT II	EMPIRICAL INVESTIGATION AND SOFTWARE-METRICS DATA COLLECTION	9

Four principles of investigation- Planning formal experiments- Planning case studies. -What is good data-How to define the data-How to collect data-When to collect data-How to store and extract data.

UNIT III	ANALYZING SOFTWARE-MEASUREMENT DATA	9

Introduction- Analyzing the results of experiments-Examples of simple analysis techniques-More advanced methods-Overview of statistical tests. Measuring internal product attributes: size-Aspects of software size-Length-Reuse-Functionality-Complexity. Structure-Types of structural measures-Control-flow structure- Modularity and information flow attributes.

UNIT IV	SOFTWARE RELIABILITY: MEASUREMENT AND PREDICTION	9

Basics of reliability theory-The software reliability problem-Parametric reliability growth models-Predictive accuracy- Cost estimation: problems and approaches-Models of effort and cost-Problems with existing modeling methods- Dealing with problems of current estimation methods.

UNIT V	MEASUREMENT AND MANAGEMENT	9

Planning a measurement program-What is a metrics plan?-Why and what: developing goals, questions, and metrics- Where and when: mapping measures to activities- How: measurement tools-Who: measurers, analysts, and audience- Revising the plan. Measurement in practice-Success criteria-Measurement in the small-Measurement in the large.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

REFERENCES:

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

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

M.Sc. SE	PO								PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**
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

YSE406			DATA BASE MANAGEMENT SYSTEM	L	T	P	C
				3	1	1	5
C	P	A		L	T	P	H
2.5	0.5	0		3	1	3	7

PREREQUISITE: Computer Fundamentals

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** and ***Express*** the fundamentals of Data Base Management System and Relational database system	Cognitive	Remember Understand
CO2	***Recognize*** and ***Explain*** the Transaction Management and Storage implementation techniques	Cognitive	Remember Understand
CO3	***Sketch and show*** the Relational data base design for the real time application.	Cognitive Psychomotor	Apply Set
CO4	***Analyze and Apply*** proper Relational data base queries	Cognitive	Analyze Apply
CO5	***Design and Construct*** an application with suitable form design and data base	Psychomotor	Origination

UNIT I	INTRODUCTION	12

Data base system Applications - Purpose of Database System – Views of data – Data base languages- Relational Databases – Data base Design - Data Storage and querying – Database System Architecture – Data mining and Information retrieval - Data base users and administrators - History of Data base system

Lab : Working with DDL, DML ,DCL

UNIT II	RELATIONAL DATABASES	12

Structure of Relational Databases – Database schema –keys – schema diagram – Relational operations – Relational Algebra – Introduction to SQL – Overview of the SQL Query Languages – SQL data definition - Basic structure of SQL queries – Additional Basic operations – Set Operations –Null Values –Nested sub queries

Lab : Working with Database Queries, Trigger , View

UNIT III	DATABASE DESIGN	12

Data base design and the ER model - Overview of the design process - Entity– Relationship model – Constraints - Entity Relationship diagrams – Entity Relationship design issues – Extended ER features - Relational database design – Features of good relational designs –Atomic domains and First Normal form - Decomposition using functional dependencies

Lab : Working with PL/SQL Basics , Procedures and Functions

UNIT IV	TRANSACTION MANAGEMENT	12

Transaction Concepts – A simple Transaction model – Storage structure – Transaction atomicity and durability – Transaction Isolation - Serializability - Concurrency control – Lock based protocol – timestamp based protocol - Transaction Recovery – Failure classification – storage – Recovery and Atomicity

Lab : Working with Transaction control

UNIT V	IMPLEMENTATION TECHNIQUES	12

Storage and file structure - Overview of physical storage media – Magnetic disk and flash storage – RAID – File organization – Organization of records in files - Data dictionary storage - Indexing and hashing – Basic concepts – ordered indices – B+ Tree index files - Distributed data base - Distributed data storage - Distributed transactions

Lab : Working with Form Design

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105

REFERENCES:

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	YGE501	L	T	P	C
COURSE NAME	BUSINESS COMMUNICATION	1	0	0	1
PREREQUISITE:	Communication Skill and Basic Grammar Knowledge	L	T	P	H
C:P:A	3:0:0	1	0	2	3

COURSE OUTCOMES		Domain	Level
CO1	***Define*** and ***Identify*** different styles to various forms of business communication.	Cognitive	Remember
CO2	***Identify*** the proper tone of language required in writing and speaking in business communication.	Cognitive	Remember
CO3	***Display*** knowledge on grammar and other linguistic features in writing various forms of business communication.	Cognitive	Understand
CO4	***Distinguish*** between letters and memos and various forms of Business Communication.	Cognitive	Analyse
CO5	***Prepare*** business reports, minutes, proposals.	Cognitive	Apply

UNIT I - INTRODUCTION TO BUSINESS COMMUNICATION	**10**
Modern developments in the style of writing letters memos and reports: block letters, semi block letters, full block letters, simplified letters etc.,	
UNIT II - USE OF LANGUAGE	**10**
Memos/minutes/telephone memos/ letters/ assignments, art of writing E-mail etc. features of written and spoken communication.	
UNIT III – GRAMMAR	**10**
The use of active and passive voice; the use of grammar, propriety, accuracy, exactness, the tone & other elements of language used in these writings.	
UNIT IV - TYPES OF REPORTS	**5**
The format of various types of Reports/ projects etc.,	
UNIT V- BUSINESS WRITING	**10**
Writing Business reports, proposals and minutes.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT BOOKS

1. John Sealy, Writing and Speaking Author:, Oxford University Press, New Delhi Third Edition 2009.
2. Williams K S, Communicating in Business (8th Edition) Engage Learning India Pvt. Ltd.; 2012

E – REFERENCES

1. https://is.muni.cz/el/1456/jaro2014/MPV_COMA/um/E-book_Business-Communication.pdf
2.http://communication-revolution.biz/wp-content/uploads/2013/12/The-Business-Communication-Revolution.pdf

Table 1: Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2
CO 1	0	0	1	0	0	0	0	0	1	0	0
CO 2	0	0	0	0	0	1	2	0	0	0	0
CO 3	0	0	0	0	0	1	1	2	0	0	0
CO 4	1	1	0	0	1	1	2	1	1	0	0
CO 5	1	0	0	2	0	2	3	2	3	0	0
Total	2	1	1	2	1	5	8	5	5	0	0
Scaled to 0,1,2,3	1	1	1	1	1	1	2	1	1	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: COs Vs GA Mapping

s	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	0	0	0	0	0	0	0	0	0	2	0	0
CO2	0	0	0	0	0	0	0	0	0	2	0	0
CO3	0	0	0	2	0	0	0	0	0	1	0	0
CO4	0	0	0	0	0	0	0	0	0	0	0	0
CO5	0	0	0	0	0	0	0	0	0	1	0	0
Total	0	0	0	2	0	0	0	0	0	6	0	0
Scaled Value				1						2		

1-5 →1, 6-10 →2, 11-15 →3

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

YSE 502			.NET TECHNOLOGIES	L	T	P	C
				3	1	1	5
C	P	A		L	T	P	H
2.5	0.5	0		3	1	3	7

PREREQUISITE: Computer Fundamentals and Computer Programming

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the basics of .net frame work	Cognitive Psychomotor	Remember Perception
CO2	***Apply*** decision and iteration control structures to implement programs	Cognitive	Apply
CO3	***Create*** database connection and ***manipulate*** the data source	Cognitive Psychomotor	Create Guided Response
CO4	***Design***, debug, and ***Show*** well-structured .NET applications.	Cognitive Psychomotor	Create Mechanism
CO5	***Analyze*** web services to improve the performance	Cognitive	Create

UNIT I	INTRODUCTION TO .NET FRAMEWORK	12

Managed Code and the CLR- Intermediate Language, Metadata and JIT Compilation - Automatic Memory Management.- Visual Studio .NET - Using the .NET Framework.- The Framework Class Library - .NET objects - ASP .NET - .NET web services – Windows Forms

Lab: 1. Familiarizing with .NET Environment

UNIT II	INTRODUCTION TO VISUALBASIC.NET	12

Variables and constants – data types – declaration. Operators – types – precedence. Expressions. Program flow – Decision statements – if .. then, if..then..else, select..case– Loop statements – while..end while, do..loop, for..next, for..each..next. - Value data types – Structures, Enumerations. Reference data types- Single dimensional – Multi-dimensional arrays – jagged arrays – dynamic arrays Windows programming – creating windows Forms – windows controls – Button, Check box, Combo box, Label, List box, Radio Button, Text box. Events – Click, close, Deactivate, Load, Mousemove, Mousedown, MouseUp. Menus and Dialog Boxes – Creating menus – menu items – context menu – Using dialog boxes – showDialog() method.

Lab: 1. Work with Console
2. Looping and Conditional Statements
3. Working with various Controls such as timer, calendar, etc.,
4. Create basic text editor

UNIT III	APPLICATION DEVELOPMENT USING ADO .NET	12

Architecture of ADO.NET – ADO.NET providers – Connection – Command – Data Adapter – Dataset. Accessing Data with ADO.NET - Connecting to Data Source, Accessing Data with Data set and Data Reader - Create an ADO.NET application - Using Stored Procedures.

Lab: 1. Insert, Delete, Update and Modify Operations
2. Store and retrieve data using Data Grids

UNIT IV	INTRODUCING ASP.NET	12

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

Server Controls - Adding ASP.NET Code to a Page.

