RAJALAKSHMI ENGINEERING COLLEGE (An Autonomous Institution Affiliated to Anna University Chennai) DEPARTMENT OF INFORMATION TECHNOLOGY

CURRICULUM AND SYLLABUS- REGULATIONS 2017 B.Tech. INFORMATION TECHNOLOGY

Vision

• TobeaDepartment ofExcellence in InformationTechnologyEducation,Research andDevelopment.

<u>Mission</u>

- Totrainthestudentstobecome highlyknowledgeablein thefieldof Information Technology.
- Topromotecontinuouslearningandresearchincoreandemerging areas.
- To develop globally competent students with strong foundations, who will be able to adapt tochangingtechnologies.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- **PEO1:** ToprovideessentialbackgroundinScience,basicElectronicsandappliedMathematics.
- **PEO 2:** To prepare the students with fundamental knowledge in programming languages and to developapplications.
- **PEO 3:** To engage the students in life-long learning, and make them to remain current in their professionandobtainadditionalqualificationsto enhancetheir careerpositions inIT industries.
- **PEO 4:** To enable the students to implement computing solutions for realworld problems and carry outbasicandappliedresearchleadingtonewinnovationsinInformationTechnology(IT)a ndrelatedinterdisciplinaryareas.
- **PEO 5:** To familiarize the students with the ethical issues in engineering profession, issues related to theworldwideeconomy,nurturing ofcurrentjobrelated skillsand emergingtechnologies.

PROGRAMMEOUTCOMES(POs)

- **PO1:** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2:** Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics,

natural sciences, and engineering sciences.

- **PO3**: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO4**: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO5:** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO6:** The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO7**: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO8**: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO10:** Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO11:** Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO12**: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMSPECIFICOUTCOMES(PSOs)

- **PSO1:** Tocomprehendandanalyzeuser requirementstodesignITbasedsolutions
- PSO2:

Toidentifyandassesscurrenttechnologiesandreviewtheirapplicabilitytoaddressin dividualand organizational needs.

- **PSO 3:** To engage in the computing profession by working effectively and utilizing professionalskillsto makeapositivecontribution to society.
- **PSO4:** To takeon positionsaspromoters inbusiness andembarkon aresearch careerin the field.

CURRICULUM

SEMESTERI

Sl. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
TH	EORY							
1.	HS17151	Communicative English	HS	3	3	0	0	3
2.	MA17151	Engineering	BS	5	3	2	0	4
		Mathematics I						
3.	PH17151	Engineering Physics	BS	3	3	0	0	3
4.	CY17151	Engineering Chemistry	BS	3	3	0	0	3
5.	GE17151	Problem Solving and Python	ES	3	3	0	0	3
		Programming						
6.	GE17152	Engineering Graphics	ES	6	2	0	4	4
PRA	CTICALS							
7.	GE17161	Problem Solving and Python	ES	4	0	0	4	2
		Programming Laboratory						
8.	GE17162	Physics and Chemistry	BS	4	0	0	4	2
		Laboratory						
		TOTAL		31	17	2	12	24

SEMESTERII

Sl. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
TH	EORY	·						
1.	HS17251/ HS17252	Technical English/ProfessionalEnglish Communication	HS	3	3	0	0	3
2.	MA17251	Engineering Mathematics II	BS	5	3	2	0	4
3.	PH17254	Physics for Information Science	BS	3	3	0	0	3
4.	CS17201	Data Structures	PC	3	3	0	0	3
5.	IT17201	Information Technology Essentials	PC	3	3	0	0	3
6.	IT17202	Digital Principles and SystemDesign	ES	3	3	0	0	3
PRA	CTICALS	·						
7.	GE17261	Engineering Practices Laboratory	ES	4	0	0	4	2
8.	CS17211	Data Structures Laboratory	PC	4	0	0	4	2
9.	IT17211	Digital Lab	ES	4	0	0	4	2
TOT	ΓAL	32	18	2	12	25		

SEMESTERIII

Sl. No.	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	C
THE	ORY							
1.	MA17354	Discrete Mathematics	BS	5	3	2	0	4
2.	CS17302	Object Oriented Programming	PC	3	3	0	0	3
3.	CS17304	Database Management Systems	PC	3	3	0	0	3
4.	IT17301	Computer Organization	PC	3	3	0	0	3
5.	EC17351	Microprocessors and Microcontrollers	ES	3	3	0	0	3
PRAC	CTICALS							
6.	CS17311	Object Oriented Programming Laboratory	PC	4	0	0	4	2
7.	CS17312	Database Management Systems Laboratory	PC	4	0	0	4	2
8.	EC17361	Microprocessors and Microcontrollers Laboratory	ES	4	0	0	4	2
9.	HS17361	Interpersonal Skills - Listening and Speaking	EEC	2	0	0	2	1
TOTA	TOTAL			31	15	2	14	23

SEMESTERIV

Sl. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
THEC	ORY							
1.	MA17353	Probability and Statistics	BS	5	3	2	0	4
2.	CS17401	Operating Systems	PC	3	3	0	0	3
3.	CS17402	Software Engineering	PC	3	3	0	0	3
4.	EC17451	Analog and Digital Communication	ES	3	3	0	0	3
5.	CS17301	Design and Analysis of Algorithms	PC	3	3	0	0	3
6.	CY17251	Environmental Science and Engineering	HS	3	3	0	0	3
PRAC	CTICALS							
7.	CS17411	Operating Systems Laboratory	PC	4	0	0	4	2
8.	IT17411	Information Systems Analysis and Design Laboratory	РС	4	0	0	4	2
9.	HS17461	Advanced Reading and Writing Skills	EEC	2	0	0	2	1
		TOTAL		30	18	2	10	24

SEMESTER V

Sl. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
THEOF	RY							
1.	IT17501	Automata Theory and Compiler Design	PC	5	3	2	0	4
2.	CS17403	Computer Networks	PC	3	3	0	0	3
3.	CS17501	Distributed Systems	PC	3	3	0	0	3
4.	IT17502	Web Technology	PC	3	3	0	0	3
5.	IT17503	Embedded Programming	PC	3	3	0	0	3
6.		Open Elective I	OE	3	3	0	0	3
PRACT	TICALS							
7.	CS17412	Computer Networks Laboratory	PC	4	0	0	4	2
8.	IT17511	Web Technology Laboratory	PC	4	0	0	4	2
9.	IT17512	Embedded Programming Laboratory	PC	4	0	0	4	2
TOTAI	1			32	18	2	12	25

SEMESTER VI

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
THE(DRY							
1.	IT17601	Computational Intelligence	PC	4	4	0	0	4
2.	CS17504	Cryptographyand NetworkSecurity	PC	3	3	0	0	3
3.	IT17602	Mobile Communication	PC	3	3	0	0	3
4.	IT17603/ CS17E62	Agile Methodologies	PC	3	3	0	0	3
5.	CS17601	Game Programming	PC	3	3	0	0	3
6.		Professional Elective I	PE	3	3	0	0	3
PRAC	CTICALS	·						
1.	CS17511	Cryptography and Network Security Laboratory	PC	4	0	0	4	2
2.	IT17611	Mobile Application Development Laboratory	PC	4	0	0	4	2
3.	IT17612	Mini Project	EEC	4	0	0	4	2
TOTA	OTAL			31	19	0	12	25

SEMESTER VII

Sl. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
THEO	RY							
1.	CS17702	Cloud Computing	PC	3	3	0	0	3
2.	IT17701	Data Analytics	PC	3	3	0	0	3
3.		Open Elective II	OE	3	3	0	0	3
4.		Professional Elective II	PE	3	3	0	0	3
5.		Professional Elective III	PE	3	3	0	0	3
PRAC	TICALS	·	·					
6.	IT17711	Data Analytics Lab	PC	4	0	0	4	2
7.	CS17711	Cloud computing Laboratory	PC	4	0	0	4	2
ТОТА	FOTAL			23	15	0	8	19

SEMESTER VIII

Sl. No	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С		
THE	THEORY									
1.Professional Elective IVPE33003										
2.		Professional Elective V	PE	3	3	0	0	3		
PRAC	CTICALS									
3.	IT17811	Project Work	EEC	20	0	0	20	10		
TOTA	AL			26	6	0	20	16		

TOTAL NO. OF CREDITS: 181

LANGUAGE ELECTIVES (HS) SEMESTER II

Sl. No.	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
1.	HS17251	Technical English	HS	3	3	0	0	3
2.	HS17252	Professional English Communication	HS	3	3	0	0	3

PROFESSIONAL ELECTIVES (PE) SEMESTER VI

ELECTIVE – I

Sl. No.	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
1.	IT17E61	Graph Theory and Applications	PE	3	3	0	0	3
2.	IT17E62	Data Warehousing & Data Mining	PE	3	3	0	0	3
3.	IT17E63	Advanced Java Programming	PE	3	3	0	0	3
4.	CS17E63	C# and .Net Programming	PE	3	3	0	0	3
5.	IT17E64	Multimedia Systems	PE	3	3	0	0	3

SEMESTER VII ELECTIVE - II

Sl. No.	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
1.	CS17E83	Cyber Forensics	PE	3	3	0	0	3
2.	IT17E71	Wireless Sensor Networks	PE	3	3	0	0	3
3.	IT17E72	Virtual Reality	PE	3	3	0	0	3
4.	IT17E73	Information Retrieval Techniques	PE	3	3	0	0	3
5.	IT17E76	Comprehension in Information Technology	PE	3	3	0	0	3

SEMESTER VII ELECTIVE - III

Sl. No.	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
1.	IT17E74	Design Thinking	PE	3	3	0	0	3
2.	GE17E51	Human values and Professional Ethics	PE	3	3	0	0	3
3.	IT17E75	Software Project Management	PE	3	3	0	0	3
4.	GE17451	Total Quality Management	PE	3	3	0	0	3

Sl. No.	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
1.	IT17E81	ServiceOriented Architecture	PE	3	3	0	0	3
2.	CS17E75	HumanComputer Interaction	PE	3	3	0	0	3
3.	IT17E82	Internet of Things	PE	3	3	0	0	3
4.	IT17E83	Social Network Analysis	PE	3	3	0	0	3

SEMESTER VIII ELECTIVE - IV

SEMESTER VIII ELECTIVE - V

Sl. No.	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
1.	MG17E81	Lean Startup Management	PE	3	3	0	0	3
2.	IT17E84	Software Testing and Quality Assurance	PE	3	3	0	0	3
3.	CS17E72	Foundation Skills in Integrated Product Development	PE	3	3	0	0	3
4.	OGE1702	Intellectual Property Rights	PE	3	3	0	0	3

*Professional Electives are grouped according to elective number as was done previously.

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

SI. No.	COURSE CODE	COURSETITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
1.	HS17361	Interpersonal Skills- Listening and Speaking	EEC	2	0	0	2	1
2.	HS17461	Advanced Reading and Writing	EEC	2	0	0	2	1
3.	IT17612	Mini Project	EEC	4	0	0	4	2
4.	IT17811	Project Work	EEC	20	0	0	20	10

OPEN ELECTIVES Offered by IT

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
1.	OIT1701	Data Science	OE	3	3	0	0	3
2.	OIT1702	Advanced Python Programming	OE	3	3	0	0	3
3.	OIT1703	Business Intelligence	OE	3	3	0	0	3
4.	OIT1704	Computer Vision	OE	3	3	0	0	3
5.	OIT1705	Cyber Security	OE	3	3	0	0	3
6.	OIT1706	Machine Learning and R Programming	OE	3	3	0	0	3

LIST OF OPEN ELECTIVES FOR IT STUDENTS

S. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
1.	OBM1703	Fundamentals of Medical Instrumentation	OE	3	3	0	0	3
2.	OBT1701	Basic Bioinformatics	OE	3	3	0	0	3
3.	OBT1703	Food and Nutrition	OE	3	3	0	0	3
4.	OBT1704	Medical Sciences for Engineers	OE	3	3	0	0	3
5.	OCS1701	Web Design and Management	OE	3	3	0	0	3
6.	OCE1701	Disaster Management	OE	3	3	0	0	3
7.	OCE1706	Global Warming and Climate Change	OE	3	3	0	0	3
8.	OEC1701	MEMSand its applications	OE	3	3	0	0	3
9.	OEC1702	Consumer Electronics	OE	3	3	0	0	3
10.	OEC1703	Digital Image Processing and its applications	OE	3	3	0	0	3
11.	OEE 1701	Renewable Power Generation Systems	OE	3	3	0	0	3
12.	OEE1702	Electrical Safety and Quality Assurance	OE	3	3	0	0	3
13.	OMT17095	Mobile Robotics	OE	3	3	0	0	3
14.	OME1705	Supply chain and	OE	3	3	0	0	3

S. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	Т	Р	С
		Logistics Management						
15.	OGE1701	Human Rights	OE	3	3	0	0	3
16.	OGE1702	Foreign Language- Japanese	OE	3	3	0	0	3
17.	OGE1703	Foreign Language- German	OE	3	3	0	0	3
18.	OGE1704	Foreign Language- French	OE	3	3	0	0	3

DISTRIBUTION OF CREDITS

CI No	SUBJECT		(CREDI	TS AS	PER	SEME	STER		CREDIT
51.1 NO.	AREA	Ι	II	III	IV	V	VI	VII	VIII	TOTAL
1	HS	3	3		3					9
2	BS	12	7	4	4					27
3	ES	9	7	5	3					24
4	PC		8	13	13	22	20	10		86
5	PE						3	6	6	15
6	OE					3		3		6
7	EEC			1	1		2		10	14
	TOTAL	24	25	23	24	25	25	19	16	181
	Non Credit/ Mandatory	0	0	0	0	0	0	0	0	0

- HS HumanitiesandScience
- BS-BasicScience
- PC Professional Core ES Engineering Science
- PE Professional Elective OE Open Elective
- EEC Employability EnhancementCourses

SYLLABUS

SEMESTERI

HS17151COMMUNICATIVEENGLISHL T PCCommon to all branches of B.E./B.Tech.programmes3 0 0 3

OBJECTIVES:

- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will enable them listen to lectures and comprehend them by asking questions; seekingclarifications.
- To help learners develop their speaking skills and speak fluently in realcontexts.
- To help learners develop vocabulary of a general kind by developing their readingskills

UNITI SHARING INFORMATION RELATED TOONE SELF/FAMILY&FRIENDS

Reading- short comprehension passages, practice in skimming-scanning and predicting. Writing- completing sentences- developing hints. Listening- short texts- short formal and informal conversations. Speaking- introducing oneself - exchanging personal information-Language development- WhQuestions- asking and answering yes or no questions.Subject-Verb agreement – regular and irregular verbs. Vocabulary development- prefixes- suffixes- articles.

UNITII GENERAL READING ANDFREE WRITING

Reading - comprehension-pre-reading-post reading- comprehension questions (multiple choice questions and /or short questions/ open-ended questions)-inductive reading- short narratives and descriptions from newspapers including dialogues and conversations (also used as short Listening texts)- register. Writing – paragraph writing- topic sentence- main ideas- free writing, short narrative descriptions using some suggested vocabulary and structures. Listening- telephonic conversations. Speaking – sharing information of a personal kind-greeting – taking leave. Language development – prepositions, conjunctions.Vocabulary development- guessing meanings of words in context.

UNITIII GRAMMAR ANDLANGUAGEDEVELOPMENT

Reading- short texts and longer passages (close reading).Writing- understanding text structure- use of reference words and discourse markers-coherence-jumbled sentences. Listening – listening to longer texts and filling up the table- product description- narratives from different sources. Speaking- asking about routine actions and expressing opinions. Language development- degrees of comparison- pronouns- direct vs indirect questions. Vocabulary development – single word substitutes- adverbs.

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UNITIV READING ANDLANGUAGEDEVELOPMENT 9

Reading- comprehension-reading longer texts- reading different types of texts- magazines. Writing- letter writing, informal or personal letters-emails-conventions of personal email. Listening- listening to dialogues or conversations and completing exercises based on them. Speaking- speaking about oneself- speaking about one's friend. Language development-Tenses- simple present-simple past- present continuous and past continuous. Vocabulary development- synonyms-antonyms- phrasal verbs.

UNITV EXTENDEDWRITING

Reading- longer texts- close reading. Writing- brainstorming -writing short essays – developing an outline- identifying main and subordinate ideas- dialogue writing. Listening – listening to talks- conversations. Speaking – participating in conversations- short group conversations. Language development-modal verbs- present/ past perfect tense.Vocabulary development-functional uses of tenses.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, learners will be able to:

- 1. Read articles of a general kind in magazines and newspapers.
- 2. Participate effectively in informal conversations; introduce themselves and their friends and express opinions.
- 3. Comprehend conversations and short talks delivered inEnglish
- 4. Express ideas about oneselffreely
- 5. Write short essays of a general kind and personal letters and emails inEnglish.

TEXT BOOKS:

- 1. Board of Editors. Using English ACoursebook for Undergraduate Engineers and Technologists. Orient BlackSwan Limited, Hyderabad: 2015.
- 2. Richards, C. Jack. Interchange Students' Book-2 New Delhi: CUP,2015.

REFERENCES:

- 1. Bailey, Stephen. Academic Writing: A practical guide for students. New York: Rutledge,2011.
- 2. Means,L. Thomas and ElaineLanglois. English & Communication For Colleges. EngagedLearning ,USA:2007

- Redston, Chris & Gillies Cunningham Face2Face (Pre-intermediate Student's Book& Workbook) Cambridge University Press, New Delhi:2005
- 4. Comfort,Jeremy,etal.SpeakingEffectively:DevelopingSpeakingSkillsforBusinessEngli sh. Cambridge University Press, Cambridge: Reprint2011
- 5. Dutt P. Kiranmai and RajeevanGeeta. Basic Communication Skills, Foundation Books:2013

		Su	ıbject	Code/	Subjeo	et Na	me:H	S171	51/C	ommu	nicativ	e Engl	ish			
				Prog	am Ou	utcom	les						Pı	rogram Outc	Specif omes	fic
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO11	PO12	PSO1	PSO2	PSO3	PSO4				
HS17151.1	1	1	1	2	2	3	2	2	2	3	1	2	-	-	2	-
HS17151.2	2	1	1	2	2	2	2	1	1	3	1	2	-	-	2	-
HS17151.3	-	2	2	2	1	2	2	1	1	3	1	2	-	-	2	-
HS17151.4	3	2	2	2	1	3	3	3	3	3	2	2	-	-	2	-
HS17151.5	3	3	2	2	2	3	3	3	2	2	-	-	2	-		
	2.3	1.8	1.6	2	1.6	2.6	2.4	2	2	3	1.4	2	-	-	2	-

MA17151ENGINEERING MATHEMATICSLT PCCommon to all branches of B.E. /B.Techprogrammes3 2 0 4

OBJECTIVES:

- To learn the basics and concepts of traditional calculus.
- To provide the basic tools of calculus mainly for the purpose of modeling the engineering problems mathematically and obtaining solutions.
- To understand the concepts of single variable and multivariable calculus that plays an important role in the field of science, engineering &technology.

UNITI MATRICES 15

Eigen values and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigen values and Eigenvectors – Cayley-Hamilton theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

15

UNITII DIFFERENTIALCALCULUS

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

UNITIII FUNCTIONS OFSEVERALVARIABLES 15

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNITIV INTEGRALCALCULUS 15

Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts – Bernoulli's formula, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

UNITV MULTIPLE INTEGRALS 15

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

TOTAL : 75

PERIODSOUTCOMES :

On completion of the course students will be able to:

- 1. Apply the concept of Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices for solvingproblems
- 2. Use the techniques of differentiation to differentiate functions and to apply the concept of differentiation to solve maxima and minimaproblems.
- 3. To apply the concept of Partial differentiation for functions two or more variables and use different techniques for solvingproblems.
- 4. Solve problems involving integration using different methods such as substitution, partial fractions, by parts.
- 5. Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.

TEXT BOOKS :

- 1. GrewalB.S.,—HigherEngineeringMathematicsI,KhannaPublishers,NewDelhi,43rdEditi on, 2014.
- 2. James Stewart, "Calculus: Early Transcendental", Cengage Learning, 7th Edition, New Delhi, 2015.

REFERENCES:

- 1. Anton, H, Bivens, I and Davis, S, "Calculus", Wiley, 10th Edition,2016.
- 2. Jain R.K. and Iyengar S.R.K., —Advanced Engineering Mathematics[∥], NarosaPublications, New Delhi, 3rd Edition,2007.
- 3. Narayanan, S. and Manicavachagom Pillai, T. K., —Calculus" VolumeI and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2007.
- 4. Srimantha Pal and Bhunia, S.C, "Engineering Mathematics" Oxford University Press,2015.
- 5. Weir, M.D and Joel Hass, "Thomas Calculus", 12th Edition, Pearson India,2016.
- 6. T. Veerarajan, Engineering Mathematics I & II, McGraw Hill Education, 3rd Edition,2012.

	Su	ıbjec	t Cod	le/Su	bject	Nam	ne:M	A171	51/Eı	nginee	ring N	lather	natics]	[
				Pro	gram	Outc	omes					Progra	m Spec	ific Ou	tcomes	
Course Outcomes	PO1	1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3 F											PSO4			
MA17151.1	3	3	3	2	1	1	1	-	1	-	1	1	2	1	-	-
MA17151.2	1	2	2	2	1	1	1	-	-	-	1	1	1	2	-	1
MA17151.3	3	1	3	2	1	1	1	-	1	-	2	1	2	1	-	1
MA17151.4	3	2	3	2	1	1	1	-	-	-	1	1	1	1	-	1
MA17151.5	2	2 3 1 1 1 1 1 -											-			
	2.4	4 2 2.8 1.8 1 1 1 - 1 - 1.3 1 1.4 1.2 - 1													1	

PH17151ENGINEERINGPHYSICSL T PCCommon to all branches of B.E./B.Tech.programmes3 0 0 3

OBJECTIVE:

• To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering andTechnology.

UNITI PROPERTIES OF MATTER 9

Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – tensional stress and deformations – twisting couple - torsion pendulum: theory and experiment -bending of beams –area moment of inertia - bending moment – cantilever - applications – uniform and non-uniform bending- I-shaped girders - stress due to bending inbeams.

UNITII WAVES AND OPTICS

Oscillatory motion – forced and damped oscillations: differential equation and its solution – plane progressive waves – wave equation. Lasers: population of energy levels, Einstein's A and B coefficients derivation – resonant cavity, optical amplification (qualitative) –CO₂ laser - Semiconductor lasers: homojunction and heterojunction – Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibers (material, refractive index, mode) – losses associated with optical fibers - fiber optic sensors: pressure and displacement.

UNITIII THERMAL PHYSICS

Transfer of heat energy – thermal expansion of solids and liquids – expansion joints - bimetallic stripsthermal conduction, convection and radiation –rectilinear heat flow – thermal conductivity - Forbe's and Lee's disc method: theory and experiment - conduction through compound media (series and parallel) – thermal insulation – applications: heat exchangers, refrigerators, ovens and solar water heaters.

UNITIV

QUANTUM PHYSICS

Black body radiation – Planck's theory (derivation) – Compton effect: theory and experimental verification – wave particle duality – electron diffraction – concept of wave function and its physical significance – Schrödinger's wave equation – time independent and time dependent equations – particle in a one-dimensional rigid box – tunneling (qualitative) – electron microscope – scanningtunneling microscope.

UNITV CRYSTAL PHYSICS

Single crystalline, polycrystalline and amorphous materials – single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances -reciprocal lattice - coordination number and packing factor for SC, BCC, FCC, and

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HCP –Polymorphism and allotropy: diamond and graphite structures - crystal imperfections: point defects, line defects – Burger vectors, stacking faults – role of imperfections in plastic deformation - growth of single crystals: solution and melt growth techniques.

TOTAL: 45 PERIODS

OUTCOMES:

On completion of the course students will be able to

- 1. Apply the knowledge of basic properties of matter and its applications in Engineering and Technology.
- 2. Use the concepts of waves and optical devices and their applications in fiberoptics.
- 3. Use the concepts of thermal properties of materials and their applications in heatexchangers.
- 4. Use the advanced physics concepts of quantum theory and its applications in electron microscope and materialsciences.
- 5. Apply the basic knowledge of crystallography in materials preparation and devicefabrication.

TEXT BOOKS:

- 1. Bhattacharya, D.K. & Poonam, T. —Engineering Physics^{II}. Oxford University Press,2015.
- 2. Gaur, R.K. & Gupta, S.L. —Engineering Physics. DhanpatRai Publishers, 2012.
- **3.** Pandey, B.K. & Chaturvedi, S.—Engineering Physics^{II}. Cengage Learning India,2012.

REFERENCES:

- 1. Halliday, D., Resnick, R. & Walker, J. Principles of Physics. Wiley, 2015.
- 2. Serway, R.A. &Jewett,J.W. -Physics for Scientistsand Engineersl.CengageLearning, 2010.
- 3. Tipler, P.A. & Mosca, G. Physics for Scientists and Engineers with Modern Physics', W.H. Freeman, 2007.
- 4. Arthur Besier and S. RaiChoudhury,Concepts of Modern Physics (SIE), 7th edition, McGraw- Hill Education, 1994.
- 5. R. Murugeshan and KiruthigaSivaprasath, Modern Physics, S.Chand, 2015.