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

UNIT V	XML WEB SERVICES	12+9

Overview of XML **:** XML Serialization in the .NET Framework -SOAP Fundamentals- Using SOAP with the .NET Framework. Introduction to web services**:** Web Services protocol and standards – WSDL Documents - Overview of UDDI - Calling a Web Service from a Browser - Calling a Web Service by Using a Proxy - Creating a simple web service - Creating and Calling a Web Service by Using Visual Studio .NET.

Lab: 1. XML web services

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105

REFERENCES:

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

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	2	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–High 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	2	2	7

PREREQUISITE: Computer Fundamentals, Computer Programming

COURSE OUTCOMES:

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	15+6 Hrs

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	15+6 Hrs

CSS Basics – Texts and Fonts – Links, Lists and Tables – Border and Outline – Position – Dimension and Display - Java Script Basics – Functions – Objects – Events – Scope – Strings – Numbers – Date – Arrays – Conditional and Looping Statements – Forms

Lab: 1. Font, color and style
2. Background and Links
3. Form Validation
4. Looping and Conditional Statements

UNIT III	PHP BASIC CONCEPTS	15+6 Hrs

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	15+6 Hrs

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	15+6 Hrs
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	30	30	105

REFERENCES:

4. Achyut S.Godbole, Atul Kahate, "Web Technologies TCP/IP To Internet Application Architectures", First Edition, Tata McGraw-Hill Publishing Company Limited, 2003.
5. N.P. Gopalan, J.Akilandeswari, "Web Technology: A Developer's Perspective", Second Edition, PHI Learning Private Limited, 2014.
6. Thomas A. Powell, "HTML & CSS: The Complete Reference", Fifth Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2010.
7. Thomas A. Powell, Fritz Schneider, "JavaScript: The Complete Reference", Second Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2008.
8. Kevin Tatroe, Peter MacIntyre and Rasmus Lerdorf, "Programming PHP", Third Edition, O'Reilly Media, Inc., 2013.
9. www.php.net/manual/en/intro-whatis.php
10. www.w3schools.com
11. 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 505			RESOURCE MANAGEMENT TECHNIQUES	L	T	P	C
				3	1	0	4
C	P	A		L	T	P	H
3	0	0		3	2	0	5

PREREQUISITE: Mathematical Simplifications.

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	15
Linear Programming Problem – Formulation, Graphical solution of two variables canonical & standard form of LPP, Simplex method.		
UNIT II	**Transportation and Assignment Problems**	**15**
Transportation algorithm - Unbalanced Transportation problem- Assignment algorithm- Unbalanced assignment problem.		
UNIT III	**Sequencing Problem**	**15**
Processing of n jobs through two machines -Processing of n jobs through three machines- Processing of n jobs through m machines.		
UNIT IV	**PERT & CPM**	**15**
Network - Fulkerson's rule- Measure of activity- PERT computation- CPM computation- Resource scheduling.		
UNIT V	**Network Models**	**15**
Network definition- Minimal spanning tree problem- Shortest route problem.		

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	30	--	75

TEXT

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.

Table 1: 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

COURSE CODE	YUM506	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	***Explain*** the basic concepts of quality management with effective leadership.	Cognitive	Understand
CO2	***Describe*** and ***Identify*** the Continuous process improvement	Cognitive Affective	Understand Receive
CO3	***Relate*** and ***Use*** the old and new seven management tools for statistical process control	Cognitive Affective	Understand Receive
CO4	***Distinguish*** the concept of total productive Maintenance with Continuous process improvement.	Cognitive	Understand
CO5	***Explain*** 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. DaleH.Besterfiled,etal.,"TotalQualityManagement",PearsonEducation,Inc.2004. (ISBN 81-297-0260-6).

2. JamesR.Evans&WilliamM.Lidsay,"TheManagementandControlofQuality",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 Hcinemann Ltd., 1989.
3. NarayanaV.andSreenivasan,N.S."QualityManagement–ConceptsandTasks",New Age International 1996.
4. Zeiri, "Total Quality Management for Engineers", Wood Head Publishers, 1991.

Table 1 : 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

YGE601			ACADEMIC WRITING SKILLS	L	T	P	SS	C
				0	0	0	2	0
C	P	A		L	T	P	SS	H
1.2	0.4	0.4		0	0	0	2	2

PREREQUISTE :

Course Outcomes		Domain	Level
CO1	***Knowledge*** on the need for going beyond grammar in writing paragraphs and essays	Cognitive	Remember
CO2	***Integrate*** all the written language elements into the production of a cohesive whole called a paragraph.	Cognitive	Understand
CO3	***Practice*** the discourse features that connects sentences and paragraphs.	Cognitive	Understand
CO4	***Synthesize*** language and ideas to develop sentences , paragraphs and essays	Cognitive	GR
CO5	***Produce*** correct, proper, and fluent pieces of writing	Psychomotor	A

UNIT I	TYPES OF PARAGRAPHS	5

Definition of a paragraph, writing different types of paragraphs: definition paragraph, descriptive paragraph, process paragraph, comparison and contrast paragraph etc.

UNIT II	DISCOURSE FEATURES	5

Cohesion, coherence (connectives) etc; précis writing, summarizing

UNIT III	VARIOUS TYPES OF ESSAYS	5

Discursive, argumentative, cause & effect, chronological etc;

UNIT IV	USE OF LANGUAGE	5

Essays according to the type of essays

UNIT V	ESSAY WRITING PRACTICE	5

LECTURE	SELF STUDY	PRACTICAL	TOTAL
0	30	0	30

Text books

1. D. H. Howe and G. MC Arthur, *Advance with English*, Oxford University Press,1993
2. Wren and Martine, *High School English Grammar and Composition*, S, Chand and Company, 1999.
3. Raymond Murphy, *Intermediate English Grammar*, Ii Ed., , Cambridge University Press, New Delhi,1994
4. Bikrim K. Das, *Functional Grammar and Spoken and written communication in English*, Orient Black swan, Hyderabad.Reprinted 2011,

Mapping of COs with GAs:

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

YUM602			ENVIRONMENTAL STUDIES	L	T	P	C
				3	0	0	2
C	P	A		L	T	P	H
1.5	0	0.5		3	0	0	3

PREREQUISITE :

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: 45	**Tutorial:0**	**Practical:0**	**Total:45**

REFERENCES

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
3. Trivedi R.K and P.K.Goel, Introduction to Air pollution, Techno Science Publications, India, 2003.
4. Disaster mitigation, Preparedness, Recovery and Response, SBS Publishers & Distributors Pvt. Ltd, New Delhi, 2006.
5. Introduction to International disaster management, Butterworth Heinemann, 2006.
6. Gilbert M.Masters, Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., Second Edition, New Delhi, 2004.
7. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media, India, 2009.
8. Cunningham, W.P.Cooper, T.H.Gorhani, Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001.
9. S.K.Dhameja, Environmental Engineering and Management, S.K.Kataria and Sons, New Delhi, 2012.
10. Sahni, Disaster Risk Reduction in South Asia, PHI Learning, New Delhi, 2003.
11. Sundar, Disaster Management, Sarup & Sons, New Delhi, 2007.
12. G.K.Ghosh, Disaster Management, A.P.H.Publishers, New Delhi, 2006.
13. http://www.e-booksdirectory.com/details.php?ebook=10526
14. https://www.free-ebooks.net/ebook/Introduction-to-Environmental-Science
15. https://www.free-ebooks.net/ebook/What-is-Biodiversity
16. https://www.learner.org/courses/envsci/unit/unit_vis.php?unit=4
17. http://bookboon.com/en/pollution-prevention-and-control-ebook

18. http://www.e-booksdirectory.com/details.php?ebook=8557
19. http://www.e-booksdirectory.com/details.php?ebook=6804

	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**

YSE603			ENTREPRENEURSHIP DEVELOPMENT	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	1		3	0	0	3

PREREQUISITE :

Course Outcome		**Domain**	**Level**
After the completion of the course, students will be able to			
CO1	***Recognize*** and ***describe*** the personal traits of an entrepreneur.	Affective Cognitive	Receiving Understand
CO2	***Determine*** the new venture ideas and ***analyze*** the feasibility report.	Cognitive	Understand Analyse
CO3	***Develop*** the business plan and ***analyze*** the plan as an individual or in team.	Affective Cognitive	Receiving Analyse
CO4	***Describe*** various parameters to be taken into consideration for launching and managing small business.	Cognitive	Understand
CO5	***Describe*** Technological management and Intellectual Property Rights	Cognitive	Understand

UNIT I	**ENTREPRENEURIAL TRAITS AND FUNCTIONS**	**9**

Definition of Entrepreneurship; competencies and traits of an entrepreneur; factors affecting Entrepreneurship Development; Role of Family and Society ; Achievement Motivation; Entrepreneurship as a career and national development;

UNIT II	**NEW PRODUCT DEVELOPMENT AND VENTURE CREATION**	**9**

Ideation to Concept development; Sources and Criteria for Selection of Product; market assessment ; Feasibility Report ;Project Profile; processes involved in starting a new venture; legal formalities; Ownership; Case Study.

UNIT III	**ENTREPRENEURIAL FINANCE**	**9**

Financial forecasting for a new venture; Finance mobilization; Business plan preparation; Sources of Financing, Angel Investors and Venture Capital; Government support in startup promotion.

UNIT IV	**LAUNCHING OF SMALL BUSINESS AND ITS MANGEI**	**9**

Operations Planning - Market and Channel Selection - Growth Strategies - Product Launching – Incubation, Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units.