		Sul	oject	Code	e/Sub	ject I	Name	e:PH1	17151	/Engi	neering	g Physi	ics			
				Prog	ram C	Dutco	mes						Р	rogran Outo	n Specia comes	fic
Course Outcomes	PO1	01 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS0												PSO2	PSO3	PSO4
PH17151.1	3	3	2	2	2	1	-	1	-	2	2	3	1	-	1	1
PH17151.2	3	3	2	2	2	1	2	1	1	2	2	3	1	1	1	1
PH17151.3	3	3	2	2	1	1	2	1	-	2	2	3	1	-	1	1
PH17151.4	3	3	2	1	2	1	1	-	2	2	3	1	2	1	1	
PH17151.5	3	3	2	1	1	1	1	-	2	2	3	1	1	1	1	
	3	3	2	1.6	1.6	1	1.5	1	1	2	2	3	1	1.33	1	1

CY17151 ENGINEERING CHEMISTRY

L T P C 3 00 3

OBJECTIVES:

- To acquire knowledge on characteristics of boiler feed water and water treatmenttechniques.
- To develop an understanding on surface chemistry and itsapplications
- To develop an understanding of the basic concepts of phase rule and its applications towards alloying
- To acquire knowledge on different types of fuels and itscharacteristics.
- To obtain knowledge on batteries and fuelcell.

UNITI WATER AND ITS TREATMENT 9

Hardness of water – types – expression of hardness – units– boiler troubles (scale and sludge) – treatment of boiler feed water – Internal treatment (phosphate, colloidal, sodium aluminate and calgonconditioning) - External treatment – ion exchange process, zeolite process – potable water treatment – break point chlorination - desalination of brackish water - Reverse Osmosis – UASB process (Up flow Anaerobic Sludge Blanket).

UNITII SURFACE CHEMISTRYAND CATALYSIS

Adsorption - types of adsorption – adsorption of gases on solids – adsorption of solute from solutions– adsorption isotherms – Freundlich's adsorption isotherm – Langmuir's adsorption isotherm – contact theory – Preparation and applications of activated carbon (up flow and down flow process) - applications of adsorption on pollution abatement.Catalysis – types of catalysis – criteria – autocatalysis – catalytic poisoning and catalytic promoters - acid base catalysis – applications (catalytic convertor) – enzyme catalysis– Michaelis – Mentenequation.

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UNITIII PHASE RULE, ALLOYS AND COMPOSITES

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Phase rule - introduction, definition of terms with examples, one component system -water system - reduced phase rule - thermal analysis and cooling curves - two component systems - lead-silver system –Pattinson process.Alloys - definition- properties of alloys- significance of alloying- functions and effect of alloying elements- nichrome and stainless steel (18/8) – heat treatment ofsteel.

Composites-polymer matrix composites -metal matrix composites-ceramic matrix composites.

UNITIVFUELS AND COMBUSTION9

Fuels - classification of fuels - coal - analysis of coal (proximate and ultimate) - carbonization - manufacture of metallurgical coke (Otto Hoffmann method) - petroleum - manufacture of synthetic petrol (Bergius process) - knocking - octane number - diesel oil - cetane number natural gas - compressed natural gas (CNG) - liquefied petroleum gas (LPG) - power alcohol and biodiesel.

Combustion of fuels - introduction - calorific value - higher and lower calorific valuestheoretical calculation of calorific value - ignition temperature - spontaneous ignition temperature - explosive range.

UNITV ENERGY SOURCES AND STORAGE DEVICES

Batteries - components – Characteristics – voltage , current , capacity, electrical storage density, energy density, discharge rate – types of batteries – primary battery (dry cell)-secondary battery (lead acid battery, Ni- Cdbattery,lithium-ion-battery). Fuel cells – H₂-O₂fuel cell, methanol oxygen fuel cell, Proton exchange membrane fuel cell – SOFC and Biofuelcells.

TOTAL: 45 PERIODS

OUTCOMES:

On completion of the course students will be able to

- 1. Get familiarized on water treatmenttechniques.
- 2. Apply adsorption phenomena on variousfields.
- 3. Analyze alloying composition based on phase ruleconcept.
- 4. Apply the role of fuels in day todayapplications.
- 5. Design batteries and fuelcells.

TEXT BOOKS:

- 1. P. C. Jain and Monika Jain, —Engineering Chemistry 17thedition, DhanpatRai Publishing Company (P) LTD, New Delhi, 2015
- 2. S.Vairam, P.KalyaniandSubaRamesh, —EngineeringChemistryl, WileyIndiaPVT, LTD, New Delhi, 2013

REFERENCES:

- 1. Friedrich Emich, —Engineering Chemistryl, Scientific International PVT, LTD, New Delhi, 2014.
- 2. PrasantaRath,—EngineeringChemistryl,CengageLearningIndiaPVT,LTD,Delhi,2015.
- 3. ShikhaAgarwal, —Engineering Chemistry-Fundamentals and Applications^{II}, Cambridge University Press, Delhi,2015.
- 4. S.S.DaraandS.S.Umare,—ATextbookofEngineeringChemistryl,12thedition,S.Chand& Company LTD, New Delhi,2015.

	Subject Code/Subject Name:CY17151 /Engineering Chemistry															
				Pro	gram	Outc	omes					Progra	m Spec	ific Ou	tcomes	
Course Outcomes	PO1)1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3 PS											PSO4			
CY17151 .1	2	1	1	1			1	1					1	1	-	-
CY17151 .2	2	1	1	1			1	1					1	1	-	-
CY17151 .3	1	1	1	1			1	1					1	1	-	-
CY17151 .4	1	1	1	1			1						1	1	-	-
CY17151 .5	2	2 1 1 1 1 1 1 1												-		
	1.6	1	1	1	-	-	1	1	-	-	-	-	1	1	-	-

GE17151 PROBLEM SOLVING AND PYTHON PROGRAMMING L T PC 3 00 3

OBJECTIVES:

- To develop an understanding of algorithmic problemsolving
- To develop Python programs with conditionals andloops.
- To define Python functions and callthem.
- To use Python data structures lists, tuples, dictionaries.
- To do input/output with files inPython.

UNITI ALGORITHMIC PROBLEM SOLVING

9

Introduction to computers - characteristics - basic organization of a computer – algorithms - building blocks of algorithms (instructions/statements, state, control flow, functions) - notation (pseudo code, flow chart, programming language) - algorithmic problem solving - simple strategies for developing algorithms (iteration, recursion).

UNITII DATA, EXPRESSIONS, STATEMENTS AND CONTROLFLOW 9

Python interpreter and interactive mode - values and types - data types - variables - keywords - expressions and statements - python I/O - operators - precedence of operators - comments. Conditionals: conditional (if) - alternative (if-else) - chained conditional (if-elif-else) - nested conditional. Iteration: while - for - break - continue - pass. Illustrative programs: exchange the values of two variables - circulate the values of n variables - test for leapyear.

UNITIII FUNCTIONS

Function calls – type conversion – math function – composition - definition and use - flow of execution - parameters and arguments. Fruitful functions: return values – parameters - scope: local and global - recursion. Strings: string slices – immutability - string functions and methods - string comparison. Illustrative programs: square root – GCD – exponentiation - sum the array of numbers - linear search – binarysearch.

UNITIV COMPOUND DATA: LISTS, TUPLES AND DICTIONARIES 9

Lists - list operations - list slices - list methods - list loop – mutability – aliasing - cloning lists - list parameters. Tuples – immutable - tuple assignment - tuple as return value.Dictionaries: operations and methods – dictionaries and tuples – dictionaries and lists. Advanced list processing - list comprehension. Illustrative programs: Sorting.

UNITV FILES, MODULES AND PACKAGES 9

Files and exception: file operation - text files - reading and writing files - format operatorcommand line arguments - errors and exceptions - handling exceptions – writing modules – packages. Illustrative programs: word count - copy file – casestudies.

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, students will be able to

- 1. Develop algorithmic solutions to simple computational problems.
- 2. Structure simple Python programs for solvingproblems.

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- 3. Decompose a Python program intofunctions.
- 4. Represent compound data using Python lists, tuples and dictionaries.
- 5. Read and write data from/to files in Pythonprograms.

TEXT BOOK:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress. com/wp/think- python/)

REFERENCES:

- 1. Anita Goel, Ajay Mittal, -Computer Fundamentals and programming in Cl,PearsonIndia Publisher, First edition,2013.
- 2. JohnVGuttag,—IntroductiontoComputationandProgrammingUsingPython",Revisedan d expanded Edition, MIT Press,2013
- 3. RobertSedgewick,KevinWayne,RobertDondero,–IntroductiontoProgramminginPython : An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd.,2016.
- 4. TimothyA.Budd,—ExploringPython^{||},Mc-GrawHillEducation(India)PrivateLtd.2015.
- 5. KennethA.Lambert,—FundamentalsofPython:FirstProgramsl,CENGAGELearning,20 12.
- 6. Charles Dierbach,—Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition,2013.
- 7. The Python Tutorial, https://docs.python.org/2.7/tutorial/

Subj	ect C	ode/S	Subje	ct Na	nme:	GE17	/151/]	Probl	em S	olving	g and H	ython	Progr	ammin	g	
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	
GE17151 .1	3	2	3	-	3	-	-	-	-	-	-	1	1	-	-	-
GE17151 .2	3	3	3	-	3	-	-	-	-	-	-	1	-	-	-	-
GE17151.3	3	3	3	-	3	-	-	-	-	-	-	1	1	-	-	-
GE17151 .4	3	3	3	2	3	-	-	-	-	-	-	1	-	-	-	-
GE17151.5	2 3 3 3 3 1										-					
	2.8 2.8 3 2.5 3 - - -											1	1	-	-	-

GE17152

ENGINEERINGGRAPHICS

L T P C 2 04 4

OBJECTIVES:

- To develop in students, graphic skills for communication of concepts, ideas and design of Engineeringproducts.
- To expose them to existing national standards related to technicaldrawings.
- To study different type of projections, and practice him on free handsketching.

CONCEPTS AND CONVENTIONS (Notfor Examination)

1

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNITI PLANE CURVES AND FREE HAND SKETCHING 7+12

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves- Construction of helical curve. Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three Dimensional objects – Layout of views- Freehand sketching of multiple views from pictorial views of objects

UNITII PROJECTION OF POINTS, LINES ANDPLANESURFACE 6+12

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNITIII PROJECTION OF SOLIDS 5+12

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method.

UNIT IVPROJECTION OF SECTIONED SOLIDS AND
DEVELOPMENT OF SURFACES5+12

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes

UNITV ISOMETRIC ANDPERSPECTIVEPROJECTIONS 6+12

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions - Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method .

TOTAL: 90 PERIODS

OUTCOMES:

On Completion of the course, the student will be able to

- 1. Perform freehand sketching of basic geometrical constructions and multiple views of objects.
- 2. Do the conic curves and special curves.
- 3. Do orthographic projection of lines and plane surfaces.
- 4. Draw projections, solids, and development o fsurfaces.
- 5. Prepare isometric and perspective sections of simple solids.

TEXT BOOK:

- 1. Bhatt N.D. and Panchal V.M., —Engineering Drawingl, Charotar Publishing House, 50th Edition, 2010.
- 2. Natrajan K.V., —A text book of Engineering Graphics^{II}, Dhanalakshmi Publishers, Chennai, 2009.

REFERENCES:

- 1. BasantAgarwal and Agarwal C.M., —Engineering Drawingl, Tata McGraw Hill Publishing Company Limited, New Delhi,2008.
- 2. Gopalakrishna K.R., —Engineering Drawing[∥] (Vol.I&II combined), Subhas Stores, Bangalore, 2007.
- 3. Luzzader, Warren.J. andDuff,John M., —Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi,2005.
- 4. VenugopalK.andPrabhuRajaV.,—EngineeringGraphicsI,NewAgeInternational(P)Limited, 2008.
- 5. ShahM.B.,andRanaB.C.,—EngineeringDrawingl,Pearson,2ndEdition,2009.

Publication of Bureau of Indian Standards:

- 1. IS 10711 2001: Technical products Documentation Size and lay out of drawingsheets.
- 2. IS 9609 (Parts 0 & 1) 2001: Technical products Documentation –Lettering.
- 3. IS 10714 (Part 20) 2001 & SP 46 2003: Lines for technicaldrawings.
- 4. IS 11669 1986 & SP 46 2003: Dimensioning of TechnicalDrawings.
- 5. IS 15021 (Parts 1 to 4) 2001: Technical drawings ProjectionMethods.

Special points applicable to end semester Examinations on Engineering Graphics:

- 1. There will be five questions, each of either or type covering all units of thesyllabus.
- 2. All questions will carry equal marks of 20 each making a total of 100.
- 3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3size.
- 4. The examination will be conducted in appropriate sessions on the sameday

Subject Code/Subject Name:GE17152/Engineering Graphics																
				Pro	gram	Outc	omes			Program Specific Outcomes						
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
GE17152 .1	2	3	2	-	2	-	-	-	-	-	-	-	-	-	-	-
GE17152 .2	3	2	2	2	2	-	-	-	-	-	-	-	-	1	-	-
GE17152.3	3	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-
GE17152 .4	3	3	2	-	2	-	-	-	-	-	-	-	-	-	-	-
GE17152.5	3	3	2	1	2	-	-	-	-	-	-	-	-	-	-	-
	2.8	2.6	2	1.7	2	-	-	-	-	-	-	-	-	1	-	-

GE17161PROBLEM SOLVING AND PYTHONL T P CPROGRAMMINGLABORATORY0 04 2

OBJECTIVES:

- Be familiar with the use of office package, exposed to presentation and visualization tools.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples and dictionaries.
- Read and write data from/to files in Python.

LIST OF PROGRAMS

- 1. Search, generate, manipulate data using Open Office
- 2. Presentation and Visualization graphs, charts, 2D,3D
- 3. Problem Solving using Algorithms and Flowcharts
- 4. Compute the GCD of two numbers.
- 5. Find the square root of a number (Newton's method)
- 6. Exponentiation (power of a number)
- 7. Linear search and Binary search
- 8. First n prime numbers
- 9. Find the maximum of a list o fnumbers
- 10. Sorting
- 11. Removing all the duplicate elements in a list
- 12. Multiply matrices
- 13. Programs that take command line arguments (word count)
- 14. Find the most frequent words in a text read from a file
- 15. Mini Project

PLATFORM NEEDED

Python 3 interpreter for Windows/Linux

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of the course, students will be able to

- 1. Develop documentation, presentation and visualization charts.
- 2. Implement Python programs with conditionals and loops.
- 3. Develop Python programs step-wise by defining functions and calling hem.
- 4. Use Python lists, tuples and dictionaries for representing compound data.
- 5. Read and write data from/to files in Python

Subject Code/Subject Name: GE17161 /Problem Solving and Python Programming Laboratory

				Pro	gram	Outc	omes			Program Specific Outcomes						
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
GE17161 .1	-	3	2	-	3	-	-	-	-	3	-	-	2	1	-	-
GE17161 .2	3	3	3	-	3	-	-	-	-	-	-	-	1	-	-	-
GE17161 .3	3	3	3	-	3	-	-	-	-	-	-	-	1	-	-	-
GE17161 .4	3	3	3	-	3	-	-	-	-	-	-	-	1	-	-	-
GE17161 .5	2	3	3	-	3	-	-	-	-	-	-	-	1	-	-	-
	2.8	3	2.8	-	3	-	-	-	-	3	-	-	1.2	1	-	-

GE17162 PHYSICS ANDCHEMISTRYLABORATORY L T PC 0 0 4 2

OBJECTIVE:

• To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

LISTOFEXPERIMENTS: PHYSICS LABORATORY (Any 5Experiments)

- 1. Determination of rigidity modulus torsionpendulum
- 2. Determination of Young's modulus by non-uniform bendingmethod
- 3. (a) Determination of wavelength, and particle size usingLaser

(b) Determination of acceptance angle in an optical fiber.

- 4. Determination of thermal conductivity of a bad conductor Lee's Discmethod.
- 5. Determination of velocity of sound and compressibility of liquid Ultrasonic interferometer
- 6. Determination of wavelength of mercury spectrum spectrometer grating
- 7. Determination of thickness of a thin wire Air wedge method

TOTAL: 30 PERIODS

OUTCOMES:

On completion of the course, students will be able to

- Apply the principle of elasticity via Young's modulus &rigidity modulus of Engineering materials.
- Apply the principle elasticity in determining compressibility of liquids using ultrasonicwaves
- Apply the principle of optics in fiber optical communication.
- Apply thermal properties of various insulating materials in engineeringapplications.

• Use the basic instruments like venire caliber, micrometer and microscope for various basic measurements.

CHEMISTRY LABORATORY: (Any seven experiments to be conducted) **OBJECTIVES:**

- To acquire practical skills in the determination of water qualityparameters.
- To gain the knowledge about spectrophotometer and flame photometer.
- To acquire knowledge on the determination of corrosion rate.

LISTOFEXPERIMENTS: CHEMISTRY LABORATORY (Any 7Experiments)

- 1. Estimation of HCl using Na₂CO₃ as primary standard and Determination of alkalinity in water sample.
- 2. Determination of total, temporary & permanent hardness of water by ED TAmethod.
- 3. Determination of DO content of water sample by Winkler's method.
- 4. Determination of chloride content of water sample by argent metricmethod.
- 5. Determination of strength of given hydrochloric acid using pHmeter.
- 6. Estimation of iron content of the given solution using potentiometer.
- 7. Conduct metric titration of strong acid vs. strong base.
- 8. Determination of strength of acids in a mixture of acids using conductivity meter.
- 9. Estimation of copper content of the given solution by Audiometry.
- 10. Estimation of iron content of the water sample using spectrophotometer (1, 10- Phenanthroline / thiocyanatemethod).
- 11. Estimation of sodium and potassium present in water using flam photo meter.
- 12. Corrosion experiment-weight lossmethod.

TOTAL: 30 PERIODS

OUTCOMES:

On completion of the course, students will be able to

- 1. Apply the quantitative chemical analysis of water quality related parameters.
- 2. Analyze characteristics of water.
- 3. Measure the corrosion rate in metals.
- 4. Apply instrumentation skills in analyzing metallic elements I nwater.
- 5. Analyze quantitatively the strength of acids and bases in water.

TEXTBOOK:

Subject Code/Subject Name:GE17162 /Physics and Chemistry Laboratory																
				Pro	gram	Outc	omes			Program Specific Outcome						
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
GE17162 .1	3	2	-	1	-	-	-	-	-	-	-	-	-	-	1	-
GE17162 .2	3	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-
GE17162.3	3	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-
GE17162.4	3	2	-	1	-	-	-	-	-	-	-	-	-	-	1	-
GE17162 .5	3	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-
GE17162 .6	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GE17162 .7	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GE17162.8	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
GE17162.9	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GE17162 .10	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	2	1	1	-	-	-	-	-	-	-	-	-	-	1	-

1. Vogel's Textbook of Quantitative Chemical Analysis (8TH edition, 2014)

SEMESTER II

HS17251

TECHNICALENGLISH

L T PC

Common to all branches of B.E. /B.Tech.Programmes 3 0 03

OBJECTIVES:

The student should be able to:

- Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- Foster their ability to write convincing job applications and effective reports.
- Develop their speaking skills to make technical presentations, participate in group discussions.
- Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialization.

UNITI INTRODUCTIONTECHNICALENGLISH

Listening- listening to talks mostly of a scientific/technical nature and completing information-gap exercises. Speaking –asking for and giving directions. Reading – reading short technical texts from journals- newspapers. Writing- purpose statements – extended definitions – issue- writing instructions – checklists-recommendations. Vocabulary Development- technical vocabulary. Language Development –subject verb agreement – compound words.

UNITII READING ANDSTUDYSKILLS 9

Listening- listening to longer technical talks and completing exercises based on them. Speaking – describing a process. Reading – reading longer technical texts- identifying the various transitions in a text- paragraphing. Writing- interpreting charts, graphs. Vocabulary Development-vocabulary used in formal letters/emails and reports. Language Development-impersonal passive voice, numerical adjectives.

UNITIII TECHNICAL WRITINGANDGRAMMAR 9

Listening- listening to classroom lectures/ talks on engineering/technology. Speaking – introduction to technical presentations. Reading – longer texts both general and technical, practice in speed reading. Writing-Describing aprocess, use of sequence words. Vocabulary Development- sequence words. Misspelled words. Language Development- embedded sentences

UNITIV REPORTWRITING 9

Listening- listening to documentaries and making notes. Speaking – mechanics of presentations. Reading – reading for detailed comprehension. Writing- email etiquette- job application – cover letter. Résumé preparation(via email and hard copy)- analytical essays and issue based essays. Vocabulary Development- finding suitable synonyms-paraphrasing. Language Development- clauses- ifconditionals.

UNITV GROUP DISCUSSION AND JOBAPPLICATIONS 9

Listening- TED talks; Speaking –participating in a group discussion. Reading– reading and understanding technical articles. Writing– writing reports- minutes of a meeting- accident and survey. Vocabulary Development- verbal analogies, foreign words and phrases Language Development- reported speech, common errors in English.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Read technical texts and write area- specific text effortlessly.
- Listen and comprehend lectures and talks in their area of specialization successfully.
- Speak appropriately and effectively in varied formal and informal contexts.
- Write reports and winning job applications.
- Write error free language.

TEXT BOOKS:

- 1. Board of editors. Fluency in English A Course book for Engineering and Technology. Orient Blackswan, Hyderabad:2016
- 2. Sudharshana.N.P and Saveetha. C. English for Technical Communication. Cambridge University Press: New Delhi,2016.

REFERENCES:

- 1. Raman, Meenakshi and Sharma, Sangeetha-Technical Communication Principles and Practice.Oxford University Press: New Delhi,2014.
- 2. Kumar, Suresh. E. Engineering English. Orient Blackswan:Hyderabad,2015
- 3. Booth-L. Diana, Project Work, Oxford University Press, Oxford:2014.
- 4. Grussendorf, Marion, English for Presentations, Oxford University Press, Oxford:2007
- 5. Means, L. Thomas and Elaine Langlois, English & Communication For Colleges. Cengage Learning, USA: 2007

Students can be asked to read Tagore and ChetanBhagat for supplementary reading.

	Subject Code/Subject Name:HS17251/Technical English															
	Program Outcomes												Program Specific Outcomes			
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
HS17251.1	1	1	1	2	2	3	2	2	2	3	1	2	2	2	2	2
HS17251.2	2	1	1	2	2	2	2	1	1	3	1	2	1	2	2	2
HS17251.3	-	2	2	2	1	2	2	1	1	3	1	2	1	2	2	1
HS17251.4	3	2	2	2	1	3	3	3	3	3	2	2	3	3	3	3
HS17251.5	3	3	2	2	2	3	3	3	3	3	2	2	1	2	2	2
	2.25	1.8	1.6	2	1.6	2.6	2.4	2	2	3	1.4	2	1.6	2.2	2.2	2

HS17252PROFESSIONAL ENGLISH COMMUNICATIONLTPC3003

OBJECTIVES:

- To prepare students to be competent in a global business environment.
- To think accurately, clearly and deeply in communicative contexts.
- To improve career opportunities get English language skills that are needed to be successful.

UNIT I CRITICAL/INFORMATIONAL LISTENING 9

Short conversations or Monologues – Listening for specific information- Conversations or Monologues with factual information-listen to fill up missing information- business related discussions or interview (two or more speakers).

UNIT II CONVERSATIONAL/PRESENTATION SKILLS 9

Speak about oneself - Face-to-face speaking for real-life context – pick and talk - personal opinion on business related topics- mini presentations on a business theme- discussion with another candidate on business related topics.

UNIT III INTENSIVE/EXTENSIVE READING AND INTERPRETING 9

Short texts (signs, messages, emails, labels and notes) -Short descriptions-graph or chart. Reading to find factual information- decision making from a written text- a leaflet or a newspaper- magazine or article- reading to understand correct grammar, contextuallyreading to understand the structure of a text-read and transfer information from memos, advertisements, notices.

UNIT IVFORMAL COMMUNICATION9

Business Correspondence - writing business letters to people outside the company. Internal Company Communication- a note, a message, a memo or an email.

UNIT V VERBAL ABILITY/FUNCTIONAL GRAMMAR 9

Grammar – tenses – concord- prepositions – articles- punctuations. Vocabulary – advanced vocabulary – synonyms and antonyms. Sentence correction – sentence completion - cloze passage - verbal reasoning: analogies, meaning – usage match.

TOTAL : 45 PERIODS

OUTCOMES:

On completion of the course students will be able to:

- 1. Listen to, understand and give opinions in meetings.
- 2. Apply for new jobs and develop their career.
- 3. Write short business messages and reports.
- 4. Use language in both official and unofficial contexts.
- 5. Speak effectively in business communication.

TEXT BOOKS:

1. Board of Editors. Sure Outcomes. A Communication Skills Course for Undergraduate Engineers and Technologists. Orient Black Swan Limited, Hyderabad, 2013.

REFERENCES:

- 1. Hartley, Mary. —The Power of Listening , Jaico Publishing House; First Edition (2015).
- 2. Chambers, Harry. —Effective Communication Skills for Scientific and Technical Professionals, Persues Publishing, Cambridge, Massachusetts, 2000.
- 3. Lesikar V. Raymond, Flatley E. Marie, Rentz, Kathryn and Pande, Neerja. —Business Communication, Eleventh Edition, Tata McGraw Hill Education Private Limited.

Subject Code/Subject Name:HS17252/Professional English Communication																
				Pro	gram	Outc	omes			Program Specific Outcomes						
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
HS17252.1	1	-	1	1	-	2	2	2	2	3	2	3	2	2	2	2
HS17252.2	2	2	1	1	-	2	2	2	2	3	2	3	1	1	1	1
HS17252.3	1	2	1	1	-	2	2	2	2	3	2	3	2	2	2	2
HS17252.4	-	-	1	-	-	2	-	-	2	3	-	3	3	2	2	2
HS17252.5	2	2	1	2	-	2	2	3	2	3	2	3	3	3	3	3
	1.5	2	1	1.25	-	2	2	2.25	2	3	2	3	2.2	2	2	2

MA17251 ENGINEERING MATHEMATICS – II L T PC

Common to all branches of B.E.B.Tech.programmes 3204

OBJECTIVES:

- To handle practical problems arising in the field of engineering and technology.
- To solve problems using the concept of Differential Equation, Vectors calculus, Complex analysis, Laplace transforms.

UNITI DIFFERENTIALEQUATIONS 15

Higher order linear differential equations with constant coefficients - Method of variation of parameters – Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients - Method of undetermined coefficients.

UNITII VECTORCALCULUS 15

Gradient and directional derivative – Divergence and curl - Vector identities – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral - Area of a curved surface - Volume integral - Green's, Gauss divergence and Stoke's theorems – Verification and application in evaluating line, surface and volume integrals (cubes and parallelepipeds).

UNIT III ANALYTICFUNCTIONS 15

Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates - Properties – Harmonic conjugates – Construction of analytic function-Conformal mapping – Mapping by functions W = z + c, cz, 1/z, z^2 Bilinear transformation.

UNITIV COMPLEXINTEGRATION 15

Cauchy's integral theorem – Cauchy's integral formula – Taylor's and Laurent's series – Singularities – Residues – Residue theorem – Application of residue theorem for evaluation of real integrals – Use of circular contour and semi circular contour.

UNITV LAP LACE TRANSFORMS 15

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems -Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem – Transform of periodic functions – Application to solution of linear second order ordinary differential equations with constant coefficients.

TOTAL: 75 PERIODS

OUTCOMES:

On completion of the course students will be able to:

- 1. Apply various techniques in solving differential equations.
- 2. Use the concept of Gradient, divergence and curl of a vector point function and related identities in different areas of Engineering.
- 3. Evaluate line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
- 4. Use the concept of Analytic functions, conformal mapping and complex integration for solving problems.
- 5. Use Laplace transform and inverse transform techniques in solving differentia equations.

TEXT BOOKS :

- 1. Grewal B.S., —Higher Engineering Mathematics^{II}, Khanna Publishers, New Delhi, 43rd Edition, 2014.
- 2. KreyszigErwin,"Advanced Engineering Mathematics",JohnWileyandSons, 10th Edition, New Delhi,2016.

REFERENCES:

- 1. Bali N., Goyal M. and Watkins C., —Advanced Engineering Mathematics^{II}, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition,2009.
- 2. Jain R.K. and Iyengar S.R.K., Advanced Engineering Mathematics[∥], NarosaPublications, New Delhi , 3rd Edition,2007.
- 3. O'Neil,P.V.—AdvancedEngineeringMathematicsI,CengageLearning India Pvt., Ltd, New Delhi,2007.
- 4. Sastry, S.S, —Engineering Mathematics", Vol. I &II, PHI Learning Pvt. Ltd, 4th Edition, New Delhi,2014.
- 5. Wylie, R.C. and Barrett, L.C., —Advanced Engineering Mathematics –Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi,2012.
- 6. T. Veerarajan, Engineering Mathematics I & II, McGraw Hill Education, 3rd Edition,2012.
| | Su | bject | Cod | e/Sul | oject | Nam | e:MA | 1725 | 51/En | ginee | ring M | lathen | natics I | I | | |
|-----------------|-----|---|-----|-------|-------|------|------|------|-------|-------|--------|--------|--------------------------|------|------|------|
| | | | | Pro | gram | Outc | omes | | | | | | Program Specific Outcome | | | |
| Course Outcomes | PO1 | O1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 I | | | | | | | | | | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| MA17251.1 | 3 | 3 | 3 | 1 | 3 | - | - | - | - | - | - | - | 3 | - | - | 1 |
| MA17251.2 | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | - | 1 | - | - | 1 |
| MA17251.3 | 2 | 2 | 3 | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| MA17251.4 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - | - | 1 |
| MA17251.5 | 3 | 3 | 3 | 1 | 1 | - | - | - | - | - | 2 | - | - | 2 | | |
| | 2.8 | 2.8 | 2.6 | 1.6 | 2 | - | - | - | - | - | - | 1.75 | - | - | 1.25 | |

PH17254PHYSICS FORINFORMATIONSCIENCEL T PCCommon to B.E. CSEandB.Tech.IT3003

OBJECTIVES:

- To understand the essential principles of Physics of semiconductor device and Electron transport properties.
- Become proficient in magnetic and optical properties of materials and Nano-electronic devices.

UNITI ELECTRICAL PROPERTIESOFMATERIALS 9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression –Weidman -Franz law – Success and failures - electrons in metals – Particle in a three dimensional box – degenerate states – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids – tight binding approximation - Electron effective mass – concept of hole.

UNITII SEMICONDUCTORPHYSICS 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type and P-type semiconductors – Variation of carrier concentration with temperature – variation of Fermi level with temperature and impurity concentration – Carrier transport in Semiconductor: random motion, drift, mobility and diffusion – Hall effect and devices – Ohmic contacts – Scotty diode.

UNITIII MAGNETIC PROPERTIESOFMATERIALS

9

Magnetic dipole moment – atomic magnetic moments- magnetic permeability and susceptibility - Magnetic material classification: diamagnetism – Para magnetism –

Department of IT, REC

ferromagnetism - anti ferromagnetism - ferrimagnetism - Ferromagnetism: origin and exchange interaction- saturation magnetization and Curie temperature - Domain Theory- M versus H behavior - Hard and soft magnetic materials - examples and uses-- Magnetic principle in computer data storage – Magnetic hard disc (GMR sensor).

OPTICAL PROPERTIESOFMATERIALS UNITIV

Classification of optical materials - carrier generation and recombination processes -Absorption emission and scattering of light in metals, insulators and semiconductors (concepts only) - photo current in a P-N diode - solar cell - LED - Organic LED - Laser diodes - Optical data storage techniques.

UNITV

NANODEVICES

Electron density in bulk material – Size dependence of Fermi energy – Quantum confinement - Quantum structures - Density of states in quantum well, quantum wire and quantum dot structure - Band gap of Nano materials - Tunneling: single electron phenomena and single electron transistor - Quantum dot laser. Conductivity of metallic nanowires - Ballistic transport - Quantum resistance and conductance - Carbon nanotubes: Properties and applications.

TOTAL : 45 PERIODS

OUTCOMES:

On completion of the course, students will be able to

- 1. Apply conducting properties of metals and energy band structures.
- 2. Apply the basics of semiconductor physics in electronic devices.
- 3. Analyze the magnetic properties of materials for data storage devices.
- 4. Analyze the properties of optical materials for optoelectronics.
- 5. Use the basics of quantum behavior in nano electronic devices.

TEXT BOOKS:

- Jasprit Singh, —Semiconductor Devices: Basic Principles, Wiley2012. 1.
- 2. Kasap,S.O.-PrinciplesofElectronicMaterialsandDevices ,McGraw-HillEducation,2007.
- 3. Kittel, C. —Introduction to Solid State Physics. Wiley, 2005.

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REFERENCES

- 1. Garcia, N.& Damask, A.—PhysicsforComputerScienceStudents. SpringerVerlag, 2012.
- 2. Hanson, G.W. —Fundamentals of Nanoelectronics. Pearson Education, 2009.
- 3. Rogers, B., Adams, J. &Pennathur, S. —Nanotechnology: Understanding Small Systems^{II}. CRC Press,2014.

PO/ PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	РО9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO 1	3	2	2	2	1	1	-	-	1	1	0	2	1	1	1	0
CO 2	3	2	2	2	2	1	-	-	1	1	1	2	-	1	1	1
CO 3	3	2	2	2	2	2	1	1	1	1	1	2	-	1	1	1
CO 4	3	2	2	2	2	2	-	-	2	1	1	2	-	1	-	1
CO 5	3	2	2	2	2	2	1	1	2	1	1	2	-	1	1	2
Average	3	2	2	2	1.8	1.6	1	1	1.4	1	1	2	1	1	1	1.25

4. S. O. Pillai, Solid state physics, New Age International, 2015.

CS17201

DATASTRUCTURES

LTPC 3003

OBJECTIVES:

The student should be made to:

- To recognize and distinguish the applications of various linear and non linear data structures.
- To demonstrate the understanding of stacks, queues and their applications.
- To apply the concepts of List ADT.
- To analyze the concepts of tree and graph data structures.
- To be able to incorporate various searching and sorting techniques in real time scenarios.

UNITI BASICDATASTRUCTURES

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Introduction to Data Structure - Classes and Objects in Python – Stack – ADT - Stack Applications - Balancing symbols -Evaluating the Postfix expressions – Queue - ADT – Queue Applications - Dequeue - Circular Queue

Linked List Implementation - Singly Linked List- Circular Linked List - Doubly Linked List - All operation (Insertion, Deletion, Merge, Traversal) - Applications of lists - Polynomial Manipulation

LINKEDLIST

Basic Tree Terminologies- Binary Tree Representation of Trees Tree Traversal Binary

TREES

GRAPHS

Basic Tree Terminologies- Binary Tree, Representation of Trees, Tree Traversal, Binary Search Tree - Operations, Implementation. Binary Heap- Properties, Heap Operations.

Graph Terminologies, Graph ADT, Traversal- BFS, DFS, Directed Acyclic Graph-Topological Sorting, Shortest Path- Dijkstra's Algorithm.

UNITV SEARCHINGANDSORTING	9
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Searching- Linear search, Binary search, Hashing- Hash function, Collision resolution techniques- Linear probing, Separate chaining. Sorting- Bubble sort, Selection sort, Insertion sort, Shell sort, Merge sort, Quick sort.

TOTAL: 45 PERIODS

OUTCOMES:

UNITII

UNITIII

UNITIV

At the end of the course, the student will be able to:

- 1. Analyze the various data structureconcepts.
- 2. Apply data structures to solve various problems.
- 3. Understand non-linear datastructures.
- 4. Correlate the uses of graphs in real lifescenarios
- 5. Apply different Sorting, Searching and Hashingalgorithms.

TEXTBOOKS:

- Bradley N. Miller, David L. Ranum, "Problem Solving with Algorithms and Data Structures Using Python", Franklin, Beedle& Associates,2nd Edition, 2013. [Units1,3,5]
- 2. Michael T. Goodrich , Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Python" Wiley, 2013 . [Units 2,4]

REFERENCES:

- 1. Rance D. Necaise, "Data Structures and Algorithms using Python", John Wiley & Sons, 2011.
- 2. David M.Reed and John Zelle, "Data Structures and Algorithms using Python and C++", Franklin Beedle& Associates2009.

	Subject Code/Subject Name:PH17254/Physics for Information Science															
				Pro	gram	Outc	omes						Program Specific Outcom			
Course Outcomes	PO1	D1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 F											PSO1	PSO2	PSO3	PSO4
PH17254.1	3	2	2	2	1	1	-	-	1	1	-	2	1	1	1	-
PH17254.2	3	2	2	2	2	1	-	-	1	1	1	2	-	1	1	1
PH17254.3	3	2	2	2	2	2	1	1	1	1	1	2	-	1	1	1
PH17254.4	3	2	2	2	2	2	-	-	2	1	1	2	-	1	-	1
PH17254.5	3	2	2	2	2	2	1	1	1	1	2	-	1	1	2	
	3	2	2	2	1.8	1.6	1	1	1.4	1	1	2	1	1	1	1.25

IT17201 INFORMATION TECHNOLOGY ESSENTIALS L T P C

3 0 0 3

OBJECTIVES:

- To introduce the concept of Internet, Networks and its working principles.
- To know scripting languages.
- To understand various applications related to Information Technology.

UNIT I WEB ESSENTIALS

Creating a Website - Working principle of a Website - Browser fundamental - Authoring tools - Types of servers: Application Server - Web Server - Database Server.

UNIT II SCRIPTING ESSENTIALS	
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Need for Scripting languages - Types of scripting languages - Client side scripting - Server side scripting - PHP - Working principle of PHP - PHP Variables - Constants - Operators – Flow Control and Looping - Arrays - Strings - Functions - File Handling - PHP and MySQL - PHP and HTML - Cookies - Simple PHP scripts.

UNIT III NETWORKING ESSENTIALS 9

Fundamental computer network concepts - Types of computer networks - Network layers - TCP/IP model - Wireless Local Area Network - Ethernet - WiFi - Network Routing - Switching - Network components.

UNIT IVMOBILE COMMUNICATION ESSENTIALS9

Cell phone working fundamentals - Cell phone frequencies & channels - Digital cell phone components - Generations of cellular networks - Cell phone network technologies/ architecture - Voice calls & SMS.

UNIT VAPPLICATION ESSENTIALS9

Creation of simple interactive applications - Simple database applications - Multimedia applications -Design and development of information systems – Personal Information System – Information retrieval system – Social networking applications.

TOTAL : 45 PERIODS

OUTCOMES:

On Completion of the course, the students should be able to:

- 1. Design and deploy web-sites
- 2. Design and deploy simple web-applications
- 3. Create simple data base applications
- 4. Develop information system
- 5. Describe the basics of networking and mobile communications

TEXT BOOKS:

- 1. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5" Third Edition, O'REILLY, 2014.
- 2. Behrouz A Forouzan, —Data Communication and Networkingl, Fourth Edition, Tata McGraw-Hill,2011.

REFERENCES:

- 1. GottapuSasibhushanaRao, "Mobile Cellular Communication", Pearson, 2012.
- 2. R. Kelly Rainer, Casey G. Cegielski, Brad Prince, —Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014.

3.	it-ebooks.org
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S	Subje	ct Co	de/S	ubjec	et Na	me:I'	Г172	01 /I	nforr	nation	Tech	nology	Essen	tials		
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	01 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10										PO12	PSO1	PSO2	PSO3	PSO4
IT17201 .1	2	2	3	-	-	-	-	-	-	-	-	-	3	3	3	1
IT17201 .2	3	2	3	-	2	-	-	-	-	-	-	-	3	3	3	1
IT17201 .3	3	2	3	-	2	-	-	-	-	-	-	-	3	3	3	1
IT17201.4	2	2	3	-	3	-	-	-	-	-	-	-	3	3	3	1
IT17201 .5	2	2 3 - 3										-	3	3	3	1
	2.4	2	3	-	2.5	-	-	-	-	-	-	-	3	3	3	1

IT17202DIGITAL PRINCIPLES ANDSYSTEMDESIGNL T PC3003

OBJECTIVE:

□ Learn how to design digital circuits, by simplifying the Boolean functions. Also, gives an idea about designs using PLDs, and writing codes for designing larger digital systems.

UNIT I BOOLEAN ALGEBRA ANDLOGIC GATES

Review of Number Systems – Arithmetic Operations – Binary Codes – Boolean Algebra and Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods – Logic Gates – NAND and NOR Implementations.

UNIT II COMBINATIONAL LOGIC 9

Combinational Circuits – Analysis and Design Procedures – Circuits for Arithmetic Operations, Code Conversion – Decoders and Encoders – Multiplexers and DE multiplexers – Introduction to HDL – HDL Models of Combinational circuits.

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UNIT III SYNCHRONOUS SEQUENTIALLOGIC

Sequential Circuits – Latches and Flip Flops – Analysis and Design Procedures – State Reduction and State Assignment – Shift Registers – Counters -HDL for Sequential Logic Circuits.

UNIT IV ASYNCHRONOUSSEQUENTIALLOGIC

Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race-free State Assignment – Hazards.

UNIT V MEMORY ANDPROGRAMMABLELOGIC 9

RAM and ROM – Memory Decoding – Error Detection and Correction – Programmable Logic Array– Programmable Array Logic -Sequential Programmable Devices – Application Specific Integrated Circuits.

TOTAL: 45 PERIODS

OUTCOMES

On completion of this course student will be able to:

- 1. Perform arithmetic operations in any number system.
- 2. Simplify the Boolean expression using K-map and Tabulation methods.
- 3. Use Boolean simplification techniques to design a combinational hardware circuit.
- 4. Design and analyze a given digital circuit combinational and sequential.
- 5. Design digital systems using PLD.

TEXT BOOK:

1. Morris Mano M. and Michael D. Ciletti, —Digital Designl, IV Edition, Pearson Education, 2008.

REFERENCES:

- 1. John F. Wakerly, —Digital Design Principles and Practices^{II}, Fourth Edition, Pearson Education,2007.
- 2. CharlesH.RothJr,—FundamentalsofLogicDesignl,FifthEdition–JaicoPublishingHouse, Mumbai, 2003.
- 3. DonaldD.Givone,—DigitalPrinciplesandDesignl,TataMcgrawHill,2003.
- 4. Kharate G. K., —Digital Electronics, Oxford University Press, 2010.

S	Subject Code/Subject Name:IT17202 /Digital Principles and System Design															
				Pro	gram	Outc	omes						Program Specific Outcome			
Course Outcomes	PO1	'01 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 I										PO12	PSO1	PSO2	PSO3	PSO4
IT17202 .1	3	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-
IT17202 .2	3	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-
IT17202 .3	3	2	-	-	-	-	-	-	-	-	1	-	-	-	1	-
IT17202 .4	3	2	-	-	-	-	-	-	-	-	1	-	-	-	1	-
IT17202 .5	3	3 2										-	-	-	3	-
	3	2										-	-	-	1.4	-

GE17261 ENGINEERINGPRACTICESLABORATORY L T PC

0 0 4 2

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OBJECTIVE:

□ To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and ElectronicsEngineering.

GROUP A (CIVIL & MECHANICAL)

I CIVILENGINEERING PRACTICE

Buildings:

(a) Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

Plumbing Works:

- (a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
- (b) Study of pipe connections requirements for pumps and turbines.
- (c) Preparation of plumbing line sketches for water supply and sewage works.
- (d) Hands-on-exercise:

Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.

(e) Demonstration of plumbing requirements of high-rise buildings.

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Carpentry using Power Tools only:

- (a) Study of the joints in roofs, doors, windows and furniture.
- (b) Hands-on-exercise:

Wood work, joints by sawing, planning and cutting.

II MECHANICALENGINEERINGPRACTICE

Welding:

- (a) Preparation of arc welding of butt joints, lap joints and tee joints.
- (b) Gas welding practice

Basic Machining:

- (a) Simple Turning and Tap returning
- (b) Drilling Practice

Sheet Metal Work:

- (a) Forming &Bending:
- (b) Model making Trays, funnels, etc.
- (c) Different type of joints.

Machine assembly practice:

- (a) Study of centrifugal pump
- (b) Study of air conditioner

Demonstration on:

- (a) Smithy operations, upsetting, swaging, setting down and bending. Example 18Exercise Production of hexagonal headed bolt.
- (b) Foundry operations like mound preparation for gear and step cone pulley.
- (c) Fitting Exercises Preparation of square fitting and vee fitting models.

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GROUP B (ELECTRICAL & ELECTRONICS)

III ELECTRICALENGINEERINGPRACTICE

- 1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
- 2. Fluorescent lamp wiring.
- 3. Stair case wiring
- 4. Measurement of electrical quantities voltage, current, power & power factor in RLCcircuit.
- 5. Measurement of resistance to earth of an electrical equipment.

IV ELECTRONICSENGINEERINGPRACTICE

- 1. Study of Electronic components and equipment's Resistor, color coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CR.
- 2. Study of logic gates AND, OR, EOR and NOT.
- 3. Generation of ClockSignal.
- 4. Soldering practice Components Devices and Circuits Using generalpurposePCB.
- 5. Measurement of ripple factor of HWR and FWR.

TOTAL: 60 PERIODS

OUTCOMES:

- 1. Ability to fabricate carpentry components
- 2. Ability to fit pipe connections including plumbing works.
- 3. Ability to use welding equipment's to join the structures.
- 4. Ability to fabricate electrical circuits.
- 5. Ability to fabricate electronics circuits.

REFERENCES:

1. Jeyachandran K., Natarajan S. &Balasubramanian S., —A Primer on EngineeringPractices Laboratoryl, Anuradha Publications,2007.

- 2. Jeyapoovan T., Saravanapandian M. &Pranitha S., —Engineering Practices Lab Manuall, VikasPublishing House Pvt.Ltd, 2006.
- 3. BawaH.S.,-WorkshopPracticel,TataMcGraw–HillPublishingCompanyLimited, 2007.
- 4. RajendraPrasadA.&SarmaP.M.M.S.,—WorkshopPracticel,SreeSaiPublication,2002.

5	Subje	ect C	ode/S	ubje	ct Na	me:(GE17	261/I	Engin	eering	g Prac	tices L	aborat	ory		
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	01 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10											PSO1	PSO2	PSO3	PSO4
GE17261 .1	2	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-
GE17261 .2	2	2	2	1	2	-	-	-	-	-	-	-	-	-	-	-
GE17261 .3	2	2	3	3	3	-	-	-	-	-	-	-	3	-	-	-
GE17261 .4	2	3	-	2	2	-	-	-	-	-	-	-	-	-	-	-
GE17261 .5	2											-	-	-	-	-
	2	2	2.33	2	2.4	-	-	-	-	-	-	3	-	-	-	

CS17211	DATASTRUCTURESLABORATORY	L T PC
		0 0 4 2

OBJECTIVES:

The student should be made to:

- To learn and implement the various linear and non lineardata structures.
- To understand the tree and graph traversal methods.
- To apply searching and sorting techniques for practical scenarios.

LIST OF EXPERIMENTS

- 1. Basics of classes and objects
- 2. Stack implementation and its applications
- 3. Queue implementation
- 4. Linked List Operations
- 5. Binary Search Tree

- 6. Tree Traversals
- 7. Graph Traversals
- 8. Sorting Techniques
- 9. Searching Techniques
- 10. Mini Project on Application of Data Structures

(Printing Tasks, Hot Potato Game, Palindrome Checker, Push Down Automata)

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Design and implement stacks, queues and linked lists.
- 2. Work with various data structures and map its applications to appropriate scenarios.
- 3. Apply good programming design methods for program development.
- 4. Design and implement trees and graph concepts.
- 5. Idealize new sorting and searching algorithms.

PLATFORM NEEDED: Python 3 interpreter for Windows/Linux

	Subject Code/Subject Name:CS17211 /Data Structures Laboratory															
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO11	PO12	PSO1	PSO2	PSO3	PSO4			
CS17211 .1	2	2	3	-	-	-	-	-	-	-	-	-	3	3	2	1
CS17211 .2	2	2	3	-	2	-	-	-	-	-	-	-	3	3	2	1
CS17211 .3	2	2	3	-	2	-	-	-	-	-	-	-	3	3	2	1
CS17211 .4	2	2	3	-	2	-	-	-	-	-	-	-	3	3	3	1
CS17211 .5	2	2 2 3 - 3									-	-	3	3	3	1
	2	2	3	-	2.25	-	-	-	-	-	-	3	3	2.4	1	

IT17211

DIGITALLABORATORY

L TPC

0 0 42

OBJECTIVES:

The student should be made to:

- Understand the various log ic gates.
- Be familiar with various combinational circuits.
- Understand the various components used in the design of digital computers.
- Be exposed to sequential circuits
- Learn to use HDL

LIST OF EXPERIMENTS:

- 1. Verification of Boolean Theorems Using Basic Gates.
- 2. Design and Implementation of Combinational Circuits Using Basic Gates for Arbitrary Functions, Code Converters.
- 3. Design And Implementation Of Combinational Circuits Using MS Devices:
 - 4 Bit Binary Adder /Sub tractor
 - Parity Generator /Checker
 - Magnitude Comparator
 - Application Using Multiplexers
- 4. Design And Implementation Of Sequential Circuits:
 - Shift –Registers
 - Synchronous And Asynchronous Counter
- 5. Coding Combinational / Sequential Circuits Using HDL
- 6. Design and Implementation of a Simple Digital System (Mini Project).

TOTAL: 45 PERIODS

OUTCOMES:

- 1. Students will be able to use Boolean simplification techniques to design a combinational hardware circuit.
- 2. Ability to Design and Implement combinational and sequential circuits.
- 3. Students will be able to analyze a given digital circuit combinational and sequential.
- 4. Ability to design the different functional units in a digital computers ystem
- 5. Students will be able to design and Implement a simple digital system.

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS HARDWARE:

- 1. Digital trainer kits 30
- 2. Digital ICs required for the experiments in sufficient numbers

SOFTWARE:

1. HDL simulator.

			Sub	ject (Code	/Subj	ject N	lame	: IT1	7211 /	Digita	l Lab				
				Pro	gram	Outc	omes						Program Specific Outcon			
Course Outcomes	PO1	D1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10										PO12	PSO1	PSO2	PSO3	PSO4
IT17211 .1	3	3	-	-	-	-	-	-	-	-	1	-	-	-	1	-
IT17211 .2	3	3	-	-	-	-	-	-	-	-	1	-	-	-	1	-
IT17211 .3	3	3	-	-	-	-	-	-	-	-	1	-	-	-	1	-
IT17211 .4	3	3	-	-	-	-	-	-	-	-	1	-	-	-	3	-
IT17211 .5	3	3	-	-	-	-	-	-	-	-	1	-	-	-	1	-
	3	3	-	-	-	-	-	-	1	-	-	-	1.4	-		

SEMESTER III

MA17354	DISCRETEMATHEMATICS	L T PC
		3 20 4

OBJECTIVES:

- To extend student's Logical and Mathematical maturity and ability to deal withabstraction.
- To introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

UNITI MATHEMATICALLOGIC 15

Propositional Logic – Propositional equivalences – Rules of inference – normal forms.