UNIT V	**TECHNOLOGY MANAGEMENT, IPR PORTFOLIO FOR NEW PRODUCT VENTURE**	**9**

Technology management; Impact of technology on society and business; Role of Government in supporting Technology Development and IPR protection; Entrepreneurship Development

Training and Other Support Services.			
Lecture	**Tutorial**	**Practical**	**Total**
45	**0**	**0**	**45**

REFERENCES

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

MAPPING COURSE OUTCOME WITH GRADUATE ATTRIBUTES:

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

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

YSE607			OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	C
				3	1	1	5
C	P	A		L	T	P	H
2.5	0.5	0		3	1	3	7

PREREQUISITE : Object Oriented Programming concepts

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**	**12**

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**	**12**

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**	**12**

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**	**12**

Modeling workflows using Activity diagrams: Components of activity diagrams- Steps in construction – Examples - Modeling behavior with state diagrams: Notations- Nesting of states- steps in construction – Examples. UML Interaction diagrams: Interaction diagrams – Components- steps in construction- examples. Collaboration diagrams- Timing diagrams- Interaction overview diagrams.

Lab:

Software Development and Debugging.

UNIT V	**STRUCTURAL MODELING**	**12**

Class diagrams- Object diagrams- Component diagrams- Deployment diagrams- Package diagrams- Composite structure diagrams. **CASE STUDIES:** Patterns and frameworks- Modeling ATM.

Lab:

Software Testing Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.

Lecture: 45	**Tutorial:15**	**Practical:45**	**Total:105**

REFERENCES

1. Ali Bahrami, "Object Oriented Systems Development" Tata-McGraw Hill, New Delhi, International editions, 2008
2. Grady Booch, James Rumbaugh and Ivar Jacobson, "The Unified Modeling Language User Guide", Addison-Wesley Longman, USA, 2005.
3. Fowler, "Analysis Patterns", Addison Wesley, USA, 1996.
4. Erich Gamna, "Design Patterns", Addison Wesley, USA, 1994.

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

M.Sc. SE	**PO**								**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**
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

YGE801			CAREER DEVELOPMENT SKILLS	L	T	P	SS	C
				0	0	0	2	0
C	P	A		L	T	P	SS	H
0	0.5	1.5		0	0	0	2	2

PREREQUISTE :

Course Outcomes		Domain	Level
CO1	***Knowledge*** on a career related communication and learning the different formats of CV	Cognitive	Knowledge
CO2	***Prepare*** how to face an interview and to learn how to prepare for an interview	Psychomotor	Set
CO3	***Communicates*** with the group of people in discussion	Affective	Receiving

UNIT I	CV WRITING	5

Difference between resume and CV; characteristics of resume and CV; basic elements of CV and resume, use of graphics in resume and CV; forms and functions of Cover Letters.

UNIT II	INTERVIEW SKILLS	5

Tips for various types of interviews. Types of questions asked ; body language, etiquette and dress code in interview, interview mistakes, telephonic interview , frequently asked questions. Planning for the interview.

UNIT III	WORK SHOP	5

Mock interviews - workshop on CV writing – Group Discussion

LECTURE	SELF STUDY	PRACTICAL	TOTAL
0	30	0	30

Text books

1. How To Write a CV That Really Works: A Concise, Clear and Comprehensive Guide to Writing an Effective CV, Paul McGee Hachette UK, 2014
2. Essentials of Business Communication, Mary Ellen Guffey, Dana Loewy, Cengage Learning, 2012
3. Interview Skills that win the job: Simple techniques for answering all the tough questions, Michael Spiropoulos, Allen & Unwin, 2005
4. Effective Interviewing and Interrogation Techniques, William L. Fleisher, Nathan J. Gordon, Academic Press, 2010
5. http://www.utsa.edu/careercenter/PDFs/Interviewing/Types%20of%20Interviews.pdf
6. http://www.amu.apus.edu/career-services/interviewing/types.htm
7. http://www.careerthinker.com/interviewing/types-of-interview/

Mapping of COs with GAs:

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

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

PREREQUISITE: Software Engineering

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***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	12

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	12

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	STRATERGIES AND METHODS FOR TEST CASE DESIGN	12

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	12

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	CONTROLING AND MONITORING THE TEST PROCESS	12

Measurements and Milestones for controlling and monitoring – Software Configuration and

management – Reviews as a testing activity - Defect analysis and prevention – Process control and Optimization – Need for Testing Maturity Model – Structure of testing maturity model – Relationships of the TMM to other process improvement models.

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105

REFERENCES:

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

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

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

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

YSE 803			SOFTWARE COMMUNICATION AND DOCUMENTATION	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2.0	0.5	0.5		3	0	0	3

PREREQUISITE: English

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** and ***Express*** various Types of communication and Documentation.	Cognitive	Remember Understand
CO2	***Discuss*** and ***Practice*** the Characteristics and Elements of Spoken and Group Communication	Cognitive ***Affective***	Understand ***Responding to a phenomena***
CO3	***Discuss*** and ***Analyze*** the procedure to be followed in Group Communication	Cognitive	Understand Analyze
CO4	***Propose*** and ***Write*** various types of Letters, Resume, Proposals and Contracts	***Affective***	***Responding to a phenomena***
CO5	***Adapt*** and ***follow*** the appropriate Technology and Standards for documentation	***Psychomotor Affective***	***Adaptation Valuing***

UNIT I	**BASIC CONCEPTS**	**9**
Importance of communication and documentation - Different types of Communications - Spoken communication - written communication - Different types of documentation.		
UNIT II	**SPOKEN COMMUNICATION**	**9**
Elements of good individual communication – getting over nervousness – organizing one self characteristics of effective communication – augmenting spoken words by actions and other means – other aspects of spoken communication like speeches – presentation - use of visual aids.		
UNIT III	**GROUP COMMUNICATION**	**9**
Meeting – Effective participation – effective management of meetings – preparing minutes – "Virtual" meetings – audio conference – video conference – use of collaboration tools		
UNIT IV	**DIFFERENT TYPES OF WRITTEN COMMUNICATION**	**9**
Principles of effective written communication – differences between written communication and spoken communication – resume writing – email - effective email techniques – proposals – contracts – user guides – external technical documentation for software – internal software technical documentation – users guides – letters and different types of letters – legal issue.		
UNIT V	**TECHNOLOGY AND STANDARDS**	**9**
Use of various tools and technologies – need for standardization – role of processes and standards in documentation – on-line help – Impact of internet on documentation – common challenges in the harnessing of technology - course summary		

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	-	45

REFERENCES:

1. Effective Technical Communication ,Asraf Ali
2. Day –to –day English Part I - Prof.Dr.V.R. Angapan ,2010, 7th edition

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

YSE 807			DATA MINING AND DATA WAREHOUSING	L	T	P	C
				3	1	1	5
C	P	A		L	T	P	H
2.75	0.25	0		3	1	1	5

PREREQUISITE: Data Base Management System

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Analyze*** Multidimensional Intelligent model from typical system	Cognitive	Analyze
CO2	***Evaluate*** various mining techniques on complex data objects	Cognitive	Evaluate
CO3	***Understand*** Data Mining processes using Open Source Data Mining tool.	Cognitive	Understand
CO4	***Choose*** the appropriate techniques and algorithms for extracting data	Cognitive Affective	Apply Respond
CO5	***Recognize*** the knowledge of data mining, data preprocessing and data warehousing	Cognitive Psychomotor	Analyze Perception

UNIT I **INTRODUCTION** **12**

Introduction, Fundamentals of data mining, Data Mining Functionalities, Data Preprocessing : Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction

Lab:

- Perform Data Preprocessing using tool
- Perform Visualization of data using tool

UNIT II **DATA WAREHOUSING** **12**

Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining.

Lab:

Implement the following Multidimensional Data Models

i.Star Schema
ii.Snowflake Schema
iii.Fact Constellation

UNIT III **ASSOCIATION** **12**

Mining Association Rules in Large Databases, Association Rule Mining, Apriori Algorithm and Frequent pattern growth algorithm

Lab:

- Classification, Association and Clustering algorithms using tool
- Implement Apriori algorithm to generate frequent Item Sets

UNIT IV **CLASSIFICATION** **12 + 9**

Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining

Lab:

- Implement the following classification algorithms

i.Decision Tree Induction

ii.KNN

UNIT V	CLUSTERING	12

Cluster Analysis Introduction Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

Lab:

- Implement the following clustering algorithms
  - i.K-means
  - ii.K-mediods

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105

REFERENCES:

1. Data Mining – Concepts And Techniques - Jiawei Han & Micheline Kamber Harcourt India.
2. Data Mining Introductory And Advanced Topics –Margaret H Dunham, Pearson Education
3. Data Mining Techniques – Arun K Pujari, University Press.
4. Data Warehousing In The Real World – Sam Anahory & Dennis Murray. Pearson Edn Asia.
5. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley Student Edition.
6. The Data Warehouse Life Cycle Tool Kit – Ralph Kimball Wiley Student Edition.
7. http://www.tutorialspoint.com/data_mining
8. 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

YSE901			MOBILE APPLICATION DEVELOPMENT	L	T	P	C
				3	1	3	5
C	P	A		L	T	P	H
3	1	0		3	1	3	7

PREREQUISITE: Knowledge on Object oriented programming and web technologies

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the significance of Android development	Cognitive	Remember
CO2	***Summarize*** the knowledge on java, xml with android and ***detect*** about the android development.	Cognitive Psychomotor	Understand Perception
CO3	***Manipulate*** and utilize the layout, resources and user interface.	Cognitive Affective	Application Receiving
CO4	To ***know*** about the database in android	Cognitive	Understand
CO5	***Design*** and test the android environment using exception handling, accessing the cloud data.	Cognitive	Create

UNIT I	INTRODUCTION	12

Overview of JAVA Programming – Inheritance – Polymorphism – Android software layers – Android libraries – Components of android application – Application life cycle – Android studio – android project structure – Android manifest file – Structure of manifest file

Lab: 1. Installing Android
2. Create a simple application

UNIT II	ANDROID SDK TOOLS AND OTHERS	12

Android SDK tools – activity – methods to remember – Fragments – views – List vies and list activity – Intents and intent filter – native action

Lab: 1. Working with fragments
2. Working with Intents and intent filters.
3. Creating contact based application.