UNITII PREDICATECALCULUS 15

Predicates and quantifiers-Nested Quantifiers-Rules of inference-introduction to Proofs-Proof Methods and strategy.

UNITIII COMBINATORICS 15

Mathematical inductions-Strong induction -The basics of counting-The pigeonhole principle – Permutations and combinations-Recurrence relations-Solving Linear recurrence relations-generating functions-inclusion and exclusion principle and applications.

UNITIV GRAPHS 15

Graphs -Graph terminology and special types of graphs-Representation of graphs - graph isomorphism -connectivity-Euler and Hamiltonpaths.

UNITV GROUPS AND BOOLEAN ALGEBRA 15

Algebraic systems-Groups-Subgroups and homomorphism's- Cossets and Lagrange's theorem- Possets- Lattices-Boolean Algebra.

TOTAL : 75 PERIODS

OUTCOMES:

On completion of the course students will be able to

- 1. Apply the concepts of logic to test the validity of a program.
- 2. Arrive at inferences on logical structures.
- 3. Use the counting principles in implementing variouspro grammes.
- 4. Handle a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
- 5. Apply the concepts and properties of algebraic structures such as groups.

TEXT BOOKS:

- 1. KennethH.Rosen,—DiscreteMathematicsanditsApplicationsI,SpecialIndianedition,Tat a McGraw-Hill Pub. Co. Ltd., New Delhi, (2007).
- 2. Veerarajan. T,—Discrete Mathematics: with graph theory and combinatoryl, McGrawHillEducation (India) Pvt.Ltd.2007.

3. Bernard Kolman, Robert C. Busby and Sharon Ross., Discrete Mathematical Structures.,3rdedition, Prentice Hall, Upper Saddle River, New Jersey1996.

REFERENCES:

- 1. Trembly J.P and Manohar R, —Discrete Mathematical Structures with Applications to ComputerSciencel, TataMcGraw–HillPub.Co.Ltd, NewDelhi, 30thRe-print(2007).
- 2. Ralph. P. Grimaldi, —Discrete and Combinatorial Mathematics: An Applied Introduction^{II}, Fourth Edition, Pearson Education Asia, Delhi,(2002).
- 3. ThomasKoshy, DiscreteMathematicswithApplications, ElsevierPublications, (2006).
- 4. Seymour Lipschutz and Mark Lipson, "Discrete Mathematics", Schaum's Outlines, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, Second edition, (2007).

		Subj	ject C	Code/	Subj	ect N	ame:	MA1	7354	/Discr	ete M	athem	atics			
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
MA17354.1	2	1	-	1	1	2	-	-	1	2	1	1	2	2	1	-
MA17354.2	2	2	-	2	1	1	-	-	1	1	1	1	2	1	1	-
MA17354.3	2	-	-	1	-	-	-	-	-	-	1	-	-	1	-	-
MA17354.4	2	2	-	1	1	-	-	-	-	1	-	1	-	2	-	-
MA17354.5	1	1	-	1	-	-	-	-	-	-	-	-	-	-	1	-
	1.8	1.5	-	1.2	1	1.5	-	-	1	1.33	1	1	2	1.5	1	-

CS17302 OBJECTORIENTEDPROGRAMMING L T PC 3003

OBJECTIVES:

The student should be made to:

- Be familiar in Object Oriented Programming Concepts of C++
- Understanding the purpose of Inheritance and ExceptionHandling
- Understand and exercise the Class and Objects inJAVA
- Acquire the knowledge of Exception handling and GenericProgramming
- Establish the connection between Database and Java usingJDBC

UNITIOBJECT ORIENTEDPROGRAMMINGFUNDAMENTALS 9

7

9

Object-Oriented Approach – C++ Programming Basics- Objects - Classes- Inheritance – Reusability - Polymorphisms and overloading- Constructors – Destructor - Functions – Passing Arguments to Functions - Returning values - Reference arguments - overloaded function – Recursion - Inline functions - Default arguments.

UNITII OBJECT ORIENTEDPROGRAMMINGCONCEPTS

Operator overloading - Overloading binary operators - Inheritance - Virtual Functions - Friend functions - Static functions - Function Templates - Class Templates - Exceptions - Introduction to Files and Operation on File.

UNITIII INTRODUCTIONTOJAVA

Introduction to Classes, Objects – Instance variable - Static Members and Methods – Access modifiers - Garbage collection – Arrays – Passing Arrays to methods – Pass-By-Value – Pass-By- Reference - Variable-Length Argument lists - Command Line Arguments Inheritance – Polymorphism Abstract classes – Final methods and classes-Interface.

UNITIV EXCEPTIONS ANDCOLLECTIONS 9

Exception Handling – Exception hierarchy-Chained Exceptions - Files – Sequential-Access Text Files - String- Class String and String Builder - Generic Collections – Type – Wrapper Classes – Autob oxing and Auto-Unboxing- Lists - Collection methods – Sets – Maps -Synchronized Collections.

UNITV MULTITHREADINGANDJDBC 11

Generic Classes and Methods – Implementation and Compile-Time Translation -Overloading Generic Methods - Generic Classes – Raw types- Wildcards in Methods -Concurrency – Thread States and Life Cycle- Thread Synchronization- GUI Components – Using menus with Frames- Layout management- Accessing Databases with JDBC – Manipulating Database with JDBC.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the students should be able to:

- 1. Design problem solutions using Object Oriented Techniques.
- 2. Apply the concepts of Encapsulation, Polymorphism and Inheritance.
- 3. Apply the concepts of Interface and Abstract Classes.
- 4. Design problem solutions using Generic Collections and Exception Handling.
- 5. Create a Database Connectivity using the JDBC.

TEXTBOOKS:

- 1. Robert Lafore —Object Oriented Programming in C++|| 4th Edition SAMSPublishing,2002
- 2. PaulDietel, HarveyDietel-Java How-toProgram(EarlyObjects)| 10thEdition 2014

REFERENCES:

- 1. K.R.Venugopal,B.RajkumarandT.Ravishankar–MasteringC++l2ndEditionTataMcGraw Hill2013.
- 2. BjarneStroustrup, -The C++ Programming Languagel, 4th Edition, Addison-Wesley Professional,2013
- 3. Bhushan Trivedi—Programming with $ANSIC + \|2^{nd}Edition Oxford University Press 2013$
- 4. HerbertSchildt–JavaThe complete Referencel 10thEdition Oracle Press2017

	Sub	ject (Code	/Subj	ject N	lame	:CS1	7302/	′ Obj	ect Or	iented	Prog	rammii	ng		
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17302.1	2	2	3	2	3	-	-	-	-	-	-	-	3	1	2	1
CS17302.2	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	1
CS17302.3	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	2
CS17302.4	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	2
CS17302.5	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	2
	2	2	3	2	3	-	-	-	-	-	-	-	3	1	2	1.6

CS17304 DATABASEMANAGEMENTSYSTEMS LTPC

3 003

OBJECTIVES:

The student should be made to:

- Understand the role of a database management system, relational data model and successfully apply logical database design principles, including E-R diagramsdatabase.
- Construct simple and moderately advanced database queries using Structured Query Language (SQL).
- Know the importance of functional dependency and normalization, and what role it plays in the database designprocess.

- Understand the concept of a database transaction including concurrency control, backup and recovery, and data object locking and handlingdeadlocks.
- Describe and discuss selected advanced database topics, such as distributed database systems and some frequently used databases along with their.

UNITI INTRODUCTION TODATABASESYSTEMS 10

Introduction – Purpose of Database Systems - View of Data –Database Architecture -Relational Databases – Database Schema – Keys – Codd's Rule – Relational Algebra – Data Models – Entity Relationship Model – Constraints – Entity Relationship Diagram Design Issues of ER Model – Extended ER Features – Relational Query Languages – Relational Algebra – Basic Operations with Examples and Exercises.

UNITII SQL ANDQUERYPROCESSING 10

SQL: Data Definition – Basic domain types – Basic structure of SQL Queries Modifications of the database – Set Operations – Aggregate Functions – Null Values – Nested Sub queries – Complex Queries – Views – Joined relations – Complex Queries – PL/SQL: Functions, Procedures, Triggers, Cursors -Embedded SQL – Query Processing – Heuristics for Query Optimization.

UNITIII DEPENDENCIES AND NORMALFORMS 8

Motivation for Normal Forms – Functional dependencies – Armstrong's Axioms for Functional Dependencies – Closure for a set of Functional Dependencies – Definitions of 1NF-2NF-3NF and BCNF – Multivalued Dependency 4NF - Joint Dependency- 5NF.

UNITIV TRANSACTIONS

Transaction Concept – State – ACID Properties – Concurrency control - Serializability – Recoverability – Locking based protocols – Timestamp Based Protocol - Deadlock handling.

UNITV ADVANCEDDATABASES 10

Data Classification-Threats and risks – Database access Control – Types of Privileges -Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Mobile Transaction Models: HiCoMo, Moflex, Kangaroo - Mobile Database Recovery -- Introduction to NoSQL – Aggregate Data Models – Schemaless Database.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

7

- 1. Use the Relational model, ERdiagrams.
- 2. Make modification to aDatabase.
- 3. Apply concurrency control and recovery mechanisms for practical problems.
- 4. Design the Query Processor and TransactionProcessor.
- 5. Apply security concepts todatabases

TEXT BOOKS:

- 1. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, —Database System Concepts^{II}, Sixth Edition, Tata McGraw Hill,2011.
- 2. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.
- 3. Vijay Kumar Mobile Database Systems, John Wiley & Sons,2006.

REFERENCES:

- 1. RamezElmasri and Shamkant B. Navathe, —Fundamentals of Database Systems^{II}, Fifth Edition, Pearson Education,2008.
- 2. C.J.Date, A.Kannan and S.Swamynathan, —An Introduction to Database Systems^{II}, Eighth Edition, Pearson Education,2006.
- 3. AtulKahate, —Introduction to Database Management Systems^{II}, Pearson Education, New Delhi,2006.

	Sub	ject (Code/	Subj	ect N	ame:	CS17	7304	/Data	base I	Manag	gemen	t Syster	ns		
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17304.1	2	2	3	2	3	-	-	-	-	-	-	-	3	1	2	1
CS17304.2	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	1
CS17304.3	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	2
CS17304.4	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	2
CS17304.5	-	-	-	-	-	-	-	-	-	-	-	-	3	1	2	2
	2	2	3	2	3	-	-	-	-	-	-	-	3	1	2	1.6

IT17301

COMPUTERORGANIZATION

L T PC 3 00 3

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OBJECTIVES

- To make students understand the basic structure and operation of digital computer and to understand the hardware-softwareinterface.
- To familiarize the students with functioning of arithmetic Logical Unit, ControlUnit.
- To expose the students to the concept ofpipelining.
- To familiarize the students with hierarchical memory system including cache memories and virtual memory.
- To expose the students with different ways of communicating with I/O devices and standard I/Ointerfaces.

UNIT I BASIC STRUCTUREOFCOMPUTERS

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface – Instruction set architectureAddressing modes – RISC – CISC. ALU design – Fixed point and floating point operations. (Text Book-1: Chapters 1, 2 and 6)

UNIT II BASICPROCESSINGUNIT 9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Nano programming.(Text Book-1: Chapter 7)

UNIT III PIPELINING

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling - Case study.(Text Book-1: Chapter 8 and Case study on Processor families)

UNIT IV MEMORYSYSTEM

Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache performance – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.(Text Book-1: Chapter 5)

UNIT VI ORGANIZATION

Accessing I/O devices – Programmed Input/Output -Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB), I/O devices and processors.(Text Book-1: Chapter 4)

TOTAL : 45 PERIODS

9

OUTCOMES

Upon successful completion of this course, Students shall be able to

- 1. Comprehend the basic structure and operation of digital computersystem.
- 2. Design arithmetic and logicunit.
- 3. Design and analyze pipelined controlunits.
- 4. Evaluate performance of memorysystems.
- 5. Understand the IO devicesorganization.

TEXT BOOK:

1. CarlHamacher,ZvonkoVranesicandSafwatZaky,—ComputerOrganizationI,FifthEditio n, Tata McGraw Hill,2002.

REFERENCES:

- 1. DavidA.PattersonandJohnL.Hennessy,—ComputerOrganizationandDesign:The Hardware / Software interfacel, Third Edition, Elsevier,2005.
- 2. WilliamStallings, -ComputerOrganization and Architecture– Designingfor Performancel, Sixth Edition, PearsonEducation
- 3. JohnP.Hayes,—ComputerArchitectureandOrganizationI,ThirdEdition,TataMcGrawHil 1, 1998.
- 4. V.P.Heuring,H.F.Jordan,—ComputerSystemsDesignandArchitecturell,Second Edition, Pearson Education,2004.

	i	Subj	ect C	ode/S	Subje	ct Na	me:I	T173	801 /0	Compu	iter O	rganiz	ation			
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17301.1	2	2	2	1	-	-	-	-	-	-	-	-	2	1	-	1
IT17301.2	1	3	3	3	-	-	-	-	-	-	1	-	2	2	1	-
IT17301.3	1	3	3	3	-	-	-	-	-	-	2	-	2	-	1	-
IT17301.4	1	2	3	2	-	-	-	-	-	-	1	-	2	2	-	1
IT17301.5	1	2	2	2	-	-	-	-	-	-	1	-	2	-	1	-
	1.2	2.4	2.6	2.2	-	-	-	-	-	-	1.25	-	2	1.66	1	1

EC17351 MICROPROCESSORSANDMICROCONTROLLERS LT PC

OBJECTIVES:

- Infer the programming concept by illustrating and elucidating the basic functionalities of 8085
- Infer the programming concept by illustrating and elucidating the basic functionalities of 8086
- Peruse the knowledge of peripherals and interface various devices with the processor.
- Infer the programming concept by illustrating and elucidating the basic functionalities of 8051
- Peruse the knowledge of microcontroller to interface various devices withit.

UNITI THE8085MICROPROCESSOR 9

8085 Architecture - Pin configuration - Instruction Set - Addressing modes – Interrupts - Timing diagram – Assembly Language Programming.

UNITII THE8086MICROPROCESSOR 9

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming –8086 signals – Maximum mode and minimum mode- Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations.

UNITIII PERIPHERALS & INTERFACING 9

Parallel communication interface (8255) – Serial communication interface (8251) – D/A and A/D Interface – Programmable Timer controller (8254) – Keyboard /display controller (8279) – Programmable Interrupt controller (8259) – DMA controller (8237).

UNITIV MICROCONTROLLER

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports- Timers – Interrupts – Serial communication - Instruction set - Addressing modes - Assembly language programming.

UNITV INTERFACINGMICROCONTROLLER 9

Interfacing – LCD & Keyboard Interfacing – RTC and EEPROM interface using I2C protocol- Stepper Motor, Traffic Light Controller

TOTAL: 45 PERIODS

OUTCOMES:

9

- 1. Design and implement the programs of 8085
- 2. Design and implement the programs of 8086
- 3. Assess various interfacing devices interfaced with the processor to adapt anapplication.
- 4. Design and implement the programs of 8051
- 5. Assess various interfacing devices interfaced with the controller to adapt anapplication.

TEXT BOOKS:

- 1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming and Applications with 8085". Sixth edition, Penram International Publishing,2012.
- 2. A.K. Ray, K.M. Bhurchandi, —Advanced Microprocessor and Peripherals, Second edition, Tata McGraw-Hill,2010.
- 3. Barry B. Brey, The Intel Microprocessors Architecture, Programming and Interfacing, Pearson
- 4. Muhammad Ali Mazidi, Janice GillispieMazidi and Rolin D. McKinley, "The 8051 Microcontroller and Embedded Systems", Second Edition, Pearson Education 2008. Fifth impression 2011.

REFERENCES:

- 1. Douglas V. Hall, "Microprocessor and Interfacing, Programming and Hardware". Revised second Edition 2006, eleventh reprint 2010.Tata McGrawHill.
- 2. Kenneth J. Ayala., The 8051 Microcontroller, 3rd Edition, Thompson DelmarLearning,
- 3. Krishna Kant, Microprocessor and Microcontroller Architecture, programming and system design using 8085, 8086, 8051 and 8096, PHI, 2007, Seventh Reprint, 2011.
- 4. Barry B. Brey, The Intel Microprocessors Architecture, Programming and Interfacing, Pearson Education, 2007. Second impression2010.

Subject Code/Subject Name:EC17351 /Microprocessors and Microcontrollers

				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
EC17351.1	3	2	3	3	3	3	-	2	1	3	3	3	2	2	3	2
EC17351.2	1	2	3	3	3	3	-	2	1	3	3	3	2	2	3	2
EC17351.3	1	2	3	3	3	3	-	2	1	2	3	2	2	2	3	2
EC17351.4	3	2	3	3	3	3	-	2	1	3	3	2	3	2	3	2
EC17351.5	1	2	3	3	3	3	-	1	3	1	3	3	3	2	3	2
	1.8	2	3	3	3	3	-	1.8	1.4	2.4	3	2.6	2.4	2	3	2

CS17311 OBJECT ORIENTEDPROGRAMMINGLABORATORY L T PC

0 04 2

OBJECTIVES:

The student should be made to:

- Be familiarized with good programming designmethods.
- Getting exposure in implementing the concepts of C++ and JAVA.
- Understand and exercise the GenericProgramming

LIST OF EXPERIMENTS:

C++

- 1. Develop a program to perform arithmetic operations using class and objects.
- 2. Design a program to count the no of objects created and destroyed using constructor and destructor.
- 3. Design different classes to apply types of inheritance using Father and Child relationship.
- 4. Design a class to find the area of a square, triangle and rectangle using functionoverloading.
- 5. Implement the Class Templates and Function Templates using stack and queue.
- 6. Develop a program to handle the runtime exception using Exception HandlingMechanism.

JAVA

- 1. Develop Rational number class in Java. Use JavaDoc comments, Your implementation should use efficient representation for a rational number, i.e. (500 / 1000) should be represented as($\frac{1}{2}$).
- 2. Develop Date class in Java similar to the one available in java.utilpackage.
- 3. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both theimplementations.
- 4. Design a Vehicle class hierarchy in Java. Write a test program to demonstratepolymorphism.
- 5. Design classes for Currency, Rupee, and Dollar. Write a program that randomly generates Rupee and Dollar objects and write them into a file using object serialization. Write another program to read that file, convert to Rupee if it reads a Dollar, otherwise read asRupee.
- 6. Develop a program to find the largest of a list using command linearguments.
- 7. Design a scientific calculator using event-driven programming paradigm ofJava.
- 8. Develop a simple student database management system using even-driven and concurrent programming paradigms of Java. Use JDBC to connect to a back-enddatabase.
- 9. Develop multi-threaded echo server and a corresponding GUI client inJava.
- 10. Develop any one Mini-Project in the given topics using JDBC and GUIComponents.
 - a) Library SystemManagement
 - b) Airline ReservationSystem.
 - c) BankingApplication
 - d) Doctor-Patient System

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Gain the basic knowledge on Object Orientedconcepts.
- 2. Apply good programming design methods for programdevelopment.
- 3. Ability to develop applications using Object Oriented ProgrammingConcepts.
- 4. Ability to implement features of object oriented programming to solve real

worldproblems.

5. Ability to write, debug and document well-structured Javaapplication.

PLATFORM NEEDED: Standalone desktops with C++ complier and Java for Windows / Linux

Subj	ect C	code/S	Subje	ectNa	me:(CS173	311 /	Objec	et Or	iented	Progr	ammi	ng Lab	orator	у	
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17311.1	2	3	3	2	3	-	-	-	-	-	-	-	3	1	2	1
CS17311.2	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	1
CS17311.3	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	2
CS17311.4	-	2	3	2	3	-	-	-	-	-	2	-	3	1	2	2
CS17311.5	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	2
	2	2.2	3	2	3	-	-	-	-	-	2	-	3	1	2	1.6

CS17312 DATABASEMANAGEMENTSYSTEMSLABORATORY L T PC

0 04 2

OBJECTIVES:

The student should be made to:

- Learn to create and use adatabase
- Get familiarized with Sequential QueryLanguage.
- Write codes on Procedures, Functions, Cursors and Triggers.
- Be exposed to advanceddatabases.
- Gain knowledge on AdvancedDatabases.

Section - 1 SQL :

- 1. Creation of tables and simplequeries
- 2. Implementation of Key Constraints (DDL: CREATE, ALTER, DROP)
- 3. Manipulating the database (DML: INSERT, UPDATE, DELETE, TRUNCATE)
- 4. Implementation of Arithmetic / logical Operations, Sorting andGrouping.
- 5. NestedQueries
- 6. Manage transactions in a database (TCL: COMMIT, ROLLBACK, SAVEPOINT)

- 7. Control Privileges in a database (DCL: GRANT, REVOKE)
- 8. Joins
- 9. Built-infunctions
- 10. UpdateOperations
- 11. Indexes, Sequences, Synonyms and Views.

Section - 2 PL/SQL:

- 1. Simple PL/SQLProcedure
- 2. PL/SQLFunctions
- 3. PL/SQLCursors
- 4. PL/SQLTriggers
- 5. ExceptionHandling

Section – 3

Advanced Databases:

1. NoSQL (Basic Operations)

Section – 4 Mini Project:

1. Mini Project on any application from the databases discussed along with a report.

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Design and implement a database schema for a given problem-domain
- 2. Populate and query a database
- 3. Create and maintain tables using PL/SQL.
- 4. Apply the skills learnt by implementing them in a project.
- 5. Prepare reports.

TEXT BOOKS:

1. —SQL Fundamentals I Exam Guidell, John Watson – Poopesh Rambles, McGraw-Hill, 2008.

SOFTWARE:

Front end: VB/VC ++ or Equivalent

Subje	ect Co	ode/S	ubjeo	ct Na	me:C	CS173	812/ I	Datał	oase I	Manag	gement	t Syste	ms La	borator	y	
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17312 .1	2	3	3	2	3	-	-	-	-	-	-	-	3	1	2	1
CS17312 .2	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	1
CS17312 .3	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	2
CS17312 .4	-	2	3	2	3	-	-	-	-	-	-	-	3	1	2	2
CS17312 .5	-	2	3	2	3	-	-	-	-	-	2	-	3	1	2	2
	2	2.2	3	2	3	-	-	-	-	-	2	-	3	1	2	1.6

EC17361MICROPROCESSORS AND MICROCONTROLLERSL T P CLABORATORY0 04 2

OBJECTIVES:

- Introduce ALP concepts and features
- Write ALP for arithmetic and logical operations in 8086 and 8051
- Differentiate Serial and Parallel Interface
- Interface different I/Os with Microprocessors
- Be familiar with MASM

List of Experiments

Cycle 1:Microprocessor – 8085/8086

- 1. Arithmetic and logical operations
 - a. Addition, Subtraction, Multiplication using 8085
 - b. Division, square and cube using 8086
 - c. Logical AND, OR using 8085
 - d. Logical XOR, 1's and 2's complement using 8086
- 2. Code conversion and Matrix operations

TOTAL:60 PERIODS

- a. BCD to HEX, Hex to BCD using8085
- b. Matrix Addition, Subtraction and Multiplication using 8086
- 3. Searching and Sorting operations
 - a. Largest and Smallest number in an array using 8085
 - b. Ascending and Descending order using8086
- 4. String manipulation operations using 8086
 - a. Search find and replace
 - b. Compare two strings

Cycle 2: Microcontroller – 8051

- 1. Basic arithmetic operations
 - a. Addition, Subtraction, Multiplication, Division
- 2. Logical operations
 - a. AND, OR, XOR, 1's complement, 2's complement
- 3. Unpacked BCD to ASCII conversion

Cycle 3: Interfacing

- 1. Serial interfacing using 8085
- 2. Timer interfacing using 8085
- 3. Parallel interfacing using 8086
- 4. Keyboard and Display interfacing using 8086
- 5. ADC and DAC interfacing using 8086
- 6. Stepper motor interfacing using 8051
- 7. Traffic light control using8051

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Write ALP Programmes for fixed and Floating Point and Arithmetic
- 2. Interface different I/Os withprocessor
- 3. Generate waveforms using Microprocessors
- 4. Execute Programs in8051
- 5. Explain the difference between simulator and Emulator

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS: HARDWARE:

8086 development kits - 30 nos Interfacing Units- 10 nos(each) Microcontroller - 30nos

SOFTWARE:

Subject Code/SubjectName:EC17361/Microprocessors and Microcontrollers Laboratory **Program Outcomes** Program Specific Outcomes PO3 PO4 PO5 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3 PSO4 Course Outcomes PO1 PO2 PO6 PO7 PO8 2 3 EC17361 .1 2 2 2 _ _ _ 1 3 3 3 _ _ EC17361 .2 2 3 3 3 ---_ -_ _ _ 1 3 3 EC17361 .3 3 3 3 3 1 2 _ ---------EC17361_4 2 2 2 2 1 3 3 3 3 _ _ _ _ _ _ _ EC17361 .5 3 3 2 _ 3 ---1 3 3 3 _ _ _ _ 1.8 2 2.5 2.33 1 3 3 3 3 -------

Intel Desktop SystemswithMASM - 30 nos8086Assembler8051Cross Assembler

HS17361 INTERPERSONAL AND SKILLS-LISTENINGSPEAKING L T P C (Common to CSE, ECE, IT, MECH,BT,AUTO, 0 02 1 CIVIL, MCT& BME)

OBJECTIVES:

The student should be able to:

- Upgrade the the students' listening and speaking skills for educational purposes.
- Enhance the employability skills of the students with a special focus on listening and speaking skills.

UNITI INTRODUCTION

Importance of listening and Types of Listening – listening to TED Talks, lectures, etc. Speaking: group discussions on general topics like how to grow organic potted plants, to furnish an apartment inexpensively, etc.– Phonetics

UNITII APPRECIATIVE LISTENINGANDIMPROMPTU 6

Listening- Listening to motivational speeches, music and poetry. Speaking-pick and talk, short talks on any event on topics- a trip to remember, a job I'd love to have, etc. - Vocabulary: Collocation.

UNITIII INFORMATIVE LISTENING ANDPERSUASIVESPEAKING 6

6

Listening–Listening- to gather information such as facts, directions, news or instructions. Speaking – Persuasive speaking- convincing the audience with the speaker's view on the topics- food additives and unhealthiest, financial education is important in today's world, etc. – Vocabulary: Idioms and Phrases.

UNIT IVCRITICAL LISTENING AND SPEAKING ONSPECIALOCCASION 6

Listening– Critical Listening- listening to examine and evaluate the message for logic and truth - televised debate, election campaign. Speaking –speech to commemorate a person or an event- speech of Introduction, etc. – Vocabulary: Foreign Words and Phrases.

UNIT V EMPATHETIC LISTENING ANDDEMONSTRATIVESPEAKING6

Listening– Empathetic Listening – paying attention to another person with empathy – listening to problems and issues (videos).Speaking – Demonstrative speaking – Demonstrate a process using visual aids (charts, graphs, maps, pictures, etc.) – Grammar: Different types of Questions.

TOTAL: 30 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Identify the different types of listening and speaking for effective interpersonal communication.
- Discuss and respond to content of a listening passage.
- Comprehend and answer questions based on the texts/passages given.
- Understand different genres of texts and comprehend the materials to improve their vocabulary and are familiar with new words, phrases, sentence structures and ideas.
- Make inferences and predictions about spoken iscourse.

REFERENCES:

- 1. Meenakshi Raman and Sangeetha Sharma, Technical Communication Principles and Practice, Second Edition, Oxford University Press, December, 2011.
- 2. Henry Lee, Interpersonal Skills: How to develop Interpersonal Skills for work and home, KindleEdition
- 3. Erik Palmer, Teaching the Core Skills of Listening and Speaking, KindleEdition

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					Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcor	nes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
HS17361 .1		1	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1
HS17361 .2		1	1	1	1	3	1	1	1	1	3	1	1	1	1	1	1
HS17361 .3		1	2	1	1	1	1	1	1	1	3	1	1	1	1	1	1
HS17361 .4		1	1	1	1	1	3	3	1	3	3	1	1	1	1	1	1
HS17361 .5		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		1	1.2	1	1	1.4	1.4	1.4	1	1.8	2.6	1	1	1	1	1	1

SEMESTER IV

MA 17353	PROBABILITY AND STATISTICS	LTPC
	Common to Chemical, Biotech , BME & IT	3204

OBJECTIVES

• To provide the required skill to apply the statistical tools in Engineeringproblems.

UNITI RANDOMVARIABLES 15

Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions.

UNITII TWO DIMENSIONAL–RANDOMVARIABLES 15

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem

UNITIII TESTINGOFHYPOTHESIS 15

Statistical hypothesis - Large sample test based on Normal distribution for single mean and difference of means -Tests based on t, F and Chi-square - Contingency table (testfor independent) - Goodness of fit.

UNITIV DESIGNOFEXPERIMENTS 15

One way and Two way classifications - Completely randomized design – Randomized block design – Latin square design.

UNITV STATISTICALQUALITYCONTROL 15

Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

TOTAL :75 PERIODS

OUTCOMES

On completion of the course students will be able to

- 1. Characterize standard probability distribution by employing basic techniques and methods of probability mass function and probability density function for discrete and continuous random variables
- 2. Develop skills to solve problems on correlation and regression
- 3. Obtain statistical data from experiments and able to analyze the same using statisticaltest.
- 4. Design experiments using suitable ANOVA techniques and drawconclusions.
- 5. Use control charts to study, analyze and interpret problems in statistical qualitycontrol.

TEXT BOOKS:

- 1. T.Veerarajan,_Probability,StatisticsandRandomProcesseswith Queuing Theoryand Queuing Networks⁴, McGrew Hill,2016.
- 2. Johnson. R.A. and Gupta. C.B., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 7th Edition,2007.

REFERENCES:

- 1. Devore.J.L.,"ProbabilityandStatisticsforEngineeringandtheSciences|,Cengage Learning, New Delhi, 8th Edition,2012.
- 2. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 8th Edition,2007.
- 3. Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 3rd Edition, Elsevier,2004.
- 4. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition,2004.

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				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
MA17353.1	3	-	2	3	2	1	-	-	-	-	2	-	1	1	2	-
MA17353.2	3	3	2	3	2	1	-	-	-	-	2	1	1	1	2	-
MA17353.3	3	3	2	3	2	-	1	-	1	-	2	1	1	2	1	-
MA17353.4	3	-	3	3	3	1	1	-	1	-	3	1	2	1	1	-
MA17353.5	3	-	3	3	3	1	1	-	-	-	3	1	1	2	1	-
	3	3	2.4	3	2.4	1	1	-	1	0	2.4	1	1.2	1.4	1.4	-

CS17401

OPERATINGSYSTEMS

L T P C 3003

OBJECTIVES:

The student should be made to:

- To study the basic concepts and functions of operating systems.
- To learn about Processes, Threads, Scheduling algorithms and Deadlocks.
- To study various Memory Managementschemes.
- To learn I/O Management and FileSystems.
- To learn the basics of Linux, Windows 7 and AndroidOS.

UNITI INTRODUCTION 9

Operating Systems Overview – Computer system architecture – OS Structure and Operations – Virtualization - System Calls – Types of System Calls- System Programs-System Boot Process – BIOS – POST- Bootstrap loader

UNITII PROCESSMANAGEMENT 9

Process -Concepts – Scheduling - Operations – Interprocess Communication Threads -Overview – Multithreading Models and Issues - CPU Scheduling - Process Synchronization -Critical Section Problem – Peterson's solution – Synchronization hardware –Semaphores-Classic Problems of Synchronization – Monitors – Deadlocks - Models - Prevention – Avoidance – Detection - Recovery
UNITIII MEMORY MANAGEMENT

9

9

Main Memory - Swapping – Contiguous Memory Allocation – Paging – Structure of a page table – Segmentation - Virtual Memory - Demand Paging – Copy –on-Write – Page Replacement – Allocation of Frames – Thrashing.

UNITIV I/OMANAGEMENT

File System Interface -Concepts – Access Methods – Directory Structure – Mounting – Protection – Access Control -File System Implementation -Structure – Directory – Allocation Methods – Free- Space Management - Mass Storage Structure -Disk Scheduling – Disk Management – Swap-Space Management .

UNITV CASE STUDY 9

The Linux System – Design Principles – Kernel Modules – Process Management – Scheduling – Memory Management – File Systems – Security - Windows7 - Design Principles –System Components - Android - Architecture and Security Model.

TOTAL: 45 PERIODS

OUTCOMES

At the end of the course, the student should be able to:

- 1. Understand the concepts and structures of OperatingSystems.
- 2. Design various Scheduling algorithms and methods to avoidDeadlock.
- 3. Compare and contrast various memory managementschemes.
- 4. Implement a prototype filesystems.
- 5. Understand the principles and issues of various operating systems.

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, —Operating System Conceptsl, 9thEdition, John Wiley and Sons Inc., 2012.

- 1. NikolayElenkov, —Android Security Internals : An In-Depth Guide to Android's Security Architecture, No StarchPress,2015.
- 2. William Stallings, —Operating Systems Internals and Design Principles^I, 7th Edition, Pearson, 2013.
- 3. Andrew S. Tanenbaum, —Modern Operating Systems^{II}, Second Edition, Addison Wesley, 2001.

- 4. Charles Crowley, —Operating Systems: A Design-Oriented Approachl, Tata McGraw Hill Educationl,1996.
- 5. D M Dhamdhere, —Operating Systems: A Concept-Based Approachl, Second Edition, Tata McGraw-Hill Education, 2007.

		Su	bject	Code	e/Sub	ject]	Namo	e: CS	1740	1 /Ope	erating	g Syste	ems			
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17401.1	3	-	-	-	-	-	-	-	-	-	-	3	2	-	-	
CS17401.2	3	3	3	-	-	-	-	-	-	-	-	3	2	-	-	
CS17401.3	-	3	3	-	-	-	-	-	-	-	-	-	3	2	-	-
CS17401.4	-	2	3	-	-	-	-	-	-	-	-	2	3	2	-	-
CS17401.5	-	-	-	-	3	2	-	-	-	-	3	3	2	-	-	
	3	2.66	3	-	3	2	-	-	-	-	-	2.5	3	2	-	-

CS17402	SOFTWARE ENGINEERING	LTPC
		3 00 3

OBJECTIVES:

The student should be made to:

- Understand the software development process
- Determine requirements to developsoftware
- Apply modeling and modelinglanguages
- Develop correct and robust softwareproducts
- Understand Advanced EngineeringConcepts

UNITI INTRODUCTION

Introduction to Software Engineering-Software Process - Perspective and Specialized Process models– Rational unified process-Agile methods- ExtremeProgramming.

UNITII REQUIREMENTS ENGINEERING 9

Software Requirements - Functional and Non-Functional requirements - User Requirements, System Requirements -Requirement Specification Documentation - Requirements elicitation and analysis- Requirement Discovery- Developing scenario and use case- Requirements Validation and Management

UNITIII DESIGN AND CODING

9

System Modelling – Context – Interaction – Structural –Behavioural - Model Driven models-Architectural patterns - Design patterns – Modelling Data – Data Flow Diagrams-Software Implementation Techniques-Coding Practices-Refactoring.

UNITIVTESTING AND QUALITY MANAGEMENT9

Software Testing – Software testing strategies – Testing Conventional applications – OO Testing - Development testing - Test-driven development - Release testing - User testing - Software maintenance - Software reengineering- Quality management-Software Standards-CMM -ISO 9000 - Six Sigma-Software measurement and metrics.

UNITV ADVANCE SOFTWAR EENGINEERING 9

Software Reuse – Component Based Software Engineering- Distributed Software Engineering - Aspect Oriented Software Engineering

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Understand the concepts of software life cyclemodels
- 2. Identifying and Writing functional and non-functional requirements
- 3. Design and implement softwareproject
- 4. Testing the developed product
- 5. Understanding reusability and distributed software engineering.

TEXT BOOKS:

1. —Software Engineering, IanSommerville, 9thedition, 2010, PearsonEducation.

REFERENCES:

- 1. —SoftwareEngineering–APractitioner'sApproachl,RogerSPressman,seventhedition, 2010.
- 2. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis andDesignandIterativeDevelopment", ThirdEdition, PearsonEducation, 2005.

PRACTICE LAB

Writing Requirement Specification –Writing Use case- Designing Project - Object Orienteddesign with UML: Modeling Concepts and Diagrams - Use Case Diagrams - Class Diagrams -Interaction Diagrams - State chart Diagrams - Activity Diagrams - Package Diagrams -Component Diagrams – Deployment Diagrams - Component, Deployment Level DesignElements. Mapping Design to code – Reverse Engineering-Testing -Implementing Mini Project -Documentation.

SOFTWARE:

- IBM Rational Rose / AGRO UML / STARUML
- Selenium/ (any testing automatedsoftware)

		Sub	ject (Code/	'Subj	ect N	ame:	CS17	7402/	Softw	are E	nginee	ring			
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17402.1	3	-	-	-	-	-	-	-	-	-	-	2	1	-	-	
CS17402.2	3	3 3 3									-	-	3	1	-	-
CS17402.3	-	3	3	-	-	-	-	-	-	-	-	-	2	1	-	-
CS17402.4	-	2	3	-	-	-	-	-	-	-	-	2	2	1	-	-
CS17402.5	-	-	-	-	3	2	-	-	-	-	3	2	1	-	-	
	3	2.66	3	-	3	2	-	-	-	-	-	2.5	2.2	1	-	-

EC17451 ANALOG ANDDIGITAL COMMUNICATION L T PC

3 00 3

OBJECTIVES:

The student should be able to:

- Understand analog communication techniques.
- Acquire knowledge in digital communication echniques.
- Learn data and pulse communication techniques.
- Be familiarized with source and Error control coding.
- Gain knowledge on multi-user radio communication.

UNIT I ANALOGCOMMUNICATION

Noise: Source of Noise - External Noise- Internal Noise- Noise Calculation. Introduction to Communication Systems: Modulation – Types - Need for Modulation. Theory of Amplitude Modulation - Evolution and Description of SSB Techniques - Theory of Frequency and Phase Modulation – Comparison of various Analog Communication System (AM – FM – PM).

UNIT II DIGITALCOMMUNICATION 9

Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK) Minimum Shift Keying (MSK) – Phase Shift Keying (PSK) – BPSK – QPSK – 8 PSK – 16 PSK - Quadrature Amplitude Modulation (QAM) – 8 QAM – 16 QAM – Bandwidth Efficiency– Comparison of various Digital Communication System (ASK – FSK – PSK – QAM).

UNITIII DATA ANDPULSECOMMUNICATION 9

Data Communication: History of Data Communication - Standards Organizations for Data Communication- Data Communication Circuits - Data Communication Codes - Error Detection and Correction Techniques - Data communication Hardware - serial and parallel interfaces. Pulse Communication: Pulse Amplitude Modulation (PAM) – Pulse Time Modulation (PTM) – Pulse Code Modulation (PCM) - Comparison of various Pulse Communication System (PAM – PTM – PCM).

UNITIV SOURCE ANDERRORCONTROLCODING

Entropy, Source encoding theorem, Shannon fano coding, Huffman coding, mutual information, channel capacity, channel coding theorem, Error Control Coding, linear block codes, cyclic codes, convolution codes, viterbi decoding algorithm.

UNIT V MULTI-USERRADIOCOMMUNICATION 9

Advanced Mobile Phone System (AMPS) - Global System for Mobile Communications (GSM) - Overview of Multiple Access techniques-FDMA, TDMA, CDMA – Cellular Concept and Frequency Reuse - Channel Assignment and Handoff. Bluetooth.

TOTAL: 45 PERIODS

9

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Attain knowledge in Analog communication techniques
- 2. Apply digital communication techniques intele-communication.
- 3. Use data and pulse communication techniques.
- 4. Analyze Source and Error control coding.
- 5. Utilize multi-user radio communication.

TEXT BOOK:

1.

WayneTomasi,—AdvancedElectronicCommunicationSystems^{||},6thEdition,Pear sonEducation, 2009.

- 1. SimonHaykin,—CommunicationSystems^{||},4thEdition,JohnWiley&Sons,2004
- 2. Rappaport T.S, "Wireless Communications: Principles and Practice", 2nd Edition, Pearson Education,2007
- 3. H.Taub,DLSchillingandGSaha,—PrinciplesofCommunication#,3rdEdition,Pearson Education,2007.
- 4. B.P.Lathi, -Modern Analog andDigital Communication Systems, 3rd Edition, Oxford University Press, 2007.
- 5. Blake, -Electronic Communication Systemsl, Thomson DelmarPublications,2002.
- 6. MartinS.Roden,—AnalogandDigitalCommunicationSystem^{||},3rdEdition,PrenticeHallof India, 2002.
- 7. B.Sklar,—DigitalCommunication Fundamentals and Applications 2ndEditionPearson Education2007.

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				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
EC174511	3	3	1	2	-	1	-	1	1	1	1	2	2	1	-	
EC17451.2	3 3 1 2 - 1 - 1 - 1										1	1	2	2	1	-
EC17451.3	3	2	1	1	-	1	-	1	-	1	1	1	2	2	1	-
EC17451.4	3	2	2	1	-	1	-	1	-	1	1	1	2	2	1	-
EC17451.5	3	2	2	1	-	1	-	1	1	1	1	2	3	1	-	
	3	2.4	1.4	1.4	-	1	-	1	-	1	1	1	2	2.2	1	-

CS17301 DESIGN AND ANALYSISOFALGORITHMS

L T PC 3 0 0 3

OBJECTIVES:

The student should be made to:

- Learn the basic ideas of algorithm and analysis techniques.
- Understand the behavior of various computer algorithms.
- Become familiar with the different algorithm design techniques.
- Learn to apply the design techniques in solving various kinds of problems.
- Understand the limitations of Algorithm power.

UNITI ANALYSISOFALGORITHMS 9

Introduction - Algorithm Specification - Performance Analysis: Space Complexity - Time Complexity - Asymptotic Notations - Practical Complexities - Solving RecurrenceRelations.

UNITII BRUTE FORCEANDDIVIDE-AND-CONQUER 9

Brute Force: Exhaustive Search - Travelling Salesman Problem - Knapsack Problem - Assignment problem - Divide and Conquer: General Method - Binary search - Finding Minimum and Maximum Problem - Merge sort - Quick sort - Strassen's Matrix Multiplication.

UNITIII GREEDY TECHNIQUE ANDDYNAMICPROGRAMMING 9

Greedy: General Method - Container Loading - Knapsack - Huffman Codes - Dynamic Programming: General Method - OBST - String Editing - 0/1 Knapsack - Travelling Salesman Problem.

UNITIV BACKTRACKING AND BRANCH & BOUND

Backtracking: General Method - 8 Queen's Problem - Sum of Subsets Problem - Graph Coloring - Hamiltonian Circuit Problem - Branch and Bound: FIFO - LC branch and bound - 0/1 Knapsack - Travelling Salesman Problem - Assignment Problem.

UNIT V STRING MATCHING AND NP COMPLETE &NP HARD PROBLEMS 9

String Matching: Naive String Matching - Rabin Karp - Knuth Morris Pratt - NP Hard and NP Complete Problems: Basic Concepts - Non Deterministic Algorithms - Class of NP Hard and NP Complete - Approximation for NP Hard Problems: Travelling Salesman problem.

TOTAL: 45 PERIODS

At the end of the course, the student should be able to:

- 1. Prove the correctness and analyze the running time of the basic algorithms for those classic problems in various domains.
- 2. Analyze the time and space complexity of variousalgorithms.
- 3. Ability to compare algorithms with respect to complexities.
- 4. Apply design strategies and Synthesize algorithms for various computingproblems.
- 5. Modify existing algorithms to improve efficiency.

TEXT BOOKS:

- 1. Ellis Horowitz, Shani, SanguthevarRajasekaran, "Computer Algorithms / C++" Universities Press, Second Edition2008.
- 2. AnanyLevitin, —Introduction to the Design and Analysis of Algorithms^{II}, Third Edition, Pearson Education,2012.

- 1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, —Introduction to Algorithms^{II}, Third Edition, PHI Learning Private Limited,2012.
- 2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, —Data Structures and Algorithms^{II}, Pearson Education, Reprint2006.
- 3. DonaldE.Knuth,-TheArtofComputerProgrammingl,Volumes1&3PearsonEducation, 2009.
- 4. Sara Baase Allen Van Gelder, "Computer Algorithms Introduction to Analysis" Pearson Education Asia,2010
- 5. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, —Data Structures and Algorithms in Pythonl, John Wiley &Sons,2013.

5	Subje	ect Co	ode/S	ubje	et Na	me:C	CS173	801 /I	Desig	n and	Analy	sis of A	Algorit	hms		
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17301.1	-	1	2	3	3	3	-	-	-	3	-	3	3	2	-	
CS17301.2	-	- 3 - 3 - 3										-	3	3	2	-
CS17301.3	-	3	-	3	-	3	-	-	-	-	-	-	3	3	2	-
CS17301.4	-	2	-	3	-	3	-	-	-	-	-	3	3	3	2	-
CS17301.5	-	-	-	-	-	-	-	-	-	-	-	3	3	2	-	
	-	2.25	2	3	3	3	-	-	-	-	3	3	3	3	2	-

CY17251 ENVIRONMENTAL SCIENCEANDENGINEERING L T PC 3003

OBJECTIVES:

- To find the scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To study the importance of environment by assessing its impact on the humanworld.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and wastemanagement.

UNITIENVIRONMENT, ECOSYSTEMSANDBIODIVERSITY 12

Definition, scope and importance of Risk and hazards; Chemical hazards, Physical hazards, Biological hazards in the environment – concept of an ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the forest ecosystem - grassland ecosystem - desert ecosystem - aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – Significance of medicinal plants –biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

UNITII ENVIRONMENTAL POLLUTION 10

Definition - causes, effects and control measures of Air pollution (Atmospheric chemistry - Chemical composition of the atmosphere; Chemical and photochemical reactions in the atmosphere - formation of smog, PAN, acid rain, oxygen and ozone chemistry- Mitigation procedures - Control of particulate and gaseous emission, Control of SO₂, NO_x, CO and HC) - Water pollution : Physical and chemical properties of terrestrial and marine water and their environmental significance - Water quality parameters – physical, chemical and biological; absorption of heavy metals - Water treatment processes. Soil pollution - soil waste management: causes, effects and control measures of municipal solid wastes – Marine pollution - Noise pollution - Thermal pollution - Nuclear hazards– e-Waste – toxic substances in e-waste – risks related to toxic substances – role of an individual in prevention of pollution – pollution case studies.

UNITIII NATURALRESOURCES

7

6

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 overutilization of surface and ground 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 - energy production from waste materials. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; 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. Introduction to Environmental Biochemistry: Proteins –Biochemical degradation of pollutants, Bioconversion of pollutants.

UNITIV SOCIAL ISSUES AND THE ENVIRONMENT

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization environmental ethics: Issues and possible solutions – Principles of green chemistry - nuclear accidents and holocaust, case studies – wasteland reclamation – consumerism and waste products – environment protection act – Air act – Water act – Wildlife protection act – Forest conservation act – The Biomedical Waste (Management and Handling) Rules; 1998 and amendments- scheme of labeling of environmentally friendly products (Eco mark). Enforcement machinery involved in environmental legislation- central and state pollution control boards - disaster management: floods, earthquake, cyclone and landslides. Public awareness and casestudies.

UNITV HUMAN POPULATION AND THE ENVIRONMENT

Population growth, variation among nations – population explosion – family welfare program me – environment and human health – human rights – value education – HIV / AIDS – Dengue fever- Swine flu – women and child welfare – Environmental Impact Analysis (EIA)- GIS-remote sensing - role of information technology in environment and human health – Case studies. Effect of Radiation from computingdevices.

TOTAL: 45 PERIODS

On completion of the course students will be able to

- 1. Solve problems that cannot be solved by mere laws.
- 2. Get familiarized with ecological balance.
- 3. Get public awareness of environment at in fan stage.
- 4. Find ways to protect the environment and play proactive roles.
- 5. Develop and improve the standard of betterliving.

TEXTBOOKS:

- 1. Benny Joseph, _Environmental Science and Engineering[•], 2nd edition, Tata McGraw-Hill, New Delhi,2008.
- 2. Gilbert M.Masters, _Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education,2004.

- 1. DharmendraS.Sengar,_Environmentallaw,PrenticehallofIndiaPvtLtd,New Delhi,2007.
- 2. ErachBharucha, -Textbookof EnvironmentalStudiesl,3rd edition, Universities Press(I) Pvt, Ltd, Hydrabad,2015.
- 3. G. Tyler Miller and Scott E. Spoolman, —Environmental Sciencel, 15th edition, Cengage Learning India PVT, LTD, Delhi,2014.
- 4. Rajagopalan, R, _Environmental Studies-From Crisis to Cure', 3rdedition,Oxford University Press,2015.

Sub	ject	Code	/Subj	ject N	lame	:CY1	7251	/ Env	viron	menta	l Scier	ice and	d Engir	neering		
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CY17251.1	3	3			2		3	3	1	1	3	-	-	-	-	
CY17251.2	3	3	3	3	2	3	3	3	_	1	2	3	-	-	-	-
CY17251.3	3	3	3	3	2	3	3	3	2	1	3	3	1	1	1	-
CY17251.4	3	3	3	3	3	3	3	3	2	1	3	3	1	-	-	1
CY17251.5	3	3	3	3	3	3	3	3	1	3	3	2	1	1	2	
	3	3	3	3	2.4	3	3	3	2	1	2.4	3	1.33	1	1	1.5

CS17411 OPERATINGSYSTEMSLABORATORYL T PC

0 0 42

OBJECTIVES:

The student should be made to:

- □ To Learn basic Linux commands and Shell scripts.
- To implement IPC and various System Calls.
- To implement CPU scheduling algorithms, Deadlock avoidance and Semaphore.
- □ To design various Page replacement and File Allocation strategies.
- □ To learn the installation and configuration of Linux OS.

List of Experiments

- 1. Installation and Configuration of Linux in a Virtual Machine.
- 2. Basic Linux commands
- 3. Shell Scripting.
- 4. Demonstrate the use of awakes cripts to extract data.
- 5. File System related System Calls.(Learn to create, open, read, write, close files; Open, read, write, search, close directories).
- 6. Process Management Operation on Processes.
- 7. Inter-process communication using Shared Memory.
- 8. Inter-process communication using message queues or pipes.
- 9. CPU Scheduling algorithms.
- 10. Implementation of Producer Consumer problem using Semaphore.
- 11. Deadlock Avoidance algorithm.
- 12. Contiguous Memory Allocation Strategies
- 13. Implementation of File Allocation Strategies.
- 14. Page Replacement Algorithms.
- 15. Customization of Linux Kernel.
- 16. Mini Project.

TOTAL: 60 PERIODS

At the end of the course, the student should be able to:

- 1. Apply Linux commands and design shellscripts.
- 2. Create processes and implementIPC.
- 3. Compare the performance of various CPU SchedulingAlgorithms.
- 4. Analyze the performance of the various page replacemental gorithms.
- 5. Configure and perform Customization of LinuxKernel.