UNIT III	ANDROID LAYOUT, RESOURSES AND UI	12

Views – Layout – customized view – Resources – themes and style – material design – User interaction – dialogs – Activities – Toasts – menus – context menus – Additional menu – pop up menu

Lab:
1. Working with views
2. Creating Dialogs and toasts
3. Working with Pop-up Menu

UNIT IV	ANDROID STORAGE, SQLite and NOTIFICATIONS	12

Android storage options – File I/O – connecting to the internet – Databases in android – content providers – custom content provider – creating notifications – actions – expandable notification – layouts – priority

Lab: 1. Quotes provider app
2. SQLite database app
. 3. Implement notification

UNIT V	ANDROID ADAVANCED DEVELOMENT	12

Exception handling – Location based services – finding your current location using GPS -

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

Lab: 1. Working with exception handling
2. Finding your location using GPS.
3. Bluetooth communication / SMS communication..

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	15	45	105

REFERENCES:

1. Professional Android 4 Application Development, 3rd edition, reto meier, wiley publication 2012.
2. Programming Android, 1st Edition, Zigurd Mednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura, Oreilly publications, 2011.

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

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

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

YUM902			CYBER SECURITY	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUSTIE:

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

UNIT I	INTRODUCTION	9

Cyber Security – Cyber Security policy – Domain of Cyber Security Policy – Laws and Regulations – Enterprise Policy – Technology Operations – Technology Configuration - Strategy Versus Policy – Cyber Security Evolution – Productivity – Internet – E commerce – Counter Measures – Challenges

UNIT II	CYBER SECURITY OBJECTIVES AND GUIDANCE	9

Cyber Security Metrics – Security Management Goals – Counting Vulnerabilities – Security Frameworks – E Commerce Systems – Industrial Control Systems – Personal Mobile Devices – Security Policy Objectives – Guidance for Decision Makers – Tone at the Top – Policy as a Project– Cyber Security Management – Arriving at Goals – Cyber Security Documentation – The Catalog Approach – Catalog Format – Cyber Security Policy Taxonomy.

UNIT III	CYBER SECURITY POLICY CATALOG	9

Cyber Governance Issues – Net Neutrality – Internet Names and Numbers – Copyright and Trademarks – Email and Messaging - Cyber User Issues - Malvertising - Impersonation – Appropriate Use – Cyber Crime – Geo location – Privacy - Cyber Conflict Issues – Intellectual property Theft – Cyber Espionage – Cyber Sabotage – Cyber Welfare

UNIT IV	INFORMATION SECURITY CONCEPTS	9

Information Security Overview: Background and Current Scenario - Types of Attacks - Goals for Security - E-commerce Security - Computer Forensics – Steganography

UNIT V	SECURITY THREATS AND VULNERABILITIES	9

Overview of Security threats -Weak / Strong Passwords and Password Cracking - Insecure Network connections - Malicious Code - Programming Bugs - Cyber crime and Cyber terrorism - Information Warfare and Surveillance

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

REFERENCE BOOKS

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

E RESOURCES

1. **https://www.coursera.org/specializations/cyber-security**
2. **www. nptel**.ac.in
3. **http://professional.mit.edu/programs/short-programs/applied-cybersecurity**

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

Course Outcome Versus GAs

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

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

Mapping of Course Outcomes (COs) with GAs)

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

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

1- Low relation 2 – Medium relation 3 – High relation

YSEE51			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: Web Technologies

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

REFERENCES:

1. Frank. P. Coyle, XML, Web Services and the Data Revolution, Pearson Education, 2002.
2. B V Kumar, S V Subrahmanya, Web Services An Introduction, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2004.
3. Gustavo Alonso, Fabio Casati, Harumi Kuno, Vijay Machiraju, Web Services Concepts, Architectures and Applications, Springer, 2004.
4. 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

YSEE52			SOFTWARE REUSE	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Software engineering concepts

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Identify*** the importance of Software Reuse and its components	Cognitive	Remember
CO2	***Interpret*** the understanding of Design Patterns	Cognitive	Understand
CO3	Clearly ***Understand*** the concepts of Structural Patterns	Cognitive	Understand
CO4	***Identify*** the various Behavioral Patterns and its functions	Cognitive	Remember
CO5	***Distinguish*** the various Architectural patterns.	Cognitive	Understand

UNIT I	INTRODUCTION	9

Software reuse success factors, Reuse driven software engineering business, Object oriented software engineering, applications and component sub systems, use case components, object components.

UNIT II	DESIGN PATTERNS	9

Design Patterns – Introduction, Creational patterns, factory, factory method, abstract factory, singleton, builder prototype.

UNIT III	STRUCTURAL PATTERNS	9

Structural Patterns- Adapters, bridge, composite, decorator, façade, flyweight, proxy. Behavioral Patterns – Chain of responsibility, command, interpreter.

UNIT IV	BEHAVIORAL PATTERNS	9

Behavioral Patterns – Iterator, mediator, memento, observer, 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

REFERENCES:

1. Ivar jacabson, Martin Griss, Patrick Hohson – Software Reuse. Architecture, Process and Organization for Bussiness Success, ACM Press, 1997.
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides – Design Patterns- Addison, 1995, Pearson Education.
3. Frank Buschmann etc. – Pattern Oriented Software Architecture – Volume 1, Wiley 1996.
4. James W Cooper – Java Design Patterns, a tutorial, Addison 2000, Pearson Education.

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

COURSE CODE	YSEE53	L	T	P	C
COURSE NAME	USER INTERFACE DESIGN	3	0	0	3
PREREQUISITE	Basics of windows and Multimedia concepts.	L	T	P	H
C P A	3:0:0	3	0	0	3

COURSE OUTCOMES		DOMAIN	LEVEL
CO1	***Identify*** the importance Graphics Interface.	Cognitive	Remember
CO2	***Interpret*** the understanding on Graphics Interface with various concepts and techniques.	Cognitive	Understand
CO3	***Understand*** the windows concepts and ***Interpret*** it in projects	Cognitive	Understand
CO4	Clearly ***understand*** the Multimedia components and ***apply*** it in projects	Cognitive	Remember, Apply
CO5	**Understand and *Distinguish*** the various Test and Software tools.	Cognitive	Understand

UNIT I	INTRODUCTION	9

Human– Computer Interface – Characteristics Of Graphics Interface – Direct Manipulation Graphical System – Web User Interface – Popularity – Characteristic & Principles.

UNIT II	HUMAN COMPUTER INTERACTION	9

User Interface Design Process – Obstacles – Usability – Human Characteristics In Design – Human Interaction Speed –Business Functions – Requirement Analysis – Direct – Indirect Methods – Basic Business Functions – Design Standards – System Timings – Human Consideration In Screen Design – Structures Of Menus – Functions Of Menus – Contents Of Menu – Formatting – Phrasing The Menu – Selecting Menu Choice – Navigating Menus – Graphical Menus.

UNIT III	WINDOWS	9

Characteristics – Components – Presentation Styles – Types – Managements – Organizations – Operations – Web Systems – Device – Based Controls Characteristics – Screen – Based Controls – Operate Control – Text Boxes– Selection Control – Combination Control – Custom Control – Presentation Control.

UNIT IV	MULTIMEDIA	9

Text For Web Pages – Effective Feedback – Guidance & Assistance– Internationalization – 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
45	0	0	45

REFERENCES :

1. Wilbent. O. Galitz ,"The Essential Guide To User Interface Design", John Wiley&Sons, 2001.
2. Ben Sheiderman, "Design The User Interface", Pearson Education, 1998.84
3. Alan Cooper, "The Essential Of User Interface Design", Wiley – Dream Tech Ltd.,2002

E- REFERENCES:

1. http://nptel.ac.in/courses/106105087/20
2. http://iitg.vlab.co.in/?sub=72&brch=170&sim=1359&cnt=1

Table 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

YSEE54			DISASTER MANAGEMENT	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2.75	0	0.25		3	0	0	3

PREREQUISTE:

Course Outcomes		Domain	Level
CO1	***Understand*** and ***Recognize*** the concepts of disaster	Cognitive	Understand Remember
CO2	***Recognize and describe*** the causes and effects of disaster	Cognitive	Understand Remember
CO3	***Describe*** the various approaches of risk reduction	Cognitive	Remember
CO4	***Demonstrate*** the inter-relationship between disaster and development	Cognitive	Understand
CO5	Discuss hazard and vulnerability profile of India and respond to drills related to relief	Cognitive Affective	Remember Response

UNIT - I	**INTRODUCTION TO DISASTERS**	**6**

Concepts and definitions- Disaster, Hazard, Vulnerability, Resilience, Risks

UNIT - II	**DISASTERS: CLASSIFICATION, CAUSES, IMPACTS**	**12**

Differential impacts- in terms of caste, class, gender, age, location, disability Global trends in disasters, urban disasters, pandemics, complex emergencies, Climate change

UNIT - III	**APPROACHES TO DISASTER RISK REDUCTION**	**10**

Disaster cycle - its analysis, Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, Centre, and other stake-holders.