REFERENCES:

http://spoken-tutorial.org

SOFTWARE:

	Sub	ject (Code/	'Subj	ect N	ame	CS1	7411	/Ope	rating	Syste	ms La	borato	ry		
				Prog	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17411 .1	3	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CS17411 .2	3	3	3	-	-	-	-	-	-	-	-	-	3	3	2	-
CS17411 .3	-	3	3	-	-	-	-	-	-	-	-	-	3	3	-	-
CS17411 .4	-	2	3	-	-	-	-	-	-	-	-	2	3	3	2	-
CS17411 .5	-	-	-	-	3	2	-	-	-	-	-	3	3	3	-	-
	3	2.66	3	-	3	2	-	-	-	-	-	2.5	3	2.8	2	-

Standalone desktops with C / Python / Equivalent complier

IT17411INFORMATION SYSTEMS ANALYSIS AND
DESIGN LABORATORYL T P C
3003

OBJECTIVES:

- □ Introduce the students to the traditional practices of specification, analysis, design, implementation, evaluation of design and operation of informationsystems.
- □ Identify the functional and non functional needs of the system.
- □ Practice different techniques of analysis, design and implementation.
- □ Practice design of various types of information systems.
- □ Learn the tools of ProjectManagement.

To develop Information Systems which is elaborated as an outcome of analysis and design as listed below:

- 1. Project identification and initiation
- 2. Feasibilityanalysis
- 3. Analysis of businessrequirement
 - Business process modeling
 - Informationrequirement
 - Data collectionmethods
 - Methods for structuring and communicatingrequirements
 - Formal specification and verification
- 4. System design and developmentstrategies
 - Use cases and develop the use case model elaborated use casedescription
 - Design the businessactivities
 - User interfacedesign
 - Data flowdiagram(DFD)
 - Entity relationshipdiagram(ER)
 - Draw the partial layered, logical architecture diagram with UML package diagram notation
 - Design class diagram, sequence diagram, behavioral state machinediagram
- 5. Implement the technical serviceslayer.
- 6. Implement the domain objectslayer.
- 7. Implement the user interfacelayer.
- 8. Draw component and deployment diagrams
- 9. Project managementtool
 - Pert
 - Ganttchart

Suggested domains for information system mini-project development

- 1. Executive Support System (ESS)
- 2. Management Information System(MIS)
- 3. Decision Support System (DSS)
- 4. Automation System (AS)
- 5. Transaction Processing System (TPS)

TOTAL: 60 PERIODS

By the end of the course the students will be able to

- 1. Use various techniques of analysis and design to specify the information system as awhole.
- 2. Understand analysis and design to design the system better knowing various tacit needs of information systems.
- 3. Understand the purpose and use of CASEtools.
- 4. Develop various viewpoints and much detailed design for variety of informationsystems.
- 5. Identify current industry standards and practices for information systems and their development and management.

LAB EQUIPMENTS FOR A BATCH OF 30 STUDENTS:

SUGGESTED SOFTWARETOOLS:

Rational Suite (or) Argo UML (or) equivalent Smart Draw tool for DFD, ER Diagrams

SOFTWARE TOOLS

Subject C	ode/S	Subje	ct Na	me:I	T174	11/ I	nfori	natio	n Sys	stems	Analys	sis and	l Desig	n Labo	ratory	
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	
IT17411 .1	-	2	2	3	-	-	-	-	-	-	-	3	1	1	-	
IT17411 .2	-	- 3 - 3									-	-	2	1	-	-
IT17411 .3	2	-	2	-	3	1	-	-	-	-	-	-	-	3	-	-
IT17411 .4	-	-	-	2	2	-	2	1	-	-	-	-	2	1	-	-
IT17411 .5	-	-	-	-	2	-	2	1	-	-	-	1	3	-	-	
	2	2.5	2	2.66	2.33	1	2	1	-	-	-	-	2	1.8	1	-

HS17461ADVANCED READINGAND WRITINGL T P C(COMMON TO CSE, IT, MECH, BT, CIVIL&AUTO)0 02 1

OBJECTIVES:

The student should be made to:

- Enhance the employability skills of the students with a special focus on critical thinking, reading andwriting.
- Enhance proficiency in the language and the ability to write compare and contrast essays effectively.

UNITI PRIMITIVE READING AND FREE WRITING 6

Reading – Primitive Reading: Reading stories.Skimming:browse through a book or a long passage, understand the gist of a text. Writing: Free writing – writing about oneself/ family/ native/ hobbies/ festivals, etc. Grammar: Sentence Structure.

UNITII SCANNING ANDEXPOSITORYWRITING 6

Reading - Scanning: Guessing meaning from the context, surveying the text. Writing – Narrative Writing: Narrating a story, incident or past events. Grammar – Imperative Sentences.

UNITIII INTENSIVE READING AND DESCRIPTIVE WRITING

Reading – Intensive Reading: Drawing inferences from the text, responding critically to the text. Writing – Descriptive Writing: an incident, place, person, process, etc. Grammar – Different kinds of adjectives.

UNITIV EXTENSIVE READING ANDCOMPARATIVEWRITING 6

Reading – Extensive Reading: Reading wide range of articles for better understanding, etc. Writing – Compare and Contrast: two things/ places/ persons/ ideas, etc. Grammar – Connectives.

UNIT V INFERENTIAL WRITING AND ARGUMENTATIVE / 6 PERSUASIVE WRITING

Reading – Inferential Reading: draw upon prior knowledge, draw conclusions and make inferences. Writing – Argumentative and Persuasive Writing: establishing facts, forming and stating conclusions. Grammar – Conjunctions, Cohesive Devices

TOTAL: 30 PERIODS

At the end of the course, the student should be able to:

- 1. Skim through columns and magazines and write on simple topics with proper sentence structures.
- 2. Read comprehensively and understand the thoughts of the writer and report clearly in detail about the happeningsaround.
- 3. Comprehend and answer questions based on the texts/passages given and write descriptive essays.
- 4. Read different genres of texts and comprehend the materials to improve their vocabulary and are familiar with new words, phrases, sentence structures and ideas.
- 5. Read between lines, draw conclusions with their prior knowledge on the subject and persuade their readers with their flawless writingskills.

- 1. Bridge to College Success Intensive Academic Preparation forAdvancedStudents–Robertson.
- 2. Source Work Academic Writing from Sources Second Edition Dellahite, Haun, Heinle / Cengage Learning, 2012.
- 3. Aebersold, Jo Ann and Field M. L. 1997, From Reader to Reading teacher, Cambridge, Cambridge University Press, Anderson, R. C.1996.
- 4. Bamford, Julian and Day, R. R. 1997, Extensive Reading: What is it? Why Bother? Language TeacherOnline.

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				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO11	PO12	PSO1	PSO2	PSO3	PSO4			
HS17461 .1	3 3										1	2	1	1	-	-
HS17461 .2	-	-	-	-	-	-	-	-	3	3	1	2	3	2	-	-
HS17461 .3	-	-	-	-	-	-	-	-	3	3	1	2	3	2	1	1
HS17461 .4	-	-	-	-	-	-	-	-	3	3	1	2	3	3	2	2
HS17461 .5	-	-	-	-	-	-	-	-	3	3	1	2	3	3	2	2
	-	-	-	-	-	-	-	-	3	3	1	2	2.6	2.2	1.66	1.66

SEMESTER V

IT17501	AUTOMATA THEORY ANDCOMPILERDESIGN	L T PC
		3 20 4

OBJECTIVES:

- □ Learn the design principles of aCompiler.
- □ Familiar with the basics of theory of automata.
- Understand the various parsing techniques and different levels of translation.
- □ Learn different techniques to optimize thecode.
- □ Implement target machine codegeneration.

UNIT I INTRODUCTION TO COMPILER ANDFORMALLANGUAGES 15

Translators - Compilation and Interpretation - Language processors - The Phases of Compiler – Symbol table – Error Handling - Regular Languages – Finite Automata – Non determinism – Regular Expressions – Regular Expressions to DFA – Minimization of DFA – Lex Tool.(Ref. Book 1: Chapter 1) & (Ref. Book 2: Chapter 1)

UNITII CONTEXT FREE GRAMMARSANDPARSING 15

Context Free Grammars – derivation - parse tree - Top Down Parsing - Recursive Descent Parser Predictive Parser-LL(1) Parser – Bottom up parsing - Shift Reduce Parser – LR parser – SLR – CLR – LALR – YACC Specification.(Ref. Book 1: Chapter 4)

UNITIII SEMANTICS AND RUNTIMEENVIRONMENT 10

Syntax directed translation – S-attributed and L-attributed grammars - applications of SDT - Storage organization and storage allocation strategies.(Ref. Book 1: Chapter 5 & 7)

UNITIV CODEOPTIMIZATION 10

Three address code implementation - Principal Sources of Optimization - Optimization of Basic Blocks – Peephole Optimization – Flow Graphs - Data Flow Analysis of Flow Graphs.(Ref. Book 1: Chapter 6, 8 & 9)

UNITV CODEGENERATION 10

Machine dependent code generation – generic code generation algorithm – register allocation and assignment – DAG representation of basic block.(Ref. Book 1:Chapter8)

TOTAL: 60PERIODS

At the end of the course, the student should be able to:

- 1. Apply the basics of automata theory in the design of acompiler.
- 2. Use various parsing techniques for parsing aninput.
- 3. Design and implement a prototypecompiler.
- 4. Apply the various optimization techniques.
- 5. Use the different compiler constructiontools.

- 1. Alfred V Aho, Monica S. Lam, Ravi Sethi and Jeffrey D Ullman, —Compilers Principles, Techniques and Toolsl, 2nd Edition, Pearson Education,2007.
- 2. Michael Sipser. Introduction to the Theory of Computation, PWS PublishingCompany.
- 3. Randy Allen, Ken Kennedy, —Optimizing Compilers for Modern Architectures: A Dependence-based Approachl, Morgan Kaufmann Publishers,2002.
- 4. StevenS.Muchnick,—AdvancedCompilerDesignandImplementation,—MorganKaufm ann Publishers Elsevier Science, India, Indian Reprint2003.
- 5. Keith D Cooper and Linda Torczon, —Engineering a Compiler^{II}, Morgan Kaufmann Publishers Elsevier Science,2004.
- 6. Charles N. Fischer, Richard. J. LeBlanc, —Crafting a Compiler with Cl, Pearson Education, 2008.

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				Pro	ogram (Outcon	nes						Progr	am Spec	cific Out	comes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17501.1	1	2	3	-	-	-	-	-	-	-	-	-	1	-	-	-
IT17501.2	1	3	3	1	3	-	-	-	-	-	-	1	1	-	-	2
IT17501.3	1	3	3	1	3	-	-	-	-	-	-	1	1	-	-	2
IT17501.4	-	2	3	-	-	-	-	-	-	-	-	-	1	-	-	-
IT17501.5	-	3	3	3	-	-	-	-	-	-	-	1	3	-	-	3
	1	2.6	3	1.66	3	-	-	-	-	-	-	1	1.4	-	-	2.33

CS17403

COMPUTERNETWORKS

L T P C 3003

OBJECTIVES:

The student should be made to:

- Make on understanding the principles of computernetworking.
- Be exposed on the required functionality at eachlayer.
- To understand the Routingmechanisms.
- Learn the connection and congestion controlmechanisms.
- Acquire knowledge of SDN and itsoperations.

UNITI FUNDAMENTALS AND DATALINKLAYER 9

Building a network – Requirements – Topologies – OSI Model – TCP/IP architecture – Performance - Link layer Services - Framing – Error Detection and Correction - Flow control

UNITII MEDIA ACCESSANDINTERNETWORKING 9

Media Access Protocols – CSMA/CA/CD – ALOHA - Ethernet –Gigabit Ethernet - Wireless LANs - 802.11- Bluetooth -Switching and bridging – Basic Internetworking- IP Service Model - Global Addresses – Sub netting – CIDR – ARP - DHCP - ICMP

UNITIII ROUTING 9

Routing – Distance Vector – Link State – Global Internet – Inter Domain Routing –IPv4 - IPv6 – Multicast routing - DVMRP- PIM

UNIT IV TRANSPORT AND APPLICATION LAYER

Overview of Transport layer – UDP – TCP - Segment Format – Connection Management – TCP Congestion control – SMTP- POP3- IMAP - MIME – HTTP – DNS

UNITV SOFTWAREDEFINEDNETWORKS 9

Introduction to SDN - Control and Data Planes - SDN Controllers – VMWare - Data Center - Multi Tenant Data Centre - Network Function Virtualization - Virtualization and Data Plane I/O.

TOTAL: 45 PERIODS

At the end of the course, the student should be able to:

- 1. Study the Principles of Networking
- 2. Understand the layering functionality in networkdesign
- 3. Understand the routing mechanisms innetworks
- 4. Use an appropriate tools to design and implement networksystems
- 5. Abstract the control plane and analyze the network functionsvirtualization.

TEXT BOOKS:

- 1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers,2011.
- 2. Thomas D. Nadeau & Ken Gray, SDN Software Defined Networks, O'Reilly, 2013.

- 1. Behrouz A. Forouzan, Data communication and Networking, Fourth Edition, Tata McGraw Hill,2011.
- 2. Andrew S. Tanenbaum, Computer Networks, Fourth Edition, Prentice Hall of India,2003.
- 3. James F. Kurose, Keith W. Ross, Computer Networking A Top-Down Approach Featuring the Internet, Pearson Education, New Delhi,2009.
- 4. William Stallings, Data and Computer Communication, Sixth Edition, Pearson Education, 2000

		Sub	ject	Code	/Subj	ject N	lame	: CS1	7403	/Com	puter	Netwo	orks				
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes	
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO1 PSO2 PSO3 PSO4			
CS17403.1	3	3	3	3	1	-	-	-	-	-	2	2	2	2	1	1	
CS17403.2	1	2	3	2	1	-	-	-	-	-	1	1	1	1	1	1	
CS17403.3	1	1	3	2	1	-	-	-	-	-	1	1	1	1	1	1	
CS17403.4	1	2	3	2	1	-	-	-	-	-	2	1	2	1	1	1	
CS17403.5	1	1	3	2	-	-	-	-	-	1	1	-	-	1	1		
	1.4 1.8 3 2.2 1												1.5	1.25	1	1	

CS17501

DISTRIBUTEDSYSTEMS

L T PC 3 0 03

OBJECTIVES:

The students should be made to:

- Explain the goals and types of DistributedSystems.
- Describe distributed OS andCommunications.
- Learn about Distributed objects and FileSystem.
- Emphasize the benefits of using Distributed Transactions and Concurrency.
- Learn issues related to developing fault-tolerant systems and Security.

UNITI INTRODUCTION 9

Introduction to Distributed systems – Design Goals - Types of Distributed Systems - Architectural Styles – Middleware - System Architecture – Centralized and Decentralized organizations – Peer-to- Peer System – Case Study: Skype and Bittorrent

UNITII OPERATING SYSTEMSANDCOMMUNICATIONS 9

Process – Threads – Virtualization – Client-Server Model - Case Study: Apache Web server -Code Migration- Communication: Fundamentals - Remote Procedure Call – Stream oriented communication – Message oriented communication – Multicastcommunication

UNITIII DISTRIBUTED OBJECTS ANDFILESYSTEM 9

Remote Invocation – Request Reply Protocol - Java RMI - Distributed Objects - CORBA - Introduction to Distributed File System - File Service architecture – Andrew File System, Sun Network File System - Introduction to Name Services- Name services and DNS - Directory and directory services - Case Study: Google File System

UNITIV DISTRIBUTED TRANSACTIONSANDCONCURRENCY

Clock Synchronization – Logical Clocks – Global States – Mutual Exclusion - Election Algorithms– Data-Centric Consistency Models – Client-Centric Consistency Models – Distribution Protocol – Consistency Protocol

UNITVFAULT TOLERANCEANDSECURITY9

Introduction to Fault Tolerance – Process Resilience – Reliable Communications – Distributed Commit – Recovery – Introduction to Security – Secure Channels – Access Control – Secure NamingSecurityManagement.

TOTAL: 45 PERIODS

At the end of the course, should be able to:

- 1. Discuss trends in DistributedSystems.
- 2. Apply networkvirtualization.
- 3. Apply remote method invocation and objects.
- 4. Design process and resource managementsystems.
- 5. Discuss security issues in DistributedSystems.

TEXT BOOKS:

- 1. Tanenbaum, A. and van Steen, M., Distributed Systems: Principles and Paradigms, Second Edition, Prentice Hall,2007.
- 2. Coulouris, G, Dollimore, J., and Kindberg, Distributed Systems: Concepts and Design, Fourth Edition, Addison-Wesley,2006.

- 1. Pradeep K Sinha Distributed Operating Systems, Prentice-Hall of India, First Edition, New Delhi,2001.
- 2. Jean Dollimore, Tim Kindberg, George Coulouris, Distributed Systems -Concepts and Design, Pearson Education, Fourth edition,2005.
- 3. M.L. Liu Distributed Computing Principles and Applications, Pearson Education, First edition,2004.
- 4. HagitAttiya and Jennifer Welch Distributed Computing: Fundamentals, Simulations and Advanced Topics, Wiley, First edition,2004.

Subject Code/Subject Name:CS17501 /Distributed Systems																
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1 PSO2 PSO3 PSO			
CS17501.1	1	2	2	1	2	-	-	-	-	-			3	3	-	-
CS17501.2	2	2	3	2	3	-	2	-	-	-			3	3	1	1
CS17501.3	2	2	3	2	3	-	2	-	-	-	2		3	3	2	1
CS17501.4	2	3	2	3	3	2	3	-	-	-	2	2	3	3	2	3
CS17501.5	2	2 2 3 3 2 3 1										2	3	3	2	3
	1.8	2.2	2.4	2.2	2.8	2	2.5	-	2	2	3	3	1.75	2		

IT17502

WEBTECHNOLOGY

L TPC 3 00 3

OBJECTIVES:

- To learn about HTML5 & CSS3Concepts.
- To be familiar with Client sidevalidation.
- Understand the emerging technologies in Server-Side Programming using Servlets and JSP's.
- To know the concepts of PHP and AJAX to develop webpages
- To expose knowledge about XML and webservice.

UNIT IMARKUP LANGAUGE& CSS8

HTML5–Introduction-Elements-RelativeURLs-Lists-Tables-Frames-Forms-Canvas-Graphics and Media.CSS:CSS3-Introduction-Properties-Background,Fonts,Text,Image,Link, 2d transform,3d transform,Animation-Box Model-Multicolumn Layout.

UNITII SCRIPTING 10

Client-Side Scripting: Introduction to JavaScript-Syntax-Variables and Data Types-Statements- Operators – Literals – Functions – Objects – Arrays – Built-inObjects.DOM-Introduction-Nodes & Trees-Traversing & Modifying a DOM Tree-DOM Collections.

UNITIII SERVLET

Server-Side Programming: Java Servlets-Life cycle of a Servlet- The Servlet API-Handling HTTP Request and Response using Cookie and Session Tracking.Connecting with Database.

UNITIV JSP&PHP

JSP Introduction-Life cycle of JSP-JSP API-Scripting elements-Directive elements-Implicit objects- Action Elements-Exception Handling-MVC in JSP-Connecting with Database.AJAX introduction- XMLHttp Request- Methods, Properties.

Hypertext Preprocessor: Introduction,Syntax,Variables,Control Statement,Arrays,Strings-Connecting with Database-PHP & AJAX.

UNITVXML & WEBSERVICES8

XML: Basic-Document Type Definition-XML Schema-XSL and XSLT. Web services-Architecture- WSDL introduction-WSDL Elements-SOAP-Application using Web Services.

TOTAL: 45 PERIODS

9

At the end the student will be able to

- 1. Create and publish a web page using HTML5 &CSS3.
- 2. Build dynamic page with Client side validation using Javascript.
- 3. Develop 2 tier or n tier web application using Servlets and JSP.
- 4. Design interactive web page using PHP and AJAX.
- 5. Build SOA based application using XML and webservice.

TEXTBOOKS:

- 1. Harvey&PaulDeitel&Associates,HarveyDeitelandAbbeyDeitel,—InternetandWorld Wide Web - How To Programl, Fifth Edition, Pearson Education,2011.
- 2. Robin Nixon, Learning PHP, MySql& Javascriptl, FourthEdition, 2015.

- 1.JeffreyC.Jackson,-WebTechnologies--AComputerSciencePerspectivel,PearsonEducation,2011.
- 2. RobertW.Sebesta, ProgrammingtheWorldWideWebl,Addison-Wesley,SixthEdition, 2010.
- 3. UttamK.Roy, —WebTechnologies^I,OxfordUniversityPress,1stEdition,2010.

	Subject Code/Subject Name:IT17502/ Web Technology															
				Pro	ogram	Outc	omes						F	Progran Outo	n Specifi comes	с
Course Outcomes	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10								PO11	PO12	PSO1	PSO2	PSO3	PSO4	
IT17502.1	3	2	3	3	3								3	3		
IT17502.2	2	2	3	3	3		2	-	1	1			3	3		
IT17502.3	2	3	3	3	3	1	1	1	1	1			3	3	2	1
IT17502.4	2	3	3	3	3	1						2	3	3	2	1
IT17502.5	2	3	3	3	3					2	3	3	1	1		
	2.2	2.6	3	3	3	1	1.5	1	1	-	2	3	3	1.66	1	

IT7503

EMBEDDEDPROGRAMMING

L T PC 3 00 3

9

9

OBJECTIVES:

- To teach the fundamentals of Embedded processor Modeling , Bus Communication in processors
- To make the students familiar with Input/outputinterfacing
- To introduce on processor scheduling algorithms, Basics of Real time operatingsystem
- To discuss on aspects required in developing a new embedded processor, different Phases &Modeling of embeddedsystem
- To involve Discussions/ Practice/Exercise onto revising & familiarizing the concepts acquired over the 5 Units of the subject for improved employabilityskills

UNIT I INTRODUCTION TOEMBEDDEDSYSTEMS

Introduction to Embedded Systems – The build process for embedded systems- Structural units in Embedded processor, selection of processor & memory devices- DMA – Memory management methods- Timer and Counting devices, Watchdog Timer, Real Time Clock, In circuit emulator, Target Hardware Debugging.

UNIT II EMBEDDEDNETWORKING

Embedded Networking: Introduction, I/O Device Ports & Buses- Serial Bus communication protocols

- RS232 standard – RS422 – RS485 - CAN Bus -Serial Peripheral Interface (SPI) – Inter Integrated Circuits(I2C)–need for device drivers.

UNIT III EMBEDDED FIRMWAREDEVELOPMENTENVIRONMENT 9

Embedded Product Development Life Cycle- objectives, different phases of EDLC, Modeling of EDLC; issues in Hardware-software Co-design, Data Flow Graph, state machine model, Sequential Program Model, concurrent Model, object oriented Model.

UNIT IV RTOS BASED EMBEDDEDSYSTEM DESIGN

Introduction to basic concepts of RTOS- Task, process & threads, interrupt routines in RTOS, Multiprocessing and Multitasking, Preemptive and non-preemptive scheduling, Task communicationshared memory, message passing-, Inter process Communication – synchronization between processes-semaphores, Mailbox, pipes, priority inversion, priority inheritance, comparison of Real time Operating systems: Vx Works, 4C/OS-II, RT Linux.

UNIT V EMBEDDED SYSTEMAPPLICATIONDEVELOPMENT

9

Case Study of Washing Machine- Automotive Application- Smart card System Application

TOTAL: 45 PERIODS

OUTCOMES:

- 1. The learning process delivers insight into design& development of computational processors
- 2. Able to work with other peripherals.
- 3. Automated process with improved designstrategies.
- 4. Knowledge up gradation on recent trends in embedded systemsdesign.
- 5. Improved Employability and entrepreneurshipcapacity

TEXT BOOKS:

- 1. Rajkamal, _Embedded system-Architecture, Programming, Design, TMH, 2011.
- 2. Peckol, —Embedded system Designl, JohnWiley&Sons,2010

- 1. Lyla B Das, Embedded Systems-An IntegratedApproach, Pearson, 2013
- 2. EliciaWhite, Making Embedded Systems, O'Reilly Series, SPD, 2011
- 3. Bruce Powel Douglass, Real-Time UML Workshop for Embedded Systems, Elsevier, 2011
- 4. MichaelBlahaandJamesRambaugh, ||OrientedModelingandDesignwihUML||
- 5. JorgenStaunstrup,WayneWolf,—Harware/SoftwareCo-Design:PrinciplesandPractice, Kluwer Academic Pub, 1997.
- 6. Shibu.K.V, —Introduction to Embedded Systems^I, TataMcgrawHill,2009
- 7. TammyNoergaard, EmbeddedSystemArchitecture, AcomprehensiveGuideforEngineers and Programmers II, Elsevier, 2006
- 8. JonathanW.Valvano, "EmbeddedMicrocomputerSystems, RealTimeInterfacing", Cengage Learning, 3rdedition, 2012

Subject Code/Subject Name:IT17503 /Embedded Programming																
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3								PSO3	PSO4			
IT17503.1	2	3	2	-	-	-	-	1	1	1	1	2	3	2	1	1
IT17503.2	2	3	3	3	2	2	2	1	1	1	1	2	2	3	2	2
IT17503.3	2	3	3	3	2	2	2	1	1	1	1	2	2	3	2	2
IT17503.4	2	3	3	3	3	2	2	1	1	1	1	2	2	3	2	2
IT17503.5	2	2 3 3 3 2 2 2 1 1 1									1	2	2	3	2	2
	2	3	2.8	3	2.25	2	2	1	1	1	1	2	2.2	2.8	1.8	1.8

CS17412	COMPUTERNETWORKSLABORATORY	L T PC
		0042

OBJECTIVES:

The student should be made to:

- Understand the working of sockets in networks.
- Create the scenario and study the performance of various network protocols at different layers of a networks hierarchy through simulation.
- Configure routers and switches which are principal components of anetwork.
- Understand network securityissues.
- Know how the resource is efficiently allocated to various entities that participate in data communications.