UNIT - IV	**INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT**	**6**

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources

UNIT - V	**DISASTER RISK MANAGEMENT IN INDIA**	**11**

Hazard and Vulnerability profile of India Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programmes and legislation).

The project / fieldwork to understand vulnerabilities work on reduction of disaster risk and build a cultural safety.

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
		45	**45**

TEXT BOOKS:

1. Coppola P Damon, “Introduction to International Disaster Management, Butterworth-

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

REFERENCES:

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

WEB SITES AND WEB RESOURCES:

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

Table 1: Mapping of CO with GA

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

YSEE55			SOFTWARE RELIABILITY	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Software Engineering

COURSE OUTCOMES:

Course Outcomes	Domain	Level
After the completion of the course, students will be able to		
CO1: ***Recognize*** the significance of Software Reliability.	Cognitive	Remember
CO2: ***Express*** the knowledge on SDLC	Cognitive	Understand
CO3: ***Estimate*** the understanding of Software Quality Management.	Cognitive	Apply
CO4: ***Recognize*** the significance of Software Reliability Tools	Cognitive	Remember
CO5: ***Express*** the knowledge on Software testing .	Cognitive	Understand

UNIT I	INTRODUCTION TO SOFTWARE RELIABILITY	9

Software Reliability Definitions - software disasters - Errors - faults - failures - different views of software reliability – software requirements specification - Causes of unreliability in software - Dependable systems: reliable, safe, secure, maintainable, and available - Software maintenance

UNIT II	SOFTWARE RELIABILITY IMPROVEMENT	9

The phases of a Software Project - Monitoring the development process – The software life cycle models - software engineering - Structured Analysis and structured Design - Fault tolerance - nspection - Software cost and schedule.

UNIT III	SOFTWARE QUALITY MANAGEMENT	9

Software quality modeling - Diverse approaches and sources of information - Fault avoidance, removal and tolerance - Process maturity levels (CMM) - Software quality assurance (SQA) - Monitoring the quality of software - Total quality management (TQA) - Measuring Software Reliability - The statistical approach - Software reliability metrics.

UNIT IV	SOFTWARE RELIABILITY TECHNIQUES AND TOOLS	9

Data Trends - Complete prediction Systems - overview of some software reliability models - The recalibration of the models - Analysis of model accuracy - Reliability growth models and trend analysis - Software Costs Models - Super models

UNIT V	SOFTWARE RELIABILITY ENGINEERING PRACTICE	9

Testing and maintaining more reliable software –logical testing – functional testing – algorithm testing – regression testing - fault tree analysis – failure mode effects and critical analysis – reusability - case studies

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

REFERENCES:

1. J.D. Musa, A. Iannino and K.Okumoto, Software Reliability, Measurement, Prediction, Application, McGraw Hill, 1990.
2. J.D. Musa, Software Reliability Engineering, McGraw Hill, 1998.
3. Michael R. Lyer, Handbook of Software Reliability Engineering, McGraw Hill, 1995.Xie,
4. Software Reliability Modelling, World Scientific, London, 1991.

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

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

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

PREREQUISITE: Computer Network

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

CO1	***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**

REFERENCES:

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

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

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

YSEE62			INTERNET OF THINGS	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2.5	0.5	0		3	0	0	3

PREREQUISITE: Computer Networks

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Identify*** the components of IOT and learn the basic issues, policy and challenges in the Internet	Cognitive Psychomotor	Remember Perception
CO2	***Design*** the portable device , program the sensors and microcontrollers	Cognitive	Create
CO3	***Perceive*** the significance of ***build***ing the software agents in the real time environments	Cognitive Psychomotor	Create Perception
CO4	***Formulate*** and ***Establish*** the cloud based communication through wifi/ Bluetooth	Cognitive Psychomotor	Create Set
CO5	***Combine*** the needed internet resources and implement in the business model	Cognitive	Analyze

UNIT I	INTRODUCTION	9

Definition – phases – Foundations – Policy– Challenges and Issues - identification - security – privacy. Components in internet of things**:** Control Units – Sensors – Communication modules – Power Sources – Communication Technologies – RFID – Bluetooth – Zigbee – Wifi – Rflinks – Mobile Internet – Wired Communication

UNIT II	PROGRAMMING THE MICROCONTROLLER FOR IOT	9

Basics of Sensors and actuators – examples and working principles of sensors and actuators – Cloud computing and IOT – Arduino/Equivalent Microcontroller platform – Setting up the board - Programming for IOT – Reading from Sensors Communication: Connecting microcontroller with mobile devices – communication through bluetooth and USB – connection with the internet using wifi / ethernet

UNIT III	IOT PROTOCOLS	9

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus – KNX – Zigbee Architecture – Network layer – APS layer – Security

UNIT IV	WEB OF THINGS	9

Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and Cloud Computing – Cloud Middleware – Cloud Standards – Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture

UNIT V	INTERNET OF EVERYTHING	9

Differences Internet of Things and Internet of Everythings – IoE at a glance –Internet of Everything: Data, Networks and opportunities-Application - IoE for cities connecting people, process and data

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45			45

REFERENCES:

1. Charalampos Doukas , Building Internet of Things with the Arduino, Create space, April 2002
2. Dieter Uckelmann et.al, “Architecting the Internet of Things”, Springer, 2011

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

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

M.Sc. SE	PO								PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**
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

YSEE63			CLIENT SERVER COMPUTING	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Fundamentals of computing and Computer Networks

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Understand*** the basics of client server computing	Cognitive	Remember
CO2	***Identify*** Client server architecture, elements and components of computer system. ***Analysis*** the performance of computer and efficiency of internal elements.	Cognitive	Knowledge Analysis
CO3	***Analyze*** the Database connectivity and support required for Client server system	Cognitive	Analysis
CO4	***recognize*** the application of client server computing using Visual C++.	Cognitive	Knowledge Analysis
CO5	***associate*** with Multiple document interface.	Cognitive	Comprehension

UNIT I	Introduction	9

Basic concepts of Client / Server – Upsizing Downsizing – Right sizing – Characteristics – File server – Database servers – Transactions servers – Groupware servers – Object Client/Servers – Web Servers – Middleware.

Client / Server building blocks – Operating System services – Base services – External services – server scalability – Remote procedure calls – Multiservers.

UNIT II	SERVER ARCHITECTURE	9

SQL Database servers – server architecture – Multithread architecture – Hybrid architecture – stored Procedures – Triggers – Rules – Client / Server Transaction Processing – Transaction models – Chained and nested transactions – Transaction processing monitors – Transaction Management Standards.

UNIT III	DATABASE CONNECTIVITY	9

Database Connectivity solutions : ODBC – The need for Database connectivity – Design overview of ODBC – Architecture – components – Applications – Driver Managers – Drivers – Data sources – ODBC 2.5 and ODBC 3.0.

UNIT IV	VISUAL C++	9

Visual C++: The Windows Programming Model – GDI – resource based programming – DLL and OLE Applications – Visual C++ components – frame work / MFC class Library – basic event handling – SDI – Appwizard – ClassWizard – Model and Models dialogues – other controls – Examples.

UNIT V	MDI	9

Multiple Document Interface – Data Management with Microsoft ODBC – OLE client – OLE server – Client / Server Data Exchange format – Dynamic Data Exchange.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	-	45

REFERENCES:

1. Robert Orfali, Dan Harkey and Jerri Edwards, Essential Client / Server Survial Guide, John Wiley and sons Inc. 1998.
2. David J. Kruglinski, Inside Visual C++, Microsoft Press 1992.
3. Boar, B.H., Implementing Client / Server Computing ; A Strategic Perspectre,

McGraw Hill, 1993.
4. Bouce Elbert, Client / Server Computing, Artech. Press, 1994.
5. Alex Berson, Client / Server Architecture, McGraw Hill, 1996.

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

M.Sc. SE	PO								PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**
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

YSEE64			DIGITAL IMAGE PROCESSING	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Digital Principles

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Understand*** image formation and the role human visual system plays in perception of gray and color image data.	Cognitive	Understand
CO2	***Use*** of various applications of image processing in industry, medicine, and defense.	Cognitive	Apply
CO3	***Relate*** the signal processing algorithms and techniques in image enhancement and image restoration.	Cognitive	Remember
CO4	***Acquire*** an appreciation for the image processing issues and techniques and be able to apply these techniques to real world problems.	Cognitive	Apply
CO5	***Study*** independent study and analysis of image processing problems and techniques.	Cognitive	Remember

UNIT I	**INTRODUCTION TO IMAGE PROCESSING SYSTEM**	**9**

Introduction to image processing system-image sampling-quantization-resolution-human visual system-classification of digital images-image types-elements of an image processing system-image fil 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**

REFERENCES:

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

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

M.Sc. SE	PO								PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**
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

YSEE65			MOBILE AD HOC NETWORKS	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Computer Networks

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Define*** the scenario of Mobile Ad hoc Networks in the world of Computer Networks.	Cognitive	Remember
CO2	***Classify*** the design issues and goals of MAC Protocols.	Cognitive	Understand
CO3	***Distinguish*** the Routing Protocols in the MANET.	Cognitive	Understand
CO4	***Compare*** the classifications of Multicast Protocols.	Cognitive	Analyze
CO5	***Demonstrate*** the recent trends in the Wireless Networks.	Cognitive	Apply

UNIT I	INTRODUCTION	9
Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio Propagation Mechanisms – Characteristics of the Wireless Channel – Modulation Techniques – Multiple Access Techniques – Ad hoc Wireless Networks		
UNIT II	**MAC PROTOCOLS**	**9**
Introduction – Issues in designing a MAC Protocol – Design Goals – Classifications – Contention based protocols – with Reservation Mechanisms – with Scheduling Mechanisms		
UNIT III	**ROUTING PROTOCOLS**	**9**
Introduction - Issues in designing a Routing Protocol – Classifications – Table Driven Routing Protocols – On-Demand Routing Protocols – Hybrid Routing Protocols		
UNIT IV	**MULTICAST ROUTING**	**9**
Introduction - Issues in designing a Multicast Routing Protocol – Classifications – Tree-Based Multicast Routing Protocols - Mesh-Based Multicast Routing Protocols		
UNIT V	**RECENT ADVANCES IN WIRELESS NETWORKS**	**9**
Introduction – Ultra-Wide-Band Radio Communication – Wireless Fidelity Systems – Optical Wireless Networks – The Multimode 802.11 – IEEE 802.11a/b/g		

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	-	45

REFERENCES:

1. C. Siva Ram Murthy and B. S. Manoj, Ad hoc Wireless Networks Architectures and protocols, Pearson Education, 2004.
2. Charles E. Perkins, Ad hoc Networking, Pearson Education, 2001.

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

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

YSEE81			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: Computer Net works

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

REFERENCES:

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.
3..Meeta Gandhi,Tilak Shetty and Rajiv Shah – The 'C' Odyssey Unix –The open Boundless C , 1st Edition , BPB Publications 1992.
4. www.tutorialspoint.com/**unix_socket**s/
5. 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

YSEE82			CLOUD COMPUTING	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2.5	0.5	0		3	0	0	3

PREREQUISITE: Computer Networks

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the importance of cloud computing behind all communications and day to day life activities.	Cognitive Psychomotor	Remember Perception
CO2	***Express*** the functionalities of each cloud services and aware of the various cloud service providers	Cognitive	Understand
CO3	***Employ*** the understanding of the various scheduling activities and actively ***participate*** in terms for the creation of various cloud services.	Cognitive	Apply Respond
CO4	***Utilize*** the cloud services tools effectively in the real world applications.	Cognitive	Apply
CO5	***Design*** and ***Establish*** the cloud services and cloud storage	Cognitive Psychomotor	Create Set

UNIT I	UNDERSTANDING CLOUD COMPUTING	9

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Need for Cloud Computing – Advantages and Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services.

UNIT II	DEVELOPING CLOUD SERVICES	9

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Servic Development – Software as a Service – Platform as a Service – Web Services – On Deman 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

REFERENCES:		

1. Michael Miller, ―Cloud Computing‖, Pearson Education, New Delhi, 2009.
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On–demand Computing‖, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
3. www.cloudbus.org/cloudsim
4. 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
Averge	2	3	3	3	3	1	1	3	3	2

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

YSEE83			PERVASIVE COMPUTING	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Computer Networks

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Understand*** the basics of pervasive computing	Cognitive	Understand
CO2	***Design*** web based applications using XML, WAP and WML	Cognitive	Create
CO3	***Apply*** the pervasive computing techniques for speech based applications	Cognitive	Apply
CO4	D***escribe*** the PDA characteristics and standards	Cognitive	Understand
CO5	***Analyze*** the issues in the pervasive computing	Cognitive	Analyze

UNIT I	**INTROCUTION**	**9**
Pervasive Computing Application - Pervasive Computing devices and Interfaces -Device technology trends, Connecting issues and protocols		
UNIT II	**WEB BASED APPLICATIONS**	**9**
Pervasive Computing and web based Applications - XML and its role in Pervasive Computing - Wireless Application Protocol (WAP) Architecture and Security – Wireless Mark-Up language (WML) – Introduction		
UNIT III	**SPEECH APPLICATIONS**	**9**
Voice Enabling Pervasive Computing - Voice Standards - Speech Applications in Pervasive Computing and security		
UNIT IV	**PDA STANDARDS**	**9**
PDA in Pervasive Computing – Introduction - PDA software Components, Standards, emerging trends - PDA Device characteristics - PDA Based Access Architecture		
UNIT V	**APPLICATIONS**	**9**
User Interface Issues in Pervasive Computing, Architecture - Smart Card- based Authentication Mechanisms - Wearable computing Architecture		

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	-	45

REFERENCES:

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec & Klaus Rindtorff. Pervasive Computing Technology and Architecture of Mobile Internet Applications, Addision Wesley, Reading, 2012.
2. Uwe Ha nsman, Lothat Merk, Martin S Nicklous & Thomas Stober: Principles of Mobile Computing, Springer- Verlag, New Delhi, 2011.
3. Rahul Banerjee: Internetworking Technologies: An Engineering Perspective, Prentice –Hall of India, New Delhi, 2003. (ISBN 81-203-2185-5)

4. Rahul Banerjee: Lecture Notes in Pervasive Computing, Outline Notes, BITS-Pilani, 2003.
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6. seminarprojects.com/.../**nptel**-lecture-notes-for-**mobile-and-pervasive-co**mputing
7. https://www.csd.cs.cmu.edu/research.../**mobile-and-pervasive-computing**

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

M.Sc. SE	**PO**								**PSO**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**
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

YSEE84			E-COMMERCE	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2.75	0	.25		3	0	0	3

PREREQUISITE: Computer Network

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** and ***Discuss*** the scope of e-commerce	Cognitive	Remember Understand
CO2	***Sketch*** *and* ***Develop*** various Business strategies	Cognitive	Apply Analyze
CO3	***Survey*** and ***Identify*** the importance and future of e market and EDI	Cognitive	Analyze
CO4	***Justify*** *and* ***Explain*** the usage of Internet in e- commerce and various types of e-commerce	Cognitive	Evaluate Valuing
CO5	***Practice*** and ***Perform*** Various on line transactions	Affective	Responding to a phenomena

UNIT I	Introduction to E-Commerce	9
Introduction - the scope of e-commerce – definition - electronic markets -electronic data interchange – internet commerce – the value chain – supply chain		
UNIT II	**Business Strategy in an Electronic Age**	**9**
Business Strategy – introduction to business strategy – strategic implications of IT – Technology – Business environment – business capability – existing business strategy – strategy formulation and implementation planning		
UNIT III	**Business to Business Electronic Commerce**	**9**
Electronic markets – Markets – usage of electronic markets – advantages and disadvantages – future of electronic markets – electronic data interchange – introduction – EDI definition – the benefits of EDI – EDI technology – EDI standards – EDI communications		
UNIT IV	**Business to Consumer Electronic Commerce**	**9**
Consumer trade transaction – the e-shop – advantages and disadvantages of consumer e-commerce – the internet – the development of internet – TCP/IP – internet components – uses of internet		
UNIT V	**Elements of e-commerce and e-business**	**9**
Elements – e-Visibility – the e-shop – online payments – delivering the goods – after sales service – internet e-commerce security – e-business – internet bookshops – grocery supplies – software supplies and support – electronic news paper – internet banking		

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

REFERENCES:

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

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

M.Sc. SE	PO								PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**
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

YSEE85			ADVANCED DATABASE MANAGEMENT SYSTEM	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Database Management System

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the basics architectures and distributed database concepts.	Cognitive	Remember
CO2	***Demonstrate*** features of relational and object oriented database.	Cognitive	Understand
CO3	***Analyze*** the different database and implement spatial database	Cognitive	Analyze
CO4	***Differentiate*** various data models	Cognitive	Analyze
CO5	***Examine*** the cloud database and Big data storage analytics	Cognitive	Analyze

UNIT I	PARALLEL AND DISTRIBUTED DATABASES	9

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Design of Parallel Systems- Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Case Studies.

UNIT II	OBJECT AND OBJECT RELATIONAL DATABASES	9

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems: Object Relational features in SQL/Oracle – Case Studies.

UNIT III	INTELLIGENT DATABASES	9

Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- Taxonomy- Applications- Design Principles for Active Rules- Temporal Databases: Overview of Temporal Databases- TSQL2- Deductive Databases: Logic of Query Languages – Datalog- Recursive Rules- Syntax and Semantics of Datalog Languages- Implementation of Rules and Recursion- Recursive Queries in SQL- Spatial Databases- Spatial Data Types- Spatial Relationships- Spatial Data Structures-Spatial Access Methods- Spatial DB Implementation.

UNIT IV	ADVANCED DATA MODELS	9

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Multimedia Databases- Information Retrieval- Data Warehousing- Data Mining- Text Mining.

UNIT V	EMERGING TECHNOLOGIES	9

XML Databases: XML-Related Technologies-XML Schema- XML Query Languages- Storing XML in Databases-XML and SQL- Native XML Databases- Web Databases- Geographic Information Systems- Biological Data Management- Cloud Based Databases: Data Storage Systems on the Cloud- Cloud Storage Architectures-Cloud Data Models- Query Languages- Introduction to Big Data-Storage-Analysis.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

REFERENCES:

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

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

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

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

YSEE91			WIRELESS SENSOR NETWORK	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Computer Networks

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Understand*** the basics of wireless sensor network.	Cognitive	Understand
CO2	***Demonstrate*** the idea behind in physical layer issues, medium Access control Protocols	Cognitive	Understand
CO3	***Analyze*** the network layer characteristics and protocols	Cognitive	Analyze
CO4	***Indicate*** the transport layer issues and protocols.	Cognitive	Understand
CO5	***Control*** and ***maintain*** the network management and Middleware services	Psychomotor	Complete overt response

UNIT I	INTRODUCTION	9

Introduction to wireless sensor networks - Challenges and Constraints - Application of sensor networks – Node architecture - Operating System - Fundamental aspects.