LIST OF EXPERIMENTS:

- 1. Configuration of Network inLinux
- 2. Assign IPAddress
- 3. Subnetmask
- 4. Default Gateway
- 5. Primary and SecondaryDNS
- 6. Testing server connectivity usingPING
- 7. Design, Build & Configure Networks using Cisco Packet Tracer(SimulationTool)

- 8. Study & Implement the different types of Network Cables(RS232C)
- 9. Setup a Local Area Network(Switches) Minimum 3 nodes and Internet
- 10. Write a socket program Remote Procedure Call using connection / connectionless oriented protocols
- 11. Create a socket to retrieve the weather data from a remotesensor
- 12. Write a Crawler program that can match patterns between the client & server
- 13. Create a socket to retrieve the meaning of words from an online dictionaryserver.
- 14. Identify the various port & its usage usingNMAP
- 15. Create a socket to retrieve the meaning of words from an online dictionaryserver.
- 16. To capture, save, and analyze network traffic on TCP / UDP / IP / HTTP /ARP /DHCP/ICMP / DNS using Wireshark Tool.
- 17. Install and Configure DNS server inLinux.
- 18. Write a code using raw sockets to implement packetSniffing.
- 19. Perform a case study using OPNET / NS3 about the different routing algorithms to select the network path with its optimum and economical during datatransfer.
- 20. Link Staterouting
- 21. Distance VectorRouting
- 22. Analyze the different types of servers using Webalizer

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Acquire knowledge of using simulators for different connections.
- 2. Deploy Operate and Troubleshoot networklayers.
- 3. Monitor the traffic within the network & analyze the transfer of packets.
- 4. Use IP addressing and apply routing algorithms to find shortestpaths.
- 5. Use networking tools to observe and analyze behaviors of networkingprotocols.

LEARNING RESOURCES:

- 1. Dr. M. O. FaruqueSarker& Sam Washington, Learning Python Network Programming : Packt Publishing,2015
- 2. Dr. M. O. FaruqueSarker, Python Network Programming Cookbook : PacketPublishing,2015
- 3. Kurose and Ross, Computer Networking: A Top-Down Approach Featuring the Internet (Sixth edition), Addison Wesley(recommended)
- 4. Wireshark packet sniffer availableathttp://www.wireshark.org

SOFTWARE:

- C / Python 3
- Network simulator like NS3 / OPNET / CISCO Packet Tracer / NMAP/Webalizer

Subject Code/Subject Name:CS17412/ Computer NetworksLaboratory																
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO									PSO3	PSO4					
CS17412 .1	3	3	3	3	2	-	-	-	-	-	2	2	1	1	1	2
CS17412 .2	3	2	3	2	2	-	-	-	-	-	1	2	1	1	2	1
CS17412 .3	3	2	3	2	2	-	-	-	-	-	2	2	1	1	1	2
CS17412 .4	3	2	3	2	2	-	-	-	-	-	2	2	1	1	2	2
CS17412 .5	1	2 3 2 2										1	-	-	1	2
	2.6	2.2	3	2.2	2	-	-	-	-	1.8	1.8	1	1	1.4	1.8	

IT17511

WEBTECHNOLOGY LABORATORY

L T PC 0 0 4 2

OBJECTIVES:

The student should be able to:

- Be familiar with Web page design using HTML / DHTML and stylesheets.
- Be exposed to validate the Webpage.
- Learn to create dynamic web pages using server sidescripting.
- Learn to write PHP databasefunctions.
- Be exposed to implement web service for simpleapplication.

LIST OF EXPERIMENTS

- 1. Write a html program for Creation of web site with forms, frames, links, tablesetc
- 2. Design a web site using HTML and DHTML. Use Basic Text Formatting, Imagesetc.
- 3. Create a web page with the following using HTML5 (i) To embed an image map in a web page (ii) To fix the hot spots (iii) Show all the related information when the hot spots are clicked.
- 4. Create a web page with all types of Cascading stylesheets.
- 5. Design a Scientific calculator using Javascript.
- 6. Design a Registration form and validate.
- 7. Create a script that collects numbers from a page and then adds them up and prints them to a blank field on thepage.
- 8. Simple Program using JSP and Servlet.
- 9. Write programs in Java using Servlets -To invoke servlets from HTMLforms.
- 10. Write programs in Java to create three-tier applications using JSP andDatabasesfor conducting on-line examination for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
- 11. Design a web page to calculate the factorial of a given number usingPHP.
- 12. Program using PHP databasefunctions.
- 13. Create a web page to perform arithmetic operation usingPHP
- 14. Programs using XML Schema XSLT/XSL.
- 15. Create a simple XMLHttpRequest, and retrieve data from a TXTfile.
- 16. Write a program to implement web service for calculatorapplication.
- 17. Consider a case where we have two web Services- an airline service and a travel agent and the travel agent is searching for an airline. Implement this scenario using Web Services andDatabase.

TOTAL:60 PERIODS

Requirement for a batch of 30 students

1. Hardware:

Standalone desktops 30

2. Software:

Windows /Linux operating system JDK 1.6(or above)

Oracle 9i(or above version) / Mysql Apache Server or Equivalent access30 user license

OUTCOMES:

At the end the student will be able to

- 1. Design Web pages using HTML/DHTML and stylesheets.
- 2. Design and Implement Client- SideValidation.
- 3. Develop an application using AJAX.
- 4. Create dynamic web pages using server sidescripting.
- 5. Built a simple application using webservice.

Subject Code/Subject Name:IT17511/ Web Technology Laboratory																
				Pro	gram	Outc	omes						Progra	am Spe	cific Out	comes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17511 .1	3	2	3	3	3								3	3		
IT17511 .2	2	2	3	3	3		2	-	1	1			3	3		
IT17511 .3	2	3	3	3	3	1	1	1	1	1			3	3	2	1
IT17511 .4	2	3	3	3	3	1						2	3	3	2	1
IT17511 .5	2	3 3 3 3										2	3	3	1	1
	2.2	2.6	3	3	3	1	1.5	1	1	1	-	2	3	3	1.66	1

IT17512 EMBEDDEDPROGRAMMINGLABORATOR

L T PC 0 04 2

OBJECTIVES:

- To introduce about the basic functions of embeddedsystems
- To enable the students to understand the basic structure of embeddedsystems
- To make the Students familiar with the basic concepts of embeddedsystems
- Introduce students to embedded systems design tools and hardwareprogrammers
- To make the students to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

LIST OF EXPERIMENTS

- 1. Study of ARM evaluationsystem
- 2. Interfacing ADC and DAC.
- 3. Interfacing LED and PWM.
- 4. Interfacing real time clock and serialport.
- 5. Interfacing keyboard andLCD.
- 6. Interfacing GS Module
- 7. Mailbox.
- 8. Interrupt performance characteristics of ARM and FPGA.
- 9. Flashing of LEDS.
- 10. Interfacing stepper motor and temperaturesensor.
- 11. Implementing zigbee protocol withARM.

TOTAL: 60 PERIODS

Hardware Requirements(Scientech Make):

- 1. ARM kit-PICOIMX6S10R512SDBW 4numbers
- 2. I²C ADC AND DAC MODULE –8NUMBERS
- 3. Display module- 4numbers
- 4. Real time clock module 4numbers
- 5. Computer interface module- 4number
- 6. Zigbee module- 4numbers
- 7. **GSM Module-** 4numbers
- 8. Sensor Module- 4numbers
- 9. Stepper motor module with motor 4numbers
- 10. LEDs- 100 numbers of different colours

- 1. Experience with a set of tools for embedded systems programming anddebugging.
- 2. Experience with implementing several embedded systems with particular focus on the interaction between multipledevices
- 3. Design products using microcontrollers and various analog and digitalICs
- 4. Can read the datasheet for any embedded system, understand how itworks.
- 5. Develop existing embedded systems by formulating the system design problem including the design constraints, create a design that satisfies the constraints, implement the design in hardware and software, and measure performance against the designconstraints.

Subject Code/Subject Name:IT17512 / Embedded Programming Laboratory																
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	08 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3 PS						PSO4	
IT17512 .1	2	3	2	-	-	-	-	1	1	1	1	2	3	2	1	1
IT17512 .2	2	3	3	3	2	2	2	1	1	1	1	2	2	3	2	2
IT17512 .3	2	3	3	3	2	2	2	1	1	1	1	2	2	3	2	2
IT17512 .4	2	3	3	3	3	2	2	1	1	1	1	2	2	3	2	2
IT17512 .5	2	2 3 3 3 2 2 2 1 1 1									1	2	2	3	2	2
	2	3	2.8	3	2.25	2	2	1	1	1	1	2	2.2	2.8	1.8	1.8

SEMESTER VI

IT17601	COMPUTATIONALINTELLIGENCE	L T PC
		4 00 4

OBJECTIVES:

- □ To understand the fundamental concepts of computationalIntelligence.
- □ To know the fundamentals of rule based systems and fuzzy expertsystems.
- □ To acquire the knowledge of artificial neuralnetworks.
- To understand the concepts of evolutionarycomputations.
- □ To expose the concepts of hybrid intelligent systems.

UNITI INTRODUCTION

Introduction to Computational Intelligence - Intelligence machines - Computational intelligence paradigms: Artificial Neural Networks, Evolutionary Computation, Swarm Intelligence, Artificial Immune Systems, Fuzzy Systems. -Short history.

(Text Book 1: Chapter 1, Text Book 2: Chapter 1)

UNIT II RULE-BASED EXPERT SYSTEMS AND FUZZYEXPERTSYSTEMS 9

Rule-based expert systems - Uncertainty management in rule-based expert systems- Fuzzy expert systems: Fuzzy sets and operations of fuzzy sets - Fuzzy rules and fuzzy inference - Case Studies. (Text Book 2: Chapter 2-4)

UNIT III ARTIFICIALNEURALNETWORKS

The Artificial Neuron – Supervised Learning Neural Networks – Unsupervised Learning Neural Networks-Performance Issues (Supervised Learning)(**Text Book 1: Chapter 2-4, 7**)

UNIT IV EVOLUTIONARYCOMPUTATION 9

Introduction to Evolutionary Computation-Genetic Algorithms: Canonical Genetic Algorithm, Crossover, Mutation, Control Parameters, Genetic algorithm variants-Genetic Programming-EvolutionStrategies- Case studies(**Text Book 1: Chapter 8-10, 12**) (**Text Book 2: Chapter 7**)

UNIT V HYBRIDINTELLIGENTSYSTEMS 9

Hybrid Intelligent Systems - Neural expert systems - Neuro-fuzzy systems - Evolutionary neural networks-fuzzy evolutionary systems(**Text Book 2: Chapter 8**)

TOTAL: 45 PERIODS

TEXT BOOKS:

- 1. A.P. Engelbrecht, Computational Intelligence: An Introduction, 2nd Edition, John Wiley & Sons, 2012.
- 2. M. Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems, 3rd Edition, Pearson/Addison Wesley,2011.

REFERENCES:

1. H.K. Lam, S.S.H. Ling, and H.T. Nguyen, Computational Intelligence and Its Applications: Evolutionary Computation, Fuzzy Logic, Neural Network and Support Vector Machine, Imperial College Press, 2011.

- 2. E. Turban, J. E. Aronson, T.-P. Liang, Decision Support Systems and Intelligent Systems, 8th Ed., Pearson Prentice Hall,2012.
- 3. E. Cox, The Fuzzy Systems Handbook, Boston: AP Professional, 1998
- 4. S. Russell and P. Norvig. Artificial Intelligence A Modern Approach, Prentice Hall,2010.

Upon successful completion of this course, Students shall be able to

- 1. Apply the fundamental concepts of computationalIntelligence.
- 2. Develop rule based systems and fuzzy expertsystems
- 3. Implement the concepts of artificial neuralnetworks.
- 4. Analyze how evolutionary computations are employed to various applications.
- 5. Design hybrid intelligentsystems.

Subject Code/Subject Name:IT17601/ComputationalIntelligence																
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1 PSO2 PSO3 PSC			
IT17601.1	3	2	1	1	-	-	-	-	-	-	-	-	-	1	-	-
IT17601.2	3	2	1	1	-	-	-	-	-	-	-	-	1	1	-	-
IT17601.3	3	2	1	1	-	-	-	-	-	-	-	-	1	1	1	1
IT17601.4	3	2	1	1	-	-	-	-	1	1	-	-	1	2	1	1
IT17601.5	3	2	1	1	-	-	-	-	-	-	-	-	1	2	1	1
	3	2	1	1	-	-	-	-	1	1	-	-	1	1.4	1	1

CS17504	CRYPTOGRAPHY ANDNETWORKSECURITY	L T PC
		3003

OBJECTIVES:

The student should be made to:

- Basics of encryption and NumberTheory.
- Methods of public keyencryption.
- Authentication and hashfunctions.
- Techniques of system levelsecurities.
- Current trends on wirelesssecurity.
Department of IT, REC

UNITI INTRODUCTION & NUMBERTHEORY 9

Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography)-Finite Fields and Number Theory: Modular arithmetic- Euclid's algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat's and Euler's theorem- Testing for primarily - The Chinese Remainder theorem-Discrete logarithms.

UNITII BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY 9

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management-Attacks on RSA - Diffie Hellman Key exchange- Elliptic curve arithmetic-Elliptic curve cryptography - Side channel analysis- side channel attacks.

UNITIII HASH FUNCTIONS ANDDIGITAL SIGNATURES 9

Authentication requirement – MAC – Hash function – MD5 - SHA - HMAC –-Digital signature and authentication protocols – DSS– Blockchain - Case Study: Bit coin – Ethereum – Zcash.

UNITIVSECURITY PRACTICE & SYSTEMSECURITY8

Kerberos – X.509 - Firewall types and design - SET - Intrusion detection system – Malicious software- Antivirus: introduction - signatures - current trends in antivirusprotection

UNITV E-MAIL, IP, WEB & WIRELESS AN SECURITY 10

E-mail Security: Pretty Good Privacy-S/MIME. IPSecurity: Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web Security: SSL/TLS Basic Protocol-computing the keysclient authentication- Wireless LAN Security: Wi-Fi Protected Access (WPA).

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. The methods of conventional encryption and NumberTheory.
- 2. The concepts of Public KeyEncryption.
- 3. Methodology for Authentication and Hashing.
- 4. Comprehending System LevelSecurities.
- 5. Perceiving WirelessSecurity.

TEXT BOOKS:

- 1. William Stallings, Cryptography and Network Security-Principles and Practices, Seventh Edition, Pearson Education,2017
- 2. Christo Paar and Jan Pelzl,Understanding Cryptography: A Textbook for Students and Practioners, First Edition, Springer,2010
- 3. JoxeanKoret and Elias Bachaalany, The Antivirus Hackers Handbook, First Edition, Wiley, 2015

REFERENCES:

- 1. Yehuda Lindell and Jonathan Katz, Introduction to Modern Cryptography, Second Edition, CRC Press,2015
- 2. Bruce Schneier, Applied Cryptography: Protocols, Algorithms and Source Code in C, Special Edition, Wiley,2015
- 3. AtulKahaet, Cryptography and Network Security, Third Edition, Tata McGraw-Hill,2013.
- 4. Imran Bashir, Mastering Blockchain: Deeper insights into decentralization, cryptography, bitcoin and popular Blockchain frameworks, First Edition, Packt, 2017

S	ubje	ct Co	de/Sı	ıbjec	t Naı	ne:C	S175	04/Cı	rypto	graph	y and	Netwo	rk Secu	ırity		
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17504.1	3	2	2	1	-	-	-	-	-	-	-	-	I	1	-	-
CS17504.2	3	2		1	-	-	-	-	-	-	-	-	1	2	-	-
CS17504.3	3	2	1	1	-	-	-	-	-	-	-	-	1	2	-	2
CS17504.4	3	2	2	1	1	-	-	-	-	-	-	-	1	2	-	1
CS17504.5	2	2	2	1	-	1	-	-	-	-	-	-	1	2	-	1
	2.8	2	1.75	1	1	1	-	-	-	-	-	-	1	1.8	-	1.3

IT17602

MOBILECOMMUNICATION

L T PC 3003

OBJECTIVES:

- Understand the basic concepts of mobilecomputing
- Be familiar with the network protocolstack
- □ Learn the basics of mobiletelecommunication
- \Box Be exposed to Ad-Hocnetworks

Gain knowledge about different mobile platforms and application development

UNITI WIRELESSCOMMUNICATION 7

Cellular systems- Frequency Management and Channel Assignment- types of handoffand their characteristics, dropped call rates & their evaluation -MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks

UNITII WIRELESSNETWORKS 9

Wireless LAN – IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- Wi-Fi and WiMAX - Wireless Local Loop

UNITIII MOBILECOMMUNICATIONSYSTEMS 11

GSM-architecture-Location tracking and call setup- Mobility management- Handover-Security-GSM SMS –International roaming for GSM- call recording functions-subscriberand service data mgt –- Mobile Number portability -VoIP service for Mobile Networks –GPRS – Architecture-GPRS procedures-attach and detach procedures-PDP contextprocedurecombined RA/LA update procedures-Billing

UNIT IVMOBILE NETWORK ANDTRANSPORTLAYERS9

Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – MobileTCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-SelectiveRetransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wirelessNetworks

UNITV APPLICATIONLAYER

WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAPuser agent profile- caching model-wireless bearers for WAP - WML – WMLScripts - WTA-iMode-SyncML.

TOTAL : 45 PERIODS

9

OUTCOMES:

At the end of the course, the student shall be able to:

- 1. Explain the basics of mobile telecommunicationsystem
- 2. Choose the required functionality at each layer forgiven
- 3. application Identify solution for each functionality at eachlayer
- 4. Use simulator tools and design Ad hocnetworks

5. Develop a mobileapplication.

TEXT BOOKS:

- 1. JochenSchiller,—MobileCommunications, SecondEdition, PearsonEducation, 2003.
- 2. WilliamStallings, –Wireless Communications and Networksl, Pearson Education,2002.

REFERENCES:

- 1. Yi Bing Lin Inrichchlamtac Wireless and mobile network architecture , John Wiley & Sons, 2001.
- 2. Ivan Stojmenovic Handbook of Wireless Network and Mobile Computing , John Wiley & Sons, 2002.
- 3. William C.Y. Lee Mobile Cellular Telecommunications, McGraw-Hill, 1989.

		Subj	ect C	ode/S	Subje	ect Na	ame:	(T176	502 /N	Mobile	e Com	munic	ation			
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17602 .1	-	-	-	-	-	1	1	-	-	-	-	-	-	1	1	1
IT17602 .2	-	-	-	-	-	2	2	-	-	-	-	-	-	1	2	1
IT17602 .3	1	1	-	-	2	-	1	1	-	-	-	-	-	1	2	1
IT17602 .4	2	1	-	1	2	-	1	1	-	-	-	-	-	1	2	1
IT17602 .5	2	-	-	1	1	2	-	-	-	-	-	-	-	1	1	1
	1.6	1	-	1	1.6	1.6	1.25	1	-	-	-	-	-	1	1.6	1

IT17603/CS17E62	AGILEMETHODOLOGIES	L T P C
		3 00 3

OBJECTIVES:

The student should be made to:

- Understand the background and driving forces for taking an Agile approach to software development
- Understand the business value of adopting Agileapproaches
- Understand the Agile developmentpractices
- Apply design principles and refactoring to achieveAgility
- Drive development with unit tests using Test DrivenDevelopment

UNITI FUNDAMENTALS OF AGILE

The Genesis of Agile- Introduction and background Agile Manifesto and Principles-Overview of Scrum- Extreme Programming- Feature Driven development- Lean Software Development- Agile project management- Design and development practices in Agile projects- Test Driven Development- Continuous Integration- Refactoring- Pair Programming-Simple Design- User Stories- Agile Testing- Agile Tools

UNITIIAGILE SCRUM FRAMEWORK9

Introduction to Scrum- Project phases- Agile Estimation- Planning game- Product backlog-Sprint backlog- Iteration planning- User story definition- Characteristics and content of user stories- Acceptance tests and Verifying stories- Project velocity- Burn down chart- Sprint planning andretrospective- Daily scrum- Scrum roles – Product Owner- Scrum Master-Scrum Team- Scrum case study- Tools for Agile project management

UNITIII AGILE TESTING

The Agile lifecycle and its impact on testing- Test-Driven Development (TDD)- Xunit framework and tools for TDD- Testing user stories - acceptance tests and scenarios- Planning and managing testing cycle- Exploratory testing- Risk based testing- Regression tests- Test Automation- Tools to support the Agiletester

UNITIVAGILE SOFTWARE DESIGNANDDEVELOPMENT10

Agile design practices- Role of design Principles including Single Responsibility Principle-Open Closed Principle-Liskov Substitution Principle- Interface Segregation Principles-Dependency Inversion Principle in Agile Design- Need and significance of Refactoring-Refactoring Techniques- Continuous Integration- Automated build tools- Version control

UNITV INDUSTRYTRENDS 9

Market scenario and adoption of Agile- Agile ALM- Roles in an Agile project- Agile applicability- Agile in Distributed teams- Business benefits- Challenges in Agile- Risks and Mitigation- Agile projects on Cloud- Balancing Agility with Discipline- Agile rapid development technologies.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Develop AgileProcess
- 2. Drive development with unit tests using Test DrivenDevelopment
- 3. Apply design principles and refactoring to achieveAgility

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- 4. Deploy automated build tools, version control and continuousintegration
- 5. Perform testing activities within an Agileproject

TEXT BOOKS:

- 1. KenSchawber, Mike Beedle, Agile Software Development with Scrum, First edition, 2004,Pearson.
- 2. Lisa Crispin, Janet Gregory, Agile Testing: A Practical Guide for Testers and Agile Teams, First Edition, 2009, AddisonWesley.

REFERENCE:

1. Robert C. Martin , Agile Software Development, Principles, Patterns and Practices, First edition, Prentice Hall

		Su	bject	Cod	e/Sub	ject	Nam	e:IT1	7603	/Agile	Meth	odolog	gies			
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17603 .1	2	3	3	3	3	2			3	2	2	1	3	3	2	1
IT17603 .2	2									2			2	2		3
IT17603 .3		2		3	3				2	3				3		
IT17603 .4	2				2				3				2	2		
IT17603 .5	2	2	3		3								2	3		
	2	2.3	3	3	2.75	2	-	-	2.6	2.3	2	1	2.25	2.6	2	2

CS17601	GAME PROGRAMMING	LTPC
		3 00 3

OBJECTIVES:

The student should be made to:

- Have an introduction into the Game programming andrendering.
- To learn the principles, mechanics and logics of GameDesign.
- Learn the various Game Development process and its design attributes.
- To gain working knowledge in various gameplatforms.
- Learn to design games usingpython.

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UNITI **INTRODUCTION**

Elements of Game Play - Artificial Intelligence - Getting Input from the Player -SpriteProgrammingSprite Animation - Multithreading - Importance of Game Design - Game Loop, Software and HardwareRendering.

9 UNITII **GAME DESIGNPRINCIPLES**

Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding. Game Engine Design: Rendering, Controller based animation, collision detection, standard objects, and physics.

9 GAME DEVELOPMENT UNITIII

Game development: Developing 2D and 3D interactive games using OpenGL, DirectX -Puzzle games, Single / Multi-player games-Games using HTML and Java Script, Scratch 2.0

UNITIV GAMING PLATFORMSANDFRAMEWORKS 9

Basics of Augmented Reality, Virtual Reality and Mixed Reality- Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DX Studio, and Unity.

UNITV GAME PROGRAMMINGUSINGPYTHON 9

Basic game objects, Getting started with cocos2d, Creating game assets, Implementing steering behaviours, Seek and flee, Arrival, Pursuit and evade Wander, Obstacle avoidance, Gravitation game, Pygame and 3D.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Identify the need for Gameprogramming. 1.
- 2. Have knowledge on the concepts and techniques used in Gamedesign.
- 3. Design and model interactivegame.
- 4. Understand the need for advanced game developmentplatforms.
- 5. Design and develop games with open sourcecomponents.

TEXT BOOKS:

- 1. Jeannie Novak, Game Development Essentials, Third Edition, Delmar Cengage Learning, ISBN-13: 978-1111307653, 2011.
- 2. Jim Thompson, Barnaby Berbank-Green, and NicCusworth, Game Design: Principles, Practice, and Techniques - The Ultimate Guide for the Aspiring Game, Designer, First edition, Wiley, ISBN 0471968943,2007.
- 3. Joseph Howse, Alejandro Rodas de Paz, Python Game Programming by Example, Packt Publishing, First edition,2015.

REFERENCES:

- 1. JeremyGibson, -Introduction to Game Design, Prototyping, and Development:From Concept to Playable Game with Unity and C#I, Addison-Wesley Professional, 2nd edition,2016.
- 2. JohnHorton,—LearningJavabyBuildingAndroidGames||,PacktPublishing Limited, 1stedition, 2015.
- 3. Jorge Palacios, -Unity5.x Game AIProgrammingCookbookl,PacktPublishing Limited, 1 st edition, 2016.