UNIT II	PHYSICAL LAYER AND MEDIUM ACCESS LAYER	9

Basic architectural framework – Physical layer – source encoding –channel encoding – modulation – Medium access control - Wireless MAC protocols – Characteristics of MAC protocols in sensor networks – Contention free MAC protocols - traffic adaptive medium access - Low-Energy Adaptive Clustering Hierarchy – Contention based protocols - Power Aware Multi-Access with Signaling – Data-Gathering MAC - Receiver-Initiated MAC.

UNIT III	NETWORK LAYER AND TRANSPORT LAYER	9

Routing metrics – Data centric Routing - Proactive routing – OLSR – Reactive Routing – AODV – Location Base Routing - Traditional Transport Control Protocols - TCP (RFC 793) - UDP (RFC 768) - Mobile IP - Feasibility of Using TCP or UDP for WSNs - Transport Protocol Design Issues – Examples of Existing Transport Control Protocols- CODA (Congestion Detection and Avoidance).

UNIT IV	NETWORK MANAGEMENT	9

Power Management - Local Power Management Aspects - Processor Subsystem – Communication Subsystem – Active Memory - Power Subsystem - Dynamic Power Management - Dynamic Operation Modes – Time Synchronization – Clocks and the Synchronization Problem – Time Synchronization in Wireless Sensor Networks - Reasons for Time Synchronization - Challenges for Time Synchronization.

UNIT V	BASICS OF TIME SYNCHRONIZATION	9

Synchronization Messages - Non determinism of Communication Latency -Time Synchronization Protocols – Lightweight Tree - Based Synchronization - Timing-sync Protocol for Sensor Networks Localization - Ranging Techniques - Time of Arrival - Time Difference of Arrival - Angle of Arrival – Received Signal Strength - Range - Based Localization - Triangulation - Range- Free Localization – Ad Hoc Positioning System.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	-	45

REFERENCES:

1. Dr.Xerenium, Shen, Dr. Yi Pan , "*Fundamentals of Wireless Sensor Networks, Theory and Practice",*Wiley Series on wireless Communication and Mobile Computing, 1st Edition, 2010.
2. Kazem Sohraby, Daniel Manoli, "*Wireless Sensor networks- Technology, Protocols and Applications"*, Wiley Inter Science Publications, 2007.
3. Bhaskar Krishnamachari , *"Networking Wireless Sensors"*, Cambridgeuniversity press, 2005.

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

M.Sc. SE	PO								PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**
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

YSEE92			PRINCIPLES OF MANAGEMENT	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2.75	0.25	.25		3	0	0	3

PREREQUISITE: Basic principles in an organization.

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the significance of Management Principle.	Cognitive Psychomotor	Remember Perception
CO2	***Express*** the understanding of the concept of planning the events in organization.	Cognitive	Understand
CO3	***Employ*** the understanding of the various scheduling activities and actively ***participate*** in terms for the organizing of various events in organization.	Cognitive Affective	Apply Respond
CO4	***Utilize*** the directing effectively in the real world class room management.	Cognitive	Apply
CO5	***Design*** and ***Establish*** the principles of management concept in day to day activities.	Cognitive Psychomotor	Create Set

UNIT I	OVERVIEW OF MANAGEMENT	9

Definition - Management - Role of managers - Evolution of Management thought-Organization and the environmental factors – Trends and Challenges of Management in Global Scenario.

UNIT II	PLANNING	9

Nature and purpose of planning - Planning process - Types of plans –Objectives - Managing by objective (MBO) Strategies - Types of strategies - Policies - Decision Making - Types of decision Decision Making Process - Rational Decision Making Process - Decision Making under differen conditions

UNIT III	ORGANIZING	9

Nature and purpose of organizing - Organization structure - Formal and informal groups organization - Line and Staff authority - Departmentation - Span of control - Centralization and Decentralization - Delegation of authority - Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - -Performance Appraisal.

UNIT IV	DIRECTING	9

Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Leadership theories - Communication - Barriers to effective communication - Organization Culture - Elements and types of culture - Managing cultural diversity.

UNIT V	CONTROLLING	9

Process of controlling - Types of control - Budgetary and non-budgetary control techniques - Managing Productivity - Cost Control - Purchase Control - Maintenance Control - Quality Control - Planning operations.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	--	--	45

REFERENCES:

1. Stephen P. Robbins and Mary Coulter, 'Management', Prentice Hall of India,8th edition.
2. Charles W L Hill, Steven L McShane, 'Principles of Management', Mcgraw Hill Education, Special Indian Edition, 2007.

3. Hellriegel, Slocum & Jackson, ' Management - A Competency Based Approach', Thomson South Western, 10th edition, 2007.
4. https://www.pearsonhighered.com
5. www.miracleworx.com

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

YSEE93			ENTERPRISE RESOURCE PLANNING	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Computer fundamentals and DBMS

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Identify*** the factors that lead to the development and implementation of ERP systems	Cognitive	Remember
CO2	***Discuss*** the advantages and disadvantages of implementing an ERP system	Cognitive	Understand
CO3	***Describe*** how an integrated information system can support effective and efficient business processes	Cognitive	Understand
CO4	***Create*** process models that assist with process improvement and ERP implementation	Cognitive	Create
CO5	Study, ***analyze*** and ***Report*** future trends of ERP	Cognitive	Analyze

UNIT I	ERP AND TECHNOLOGY	9

Introduction – Related Technologies – Business Intelligence – E-Commerce and E-Business – Business Process Reengineering – Data Warehousing – Data Mining – OLAP – Product life Cycle management – SCM – CRM

UNIT II	ERP IMPLEMENTATION	9

Implementation Challenges – Strategies – Life Cycle – Pre-implementation Tasks – Requirements Definition – Methodologies – Package selection – Project Teams – Process Definitions – Vendors and Consultants – Data Migration – Project management – Post Implementation Activities.

UNIT III	ERP IN ACTION AND BUSINESS MODULES	9

Operation and Maintenance – Performance – Maximizing the ERP System – Business Modules – Finance – Manufacturing – Human Resources – Plant maintenance – Materials Management – Quality management – Marketing – Sales, Distribution and service.

UNIT IV	ERP MARKET	9

Marketplace – Dynamics – SAP AG – Oracle – PeopleSoft – JD Edwards – QAD Inc – SSA Global – Lawson Software – Epicor – Intuitive.

UNIT V	FUTURE TRENDS	9

Enterprise Application Integration – ERP and E-Business – ERP II – Total quality management – Future Directions – Trends in ERP.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45			45

REFERENCES:

1. Alexis Leon, "ERP DEMYSTIFIED", Tata McGraw Hill, Second Edition, 2008.
2. Mary Sumner, "Enterprise Resource Planning", Pearson Education, 2007.
3. Jim Mazzullo,"SAP R/3 for Everyone", Pearson,2007
4. Jose Antonio Fernandz, " The SAP R /3 Handbook", Tata McGraw Hill, 1998.
5. Biao Fu, "SAP BW: A Step-by-Step Guide", First Edition, Pearson Education, 2003.
6. www.netsuite.com/portal/products/netsuite/**erp**.shtm
7. go.sap.com/product/ent**erp**rise-management/**erp**.html
8. 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

YSEE94			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:

1. Fundamentals of computing and Programming
2. Computer organization and architecture
3. Microprocessor and Microcontroller

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Understand*** the basic and advanced level of architecture and elements of computer system	Cognitive	Remember
CO2	***Analysis*** the performance of computer and efficiency of internal elements.	Cognitive	Analysis
CO3	***identify*** multiprocessor architecture, elements and components of computer system.	Cognitive	Knowledge Analysis
CO4	***recognize*** the application of microprocessor in different applications.	Cognitive	Knowledge Analysis
CO5	***associate*** with modern architecture.	Cognitive	Comprehension

UNIT I	COMPUTER ORGANIZATION	9

Basic concepts of computer organization, stored program model, Classes of computer architecture, Processor vs. System architecture, Elements of computer systems – processors, memories, I/Os, disks, buses

UNIT II	PERFORMANCE ANALYSIS OF COMPUTER ARCHITECTURE	9

Goals of computer architecture – performance, throughput, latency, power, cost. Processor performance vs. system performance, Comparison of various platforms in terms of performance and efficiency internal elements and architecture of processors, Instruction execution, Instruction set architectures, CISC vs. RISC architectures.

UNIT III	MULTIPROCESSOR ARCHITECTURE	9

Bus architecture, Multi Processor architecture, Memories and Caches, Cache coherency, Pipelining and data path elements System architecture elements, H/W component selection and datasheet analysis, Bill of Materials, IP selection and System on Chip integration, Standard interfaces and I/Os, Analog and Mixed signal element integration. Reset and clocking elements

UNIT IV	APPLICATION OF MULTIPROCESSOR	9

Multi processor system Application specific processors, Packet processing, Microcontrollers, Network controllers, DSP and Multimedia processors, GPU elements.

UNIT V	MODERN ARCHITECTURES	9

An overview of the latest Intel, ARM, TI, SPARC and Power PC architectures as modern SOC architectural elements

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	-	45

REFERENCES:

1. V.C. Hamacher,Z.G.Vranesic, S.G. Zaky. “Computer Organization”. 5th Edition. “Peter”
2. David A. Patterson and John L. Hennessy.
3. Computer Organization and Design, Revised Printing, Third Edition, Andrew S. Tanenbaum. Structured Computer Organization Prentice Hall; 5th Edition. 2005. 800p.

4. W. Stallings. “Computer Organization and Architecture. Designing and Performance”. 7th Edition. Prentice Hall. 2005.
5. J.L. Hennessy, D.A. Patterson. “Computer architecture: A Quantitative Approach”,4thEdition. Morgan Kaufmann, 2006.

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

M.Sc. SE	PO								PSO	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**
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

YSEE95			BIG DATA ANALYTICS	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Data Mining and Data warehousing

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Analyze*** the HADOOP and Map Reduce technologies associated with big data analytics Explore on Big Data applications Using NOSQL, Pig and Hive	Cognitive	Analyze
CO2	***Design*** efficient algorithms for mining the data from large volumes.	Cognitive	Create
CO3	***Understand*** the fundamentals of various big data analysis techniques	Cognitive	Understand
CO4	***Apply*** the big data analytic techniques for useful business applications.	Cognitive	Apply
CO5	***Relate*** to Work with big data analytic platform	Cognitive	Remember

UNIT I	UNDERSTANDING BIG DATA	9

What is big data – Big data Analytics-Characteristics of Big data- why big data – unstructured data – industry examples of big data – Big data and Marketing – Fraud and Big data- Risk and Big data- Big data advances in Health care – Cloud and Big data

UNIT II	NO SQL MANAGEMENT	9

Introduction to NoSQL – Difference between SQL and NoSQL-Types of NOSQL Databases- NOSQL Data model-relational vs aggregate data models – schemaless map-reduce – partitioning and combining – composing map-reduce calculations

UNIT III	BASICS OF HADOOP	9

Introduction to Hadoop - Hadoop Architecture- Map Reduce in Hadoop - Data format – analyzing data with Hadoop - Design of Hadoop distributed file system (HDFS) – HDFS concepts

UNIT IV	MAP REDUCE APPLICATIONS	9

Classic Map-reduce – YARN – failures in classic Map-reduce and YARN – job scheduling – shuffle and sort – task execution – MapReduce types – input formats – output formats

UNIT V	HADOOP RELATED TOOLS	9

Hbase – data model and implementations –Cassandra – cassandra data model – cassandra examples –Hadoop integration. Pig – pig data model Hive – data types and file formats – HiveQL.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	-	45

REFERENCES:

1. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
2. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.
3. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.
4. E. Capriolo, D. Wampler, and J. Rutherglen, "Programming Hive", O'Reilley, 2012.
5. Lars George, "HBase: The Definitive Guide", O'Reilley, 2011.
6. Eben Hewitt, "Cassandra: The Definitive Guide", O'Reilley, 2010.
7. Alan Gates, "Programming Pig", O'Reilley, 2011.

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

YSEOE1			Software Development Techniques	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
3	0	0		3	0	0	3

PREREQUISITE: Computer programming and OOPS

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Apply*** software development techniques with reference to model driven software development.	Cognitive	Remembering Understanding, Applying
CO2	***Identify*** verification and translation of specifications.	Cognitive	Remembering Understanding, Applying
CO3	***Design*** and ***implement*** the practical application of domain-specific modeling language.	Cognitive	Remembering Understanding
CO4	***Analyze*** emerging model-driven development techniques.	Cognitive	Remembering Understanding, Analyzing
CO5	***Identify*** the risk and assure the quality standards	Cognitive	Remembering Understanding, Analyzing

UNIT I	INTRODUCTION TO SOFTWARE ENGINEERING	9

The evolving role of software, Changing Nature of Software, legacy software, Software myths. **A Generic view of process:** Software engineering - A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

UNIT II	SOFTWARE REQUIREMENTS	9

Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT III	DESIGN ENGINEERING	9

Design process and Design quality, Design concepts, the design model, pattern based software design. **Creating an architectural design:** software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into software architecture

UNIT IV	TESTING STRATEGIES	9

A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging. Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance. Metrics for Process and Products: Software Measurement, Metrics for software quality

UNIT V	MANAGEMENT OF SOFTWARE	9

Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan. **Quality**

Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	**-**	**-**	**45**

Text Books:

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

REFERENCES:

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

YSEOE2			WEB TECHNOLOGY	L	T	P	C
				3	0	0	3
C	P	A		L	T	P	H
2.5	0.5	0.5		3	0	0	3

PREREQUISITE: Computer Programming

Course Outcomes		Domain	Level
After the completion of the course, students will be able to			
CO1	***Recognize*** the significance of Web Technology.	Cognitive Psychomotor	Remember Perception
CO2	***Express*** the knowledge on HTML, CSS and JavaScript in Web Design.	Cognitive	Understand
CO3	***Employ*** the understanding of the Client side scripts and actively ***participate*** in teams for the creation of static web pages.	Cognitive Affective	Apply Respond
CO4	***Utilize*** the web designing tools effectively in the real world applications.	Cognitive	Apply
CO5	***Design*** and ***Establish*** the Website.	Cognitive Psychomotor	Create Set

UNIT I	INTRODUCTION TO WEB TECHNOLOGY	9

Basics of Internet – World Wide Web – Web Server – Proxy Server – Web Browsers – IP Address – Domain Name – HTTP – Uniform Resource Locator – Concept of Tier – Web Pages – Static Web Pages – Dynamic Web Pages – Search Engine – Search Tools

UNIT II	HTML	9

HTML Basics – HTML Editor – HTML CSS – Links – Images – Tables – Lists - Frames - HTML forms and Input tags

UNIT III	CSS	9

CSS Basics – Texts and Fonts – Links, Lists and Tables – Background, Border and Outline – Position – Dimension and Display

UNIT IV	JAVASCRIPT	9

Java Script Basics – Functions – Objects – Events – Scope – Strings – Numbers – Date – Arrays – Conditional and Looping Statements - Forms

UNIT V	WEB APPLICATIONS	9

Free Website Creation – Getting Server Space - Case Studies: College Website – Blog Creation – Online Education – Career Guidance

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	-	-	45

REFERENCES:

1. Achyut S.Godbole, Atul Kahate, "Web Technologies TCP/IP To Internet Application Architectures", First Edition, Tata McGraw-Hill Publishing Company Limited, 2003.
2. N.P. Gopalan, J.Akilandeswari, "Web Technology: A Developer's Perspective", Second Edition, PHI Learning Private Limited, 2014.
3. Thomas A. Powell, "HTML & CSS: The Complete Reference", Fifth Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2010.
4. Thomas A. Powell, Fritz Schneider, "JavaScript: The Complete Reference", Second Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2008.
5. www.w3schools.com
6. www.tutorialspoint.com

			Game Design Using Python and Pygame	L	T	P	C
				0	0	1	1
C	P	A		L	T	P	H
0.5	0.4	0.1		1	0	1	2

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 and Pygame in designing games.	Cognitive Psychomotor	Remember Perception
CO2: ***Express*** the knowledge on events and functions of Python and Pygame.	Cognitive	Understand
CO3: ***Employ*** the understanding of the Python and Pygame in the game creation and ***Establish*** a game design on their own and actively ***participate*** in the teams for designing various interesting games.	Cognitive Psychomotor Affective	Apply Set Respond

SYLLABUS:

Installing Python and Pygame – Setting up a Pygame Program – Game Loops and Game States – pygame.event.Event Objects – The QUIT Event and pygame.quit( ) Function – Pixel Coordinates – Surface Objects and the Window – Colors – Primitive Drawing Functions – pygame.PixelArray Objects – pygame.display.update( )Function – Animation – Frames Per Second and pygame.time.Clock Objects – Drawing Images with pygame.image.load( ) and blit( ) – Fonts – Playing Sounds – Case Study: Memory Puzzle, Simulate

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	-	15	30

Text Book:

Albert Sweigart, “Making Games with Python and Pygame”, First Edition, 2012.

Reference Books:

12. David Beazley and Brian K.Jones,”Python Cookbook”, Third Edition, O’Reilly Media, Inc.,CA, 2013.
13. Mark Lutz, “Learning Python”, Fifth Edition, O’Reilly Media, Inc.,CA, 2013.

Web 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/

			MongoDB	**L**	**T**	**P**	**C**
				0	**0**	**1**	**1**
C	**P**	**A**		**L**	**T**	**P**	**H**
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 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 2nd edition 2010.
2. David Hows, Eelco Plugge, and Peter Membrey "MongoDB Basics" Apress, 1st Edition, 2014.

e-Reference

1. https://university.mongodb.com/

			Software Testing Tools and Practices	L	T	P	C
				0	.5	.5	1
C	P	A		L	T	P	H
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 techniques, skills and recent tools to test the software based on the constraints.	Cognitive	Remember
CO2: ***Express*** the knowledge on different types of testing tools, and ***trace*** the different problem domains with tool.	Cognitive Psychomotor	Understand Guided Response

SYLLABUS:

Software Test Automation: Skills Needed for testing- Scope of testing: Design and Architecture for testing : Test Cases and Test Framework Modules, Tools and Results Modules- Report Generator and Reports/Metrics Modules, Generic Requirements for Test Tool/Framework : Selecting a Test Tool. Creating Test cases, Mapping test cases with release/cycle, Mapping test cases with requirements, Test metrics, QTP Tool: Creating simple record/playback scripts, handling exception, QTP-QC Integration.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	0	15	30

Text Book:

1. Srinivasan Desikan,Gopalswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2nd Edition, 2007.
2. Bernie Gauf, Elfriede Dustin, and Thom Garrett, "Implementing Automated Software Testing"Addition-Wesley,2009.