		Sul	oject	Code	e/Sub	ject I	Name	e:CS1	7601	/Gam	e Prog	ramm	ing			
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17601 .1	1	2	2	2	2	-	-	-	-	-			1	1		
CS17601 .2	2	2	3	2	2	-	-	-	-	-		1	2	2		2
CS17601 .3	2	2	3	3	3	-	-	-	-	-	2		3	3		2
CS17601 .4	2	2	3	3	3	-	-	-	-	-	2		3	3	2	
CS17601 .5	2	2	3	3	3	-	-	-	-	-	2		3	2	2	
	1.8	2	2.8	2.6	2.6	-	-	-	-	-	2	1	2.4	2.2	2	2

CS17511 CRYPTOGRAPHY AND NETWORK SECURITY L T P C LABORATORY 0042

OBJECTIVES:

The student should be made to:

- Exposed to the different Ciphertechniques
- To construe symmetric and asymmetrical gorithms

- To accomplish digital signature schemes and hashalgorithms
- To acquire skills to demonstrate network security tools
- Perform wireless audit and decrypting of WPA

LIST OF EXPERIMENTS

- 1. Implement the following Substitution and TranspositionTechniques:
- a) CaesarCipher
- b) PlayfairCipher
- c) Hill Cipher
- d) VigenereCipher
- e) Rail fence row & ColumnTransformation
- f) AffineCipher
- 2. Implement the following algorithms
- a) DES
- b) RSAAlgorithm
- c) Diffie-Hellman
- d) MD5
- e) SHA-1
- 3. Implement the Digital Signature Algorithm(DSA).
- 4. Implement Linux Privilege Escalation Checker.
- 5. Implement a Keylogger to record thekeystrokes.
- 6. Develop a simple Block chain with SHA256
- 7. Set up a honey pot and monitor the honeypot on network (Pent box or Honeyed or any other equivalents/w)
- 8. Perform wireless audit on an access point or a router and decrypt WPA keys(aircracking)
- 9. Demonstrate Intrusion Detection System using any tool (snort or any other equivalents/w)
- 10. Demonstrate various exploits of Windows OS using Meta split framework.
- 11. Install and Configure Firewalls for variety of options (Iptablesorpfsense)
- 12. Demonstrate simple MITM attack(eternal)

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Implement the traditional ciphertechniques
- 2. Develop the various symmetric and asymmetric securityalgorithms
- 3. Develop the various digital signature and hashalgorithms
- 4. Use different open source tools for network security and analysis
- 5. Perform wireless audit and decrypt WPAkeys

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:

Hardware: TL-WN-722N Wi-FiAdaptor

Software: C/Python/ equivalent compiler, Pentbox or Honeyed

OS: Kali Linux /Fedora

Subject	Code	e/Sub	ject I	Name	:CS1	7511	/Cry	ptog	raph	y and i	Netwo	ork Sec	curity 1	Labora	tory	
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17511 .1	3	2	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CS17511 .2	3	2		1	-	-	-	-	-	-	-	-	1	2	-	-
CS17511 .3	3	2	1	1	-	-	-	-	-	-	-	-	1	2	-	2
CS17511 .4	3	2	2	1	1	-	-	-	-	-	-	-	1	2	-	1
CS17511 .5	2	2	2	1	-	1	-	-	-	-	-	-	1	2	-	1
	2.8	2	1.75	1	1	1	-	-	-	-	-	-	1	1.8	-	1.3

IT17611MOBILE APPLICATIONDEVELOPMENTL T P CLABORATORY0 04 2

OBJECTIVES:

The student should be able to

- Know the components and structure of mobile application development frameworks for android and windows OS basedmobiles.
- Understand how to work with various mobile application development frameworks.

- Learn the basic and important design concepts and issues of development of mobile applications.
- Understand the capabilities and limitations of mobiledevices.
- Understand the working principle of Internal and Externalstorage

LIST OF EXPERIMENTS

- 1. Develop an application to change the font and color of the text and display toast message when the user press thebutton
- 2. Develop an application to add two numbers(Read the input values in first and second text box) and display the result in third text box using EventManager and display the UI in Grid layoutformat
- 3. Develop a scientific calculator to perform arithmetic and mathematical functions using Math class. .[Your scientific calculator should contain +,- *,/,=,cos,sin,tan,pow,sqrt,log,lan and mod].
- 4. Develop an android application to draw the circle,ellipse,rectangle and some text using Android Graphicalprimitives
- 5. Create a Database table with the following structure using SQLite: Student(Name, Roll no,Marks) Develop an android application to perform the following operation using SQLite developer classes 1.Insert student Details 2.Update the student Record 3.Delete the student record by roll no 4.View thedetails
- 6. Create on-line recruitment form for XXX-InfoTech Company. The form should consists of First Name, Last Name , DOB , Phone No,Gender , Address , E-mail , Highest Qualification, Branch, Percentage of marks,Language Known,upload the image and provide with save and cancelbutton.All form controls should have appropriatevalidation.
- Design an android activity with a text box (username) where the user can enter a name
 andanothertextbox(ID)wheretheuserenteronlyfourdigitID.NOandabutton—validatell.
 Validate the entered username and ID field for the following using android code.
 - i) Both the fields should not beempty
 - ii) Name field should havealphabets
 - iii) ID field should havenumeric
- 8. Develop an application to get the latitude, Longitude of the current location using android LocationManager and also convert the Latitude / Longitude to address format using Geocode Class.

- 9. Implement an application to write the name and marks to SD card in text fileformat
- 10. Implement an application to display the alert box message when your application receives the SMS
- 11. Write a mobile application to set the alarm using android Alarm Manager class and also snooze the alarm after every 10minutes
- 12. Develop an application to send and receive messages using SMSMangerclass
- 13. Develop an android application to tae the screen shot while you shake your mobilephone
- 14. Create a Database table with the following structure using MySQL External Storage:Employee(Empno,Empname,Empid,Empslary,Empaddress) Develop an android application to perform the following operation using MySQL developerclasses
 1.Insert student Details 2.Update the student Record 3.Delete the student record by Rollno 4.View the details
- 15. Develop an android application to display the information of the telephonyservices
- 16. DevelopanandroidapplicationtocreateTwoactivitynamedas StudentBasicDetailsActivity(name,age,address)and StudentMarkActivity(Marks,Total,Grade,Status). Write an android code to combine these two activity in single screen using androidfragment
- 17. Develop an android application to conduct online-examination. Prepare the questions of your choice. The students should enter their name and register number before answering the questions. The online exam should contain at least five questions. Each question should be of multiple choices. The choice of selection should use radio buttons, for each correct answer one mark should be awarded. After attempting all questions, proceed with submit button. After clicking the submit button, display the result with register number, name of the student and marks in Toastbutton.
- 18. Develop an android application to display the button after 30s usingThread
- 19. Develop an android application to perform the following i).Text toSpeechii).Speech to Text
- 20. Develop an application to display the cricket scores of the ICC world cup matchYour application should update the scores automatically. Use RSS feed to implement this application.

TOTAL: 60 PERIODS

OUTCOMES:

At the end the student will be able to

- 1. Learn the components of mobile applicationdevelopment
- 2. Gain the knowledge of how to work with various mobile application development frameworks.
- 3. Acquire the basic and important design concepts and issues of development of mobile applications.
- 4. Deploy applications to the hand helddevices
- 5. Develop the mobile applications using Internal and Externaldatabases

LIST OF EQUIPMENTS

Stand alone desktops with windows or Android or iOS or Equivalent Mobile **Application Development**

Subje	ct Co	de/S	ubjec	t Na	me:I	Г176	11 /M	lobile	e App	olicatio	on Dev	elopm	ent La	borato	ry	
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17611 .1	3	3	3	3	3	3	2	2	3	-	1	3	3	3	2	2
IT17611 .2	3	3	3	3	3	3	-	-	-	-	1	1	3	3	2	2
IT17611 .3	3	3	3	3	3	-	-	2	2	-	2	2	3	2	3	1
IT17611 .4	3	3	3	3	3	-	-	-	2	2	2	3	3	3	3	2
IT17611 .5	2	3	3	3	3	3	2	2	-	-	3	3	3	3	3	2
	2.8	3	3	3	3	3	2	2	2.3	2	1.8	2.4	3	2.8	2.6	1.8

Tools with appropriate emulators and debuggers

SEMESTER VII

CS1

7702	CLOUDCOMPUTING	L TPC
		3 00 3

OBJECTIVES:

The student should be made to:

the Learn fundamentals of Cloud Computing and designing Private CloudEnvironment.

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- Learn the basic ideas and principles of Virtualization.
- Learn the programming models forCloud.
- Gain knowledge on various cloud components mechanisms for data center design and management.
- Understand the issues and solutions for cloudsecurity.

UNITI INTRODUCTION 9

Technology Innovations for Cloud Computing –Concepts and Terminologies, Cloud Architecture and its Characteristics- Cloud Delivery and Deployment Models, Broadband Network and Internet Architecture. Case Study: Design and Implementation of Public and Private Cloud Environments – Open Stack and AWS

UNITII VIRTUALIZATION

Data center technology, Characteristics of Virtualized Environments, Virtualization Techniques and types, Implementation levels of virtualization, VM Provisioning, Managing and Migration.

Case Study:Xen, KVM, VMWare, Docker Container.

UNIT III DISTRIBUTEDPROGRAMMINGMODEL

Design of HDFS, Concepts and Java Interface, Dataflow of File read & File write, Map Reduce, Input splitting, map and reduce functions, Specifying input and output parameters, Configuring and Running a Job. HadoopVsSpark.Case Study: Design and Implementation of Hive, Pig,HBase.

UNITIV CLOUDCOMPUTINGMECHANISM

Cloud Infrastructure Mechanism: Cloud Storage and Usage Monitor, Resource Replication – Specialized Cloud Mechanism: Load Balancer, SLA Monitor, Pay-per-use Monitor, Audit Monitor, Failover System, Hypervisor, Resource Cluster, Multi Device Broker, State Management Database – Cloud Management Mechanism: Remote Administration System, Resource Management System, SLA Management System, Billing ManagementSystem.

UNITV CORE ISSUES AND ADVANCEDCLOUDCONCPETS

Cloud Security Threats – Cloud Security Mechanism: Encryption, Hashing, Digital Signature, Public Key Infrastructure, IAM, Single Sign-on, Trust in cloud, Clustering, Dynamic Failure Detection and Recovery, Bare-metal provisioning architecture, Mobile Cloud Computing, Edge and Fog Computing.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Demonstrate the main concepts of cloud, its characteristics, advantages, key technologies and its various delivery and deploymentmodels.
- 2. Articulate the strength of virtualization and outline its role in enabling the cloud computing systemmode.
- 3. Recognize the scope of distributed file systems in cloud and their applications inindustry.
- 4. Illustrate the fundamental cloud computing mechanism with which cloud data centers are managed and administered.
- 5. Analyze the core issue of cloud such as security, energy efficiency and interoperability, and provide an insight into future prospects of computing in the cloud.

TEXT BOOKS:

- 1. Thomas Erl, ZaighamMahood, Ricardo Puttini —Cloud Computing, Concept, Technology and Architecturel, Prentice Hall, First Edition,2013.
- 2. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet, First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012.

REFERENCES:

- 1. Michael J. Kavis Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS), First Edition, Wiley.
- 2. Tom White, Hadoop: The Definitive Guide, Yahoo Press, 2014.
- 3. RajkumarBuyya, Christian Vecchiola, and ThamaraiSelvi, Mastering Cloud Computing, Tata McGraw Hill,2013.
- 4. JohnW.RittinghouseandJamesF.Ransome,CloudComputing:Implementation,Managem ent, and Security, CRC Press,2010.

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				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17702.1	3	2	1	1	1				1		1	1	1	1	1	1
CS17702.2	3	2	1	1	1				1		1	1	2	1	1	1
CS17702.3	2	2	1	1			1		1		1	1	2	1	1	1
CS17702.4	2	2	1	1	1		1		1		1	1	2	1	1	1
CS17702.5	2	1	1	1	1				1		1	1	2	1	1	1
	2.4	1.8	1	1	1	-	1	-	1	-	1	1	1.8	1	1	1

IT17701

DATAANALYTICS

L TPC 3 00 3

OBJECTIVES:

The student should be made to:

- To introduce the concepts of Big Data and Hadoop
- To help understand HDFS and Mapreduceconcepts
- To imbibe the Hadoop Eco System of NoSQL
- To describe the data stream analyticsmethodologies
- To narrate various data analysistechniques

UNITI INTRODUCTION TO BIG DATAAND HADOOP 6

Introduction to Big Data, Types of Digital Data, Challenges of conventional systems - Web data, Evolution of analytic processes and tools, Analysis Vs reporting - Big Data Analytics, Introduction to Hadoop - Distributed Computing Challenges - History of Hadoop, Hadoop Eco System.

UNIT II HDFS (HADOOP DISTRIBUTED FILE SYSTEM) ANDMAP REDUCE

 $\label{eq:hadoop-Hado$

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UNIT III NOSQL DATABASES

12

NoSQL - Pig - Introduction to Pig, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators - Hive - Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying – MongoDB - Needs-Terms-Data Types-Query Language – Cassandra - Introduction-Features-Querying Commands.

UNIT IV MININGDATASTREAMS 9

Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window – Realtime Analytics Platform(RTAP) applications - case studies - real time sentiment analysis, stock marketpredictions.

UNIT VDATA ANALYSISANDVISUALIZATION12

Regression modeling, Multivariate analysis, Decision Trees, Support vector and kernel methods, Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data – Frequent pattern based clustering methods – Clustering in Non-Euclidean space – Clustering for streams and Parallelism- Visualization - Time seriesanalysis.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, student will be able to:

- 1. understand the usage scenarios of Big Data Analysis and Hadoopframework
- 2. Apply Mapreduce overHDFS
- 3. Make design decisions for choice of NoSQL platforms to buildapplications
- 4. Apply Stream DataModel
- 5. Use various data analysistechniques

TEXT BOOKS:

- 1. SeemaAcharya, SubhasiniChellappan, "Big Data Analytics" Wiley India; First Edition, 2015.
- 2. AnandRajaramanandJeffrey David Ulman, -Miningof Massive Datasetsl, Cambridge University Press, First Edition,2012.

- 3. JiaweiHan, MichelineKamber—DataMiningConceptsandTechniquesl, SecondEdition, Elsevier, Reprinted2008.
- MichaelBerthold,DavidJ.Hand,"IntelligentDataAnalysis|,SecondEdition,Springer,200
 7.

REFERENCES:

- 1. Jay Liebowitz, —Big Data and Business Analytics Auerbach Publications, CRC press First Edition, 2013.
- 2. TomWhite—Hadoop:TheDefinitiveGuidelThirdEdition,O'ReillyMedia,2012.
- 3. BillFranks,-TamingtheBigDataTidalWave:FindingOpportunitiesinHugeDataStreams with Advanced Analytics^{||}, John Wiley & sons, First Edition,2012.

			Subj	ect C	ode/S	Subje	ct Na	ame:I	T177	/01/Da	ita An	alytics				
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17701.1					2	2		2			3	2		2	1	3
IT17701.2					3	1		2			3	2	2	2	2	3
IT17701.3					3	2		2			3	3	3	3	3	3
IT17701.4	3	3	3					2			3	3	3	3	3	3
IT17701.5	3	3	3					2		3	3	3	3	3	3	3
	3	3	3	-	2.6	1.6	-	2	-	3	3	2.6	2.75	2.6	2.4	3

IT17711 DATAANALYTICSLABORATORY L TPC

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OBJECTIVES:

The student should be made to:

- Implement Map Reduce concept to process bigdata.
- Apply linear models to analyze bigdata.
- Analyze big data using machine learningtechniques.
- Realize storage of big data using Hbase,MongoDB.
- Develop big data applications for streaming data using ApacheSpark.

LIST OF EXPERIMENTS

- 1. Install, configure and run Hadoop andHDFS.
- 2. Implement word count/frequency programs usingMapReduce.
- 3. Implement a MapReduce program to process a weatherdataset.
- 4. Implement Linear and LogisticRegression.
- 5. Implement SVM/Decision tree classificationtechniques.
- 6. Implement clustering techniques Hierarchical and K-Means.
- 7. Visualize data using any plottingframework.
- 8. Implement an application that stores big data in Hbase/MongoDB/Pig usingHadoop/R.
- 9. Install, Deploy & Configure Apache Spark Cluster. Run Apache Spark applications using Scala.

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Process big data using Hadoopframework.
- 2. Build and apply linear and logistic regressionmodels.
- 3. Perform data analysis with machine learningmethods.
- 4. Perform graphical data analysis.
- 5. Create applications for big dataanalytics.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:

Hardware: PC with 8 GB RAM, i3Processor

Software: Hadoop, R package, Hbase, MongoDB

		Su	bject	t Cod	le/Sul	bject	Nam	e:IT	17711	l/Data	Analy	tics L	ab			
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17711 .1					2	2		2			3	2		2	1	3
IT17711 .2					3	1		2			3	2	2	2	2	3
IT17711 .3					3	2		2			3	3	3	3	3	3
IT17711 .4	3	3	3					2			3	3	3	3	3	3
IT17711 .5	3	3	3					2		3	3	3	3	3	3	3
	3	3	3	-	2.6	1.6	-	2	-	3	3	2.6	2.75	2.6	2.4	3

CS17711 CLOUD COMPUTING LABORATORY L T PC 0 0 4 2

OBJECTIVES:

The student should be made to:

- Learn and understand Virtualization and run VMs of different configuration.
- Be familiar with current cloud technologies by creating applications and deploying it in public cloud.
- Learn to set up an enterprise level cloudinfrastructure.
- To understand the programming models for distributed cloudmanagement.
- To understand the issues and solutions by simulating a cloud datacentre.

Virtualization:

- 1. Find procedure to run the virtual machine of different configuration usingvirtmanager.
- 2. Virtualize a machine and check how many virtual machines can be utilized at a particular time.
- 3. Create a VM Clone and attach virtual block to the cloned virtual machine and check whether it holds the data even after the release of the virtualmachine.
- 4. Create a Snapshot of a VM at a given point in time and test the snapshot by restoring the VM to that time. (Note: Testing can be done by installing an application and then restoreit.)
- 5. Perform Storage Virtualization by Installing a Storage controller and interact with it using open-source network-attached storage (NAS)software.

Public Cloud:

- 1. Develop a simple application to understand the concept of PAAS using GAE/Amazon Elastic Beanstalk/IBM Blue Mix and launch it.
- 2. Test how a SaaS applications scales in response todemand.
- 3. Find the procedure to launch a Cloud instance using a Public IaaS cloud likeAWS/GCP.

Private Cloud:

- 1. Setup a Private Cloud by performing the procedure using a Single node OPENSTACK implementation.
- 2. Perform Creation, Management and Termination of a CirrOS instance inOPENSTACK.
- 3. Show the virtual machine migration based on certain conditions from one node to theother.

Hadoop - Map Reduce:

- 1. Setup a Single Node Hadoop cluster and show all the process through WEBUI.
- 2. Demonstrate the MAP REDUCE programming model by counting the number of words in a file.
- 3. Implement the procedure to interact with Hadoop API for Accessing HDFS from local file system.

Cloud Simulators:

- 1. Model and simulate a Cloud computing environment with Data Centers, Hosts and Cloudlets and perform VM provisioning using Clouds.
- 2. Design a host with two CPU cores, which receives request for hosting two VMs, such that each one requires two cores and plans to host four tasks units. More specifically, tasks t1, t2, t3 and t4 to be hosted in VM1, while t5, t6, t7, and t8 to be hosted in VM2. Implement space- shared allocation policy and time-shared allocation policy. Compare theresults.
- 3. Model a Cloud computing environment having Data centre that had 100 hosts. The hosts are to be modeled to have a CPU core (1000 MIPS), 2 GB of RAM and 1TB of storage. Consider the workload model for this evaluation including provisioning requests for 400 VMs, with each request demanding 1 CPU core (250 MIPS), 256 MB of RAM and 1 GB of storage. Each VM hosts a web-hosting application service, whose CPU utilization distribution was generated according to the uniform distribution. Each instance of a web hosting service required 150,000 MIPS or about 10 minutes to complete execution assuming 100% utilization.

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Design and implement virtual machines and understand the need for resourceutilization
- 2. Use public cloud infrastructure for deploying their pplications.
- 3. Create a private cloudinfrastructure
- 4. Understand the Mapreduceconcept
- 5. Test how a cloud data centre would function using a simulatorsoftware

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:

Hardware: Systems with Virtualization Enabled, dual core processor with 8 GB RAM.

Software: CentOS, VirtualBox, OpenStack, CirrOS, CloudSim.

Internet:For updating packages and for doing public cloud experiments. Public cloud requires accessing well know a cloud platform, which requires VISA/MASTER CARD for verification with zero cost.

	Subject Code/Subject Name: CS17711 /Cloud computingLaboratory															
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	O1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 F										PO12	PSO1	PSO2	PSO3	PSO4
CS17711 .1	3	2	1	1	1		1		1		2	2	2	1	1	1
CS17711 .2	3	2	1	1	1				1		1	1	2	1	1	1
CS17711 .3	2	2	1	1	2		1	1	1		1	1	1	1	1	1
CS17711 .4	2	1	1	1	1		1		1		1	1	2	1	1	1
CS17711 .5	3	2	1	1	1		1		1	1	2	1	1	1		
	2.6	1.8	1	1	1.2	-	1	1	-	1.2	1.2	1.8	1	1	1	

SEMESTER VI ELECTIVE - I

IT17E61GRAPH THEORYANDAPPLICATIONL TP C3 0 03

OBJECTIVES:

The student should be able to

- To develop an understanding the most fundamentals of Graphs, Sub graphs and Trees.
- To be familiar with the concept of Spanning trees, Cut sets, Isomorphism, Network flows and Planargraphs.

9

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- To learn about Directed graphs & its types, Eulergraphs.
- To understand the principle of permutations and combinations.
- To learn about how to generate functions, solving homogeneous and nonhomogeneous recurrencerelations.

UNITI INTRODUCTION 9

Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits – Connectedness – Components – Euler graphs – Hamiltonian paths and circuits – Trees – Properties of trees – Distance and centers in tree – Rooted and binarytrees.

(Ref. Book 1: Chapter 1-3)

UNITII TREES, CONNECTIVITY&PLANARITY

Spanning trees – Fundamental circuits – Spanning trees in a weighted graph – cut sets – Properties of cut set – All cut sets – Fundamental circuits and cut sets – Connectivity and separability – Network flows – 1-Isomorphism – 2-Isomorphism – Combinational and geometric graphs – Planar graphs – Different representation of a planergraph.

(Ref. Book 1: Chapter 3-5)

UNITIII MATRICES, COLOURING ANDDIRECTEDGRAPH

Chromatic number – Chromatic partitioning – Chromatic polynomial – Matching – Covering – Four color problem – Directed graphs – Types of directed graphs – Digraphs and binary relations – Directed paths and connectedness – Eulergraphs.

(Ref. Book 1: Chapter 8-9)

UNITIV PERMUTATIONS& COMBINATIONS 9

Fundamental principles of counting – Permutations and combinations – Binomial theorem – Combinations with repetition – Combinatorial numbers – Principle of inclusion and exclusion – Derangements – Arrangements with forbidden positions.

(Ref. Book 2: Chapter 1 & 8)

UNITV GENERATINGFUNCTIONS 9

Generating functions – Partitions of integers – Exponential generating function – Summation operatorRecurrence relations – First order and second order – Non-homogeneous recurrence relations–Method of generating functions (Ref. Book 1: Chapter 9 & 10)

TOTAL: 45 PERIODS

OUTCOMES:

At the end the student will be able to

- 1. Write precise and accurate mathematical definitions of objects in graphtheory.
- 2. Use mathematical definitions to identify and construct examples and to distinguish examples fromnon-examples.
- 3. Validate and critically assess a mathematical proof.
- 4. Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graphtheory.
- 5. Reason from definitions to construct mathematical proofs.

REFERENCES:

- 1. NarsinghDeo, —GraphTheory:WithApplication toEngineering andComputer Sciencel, Prentice Hall of India,2003.
- 2. Grimaldi R.P. —Discrete and Combinatorial Mathematics: An Applied Introduction^{II}, Addison Wesley,1994.
- 3. ClarkJ. AndHolton D.A, -AFirstLookatGraphTheory, AlliedPublishers, 1995.
- 4. Mott J.L., Kandel A. and Baker T.P. —Discrete Mathematics for Computer Scientists and Mathematicians, Prentice Hall of India, 1996.
- 5. Liu C.L., —Elements of Discrete Mathematics, McGraw Hill, 1985.
- 6. RosenK.H.,—DiscreteMathematicsandItsApplications|,McGrawHill,2007.

	Subject Code/Subject Name: IT17E61/Graph Theory and Applications															
				Pro	ogram	Outco	omes						Progra	am Spec	ific Out	comes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17E61.1	-	- 2 2 2 2 1 2 1 2 -											2	2	2	2
IT17E61.2	-	1	2	2	2	1	2	1	2	-	2	1	1	1	2	2
IT17E61.3	-	1	1	-	-	2	1	1	1	-	-	2	2	1	2	2
IT17E61.4	-	2	-	2	2	1	-	1	-	-	1	1	1	2	2	2
IT17E61.5	-	2	2	2	2	1	2	1	2	2	2	2	2			
		1.6	1.75	2	2	1.2	1.75		1.25	1.6	1.6	1.6	2	2		

IT17E62 DATA WAREHOUSING ANDDATAMINING

L T PC 3 00 3

OBJECTIVES: The student should be made to:

- Learn the concepts of Data Warehousing and BusinessAnalysis.
- □ Familiar with the concepts of DataMining.
- Understand the concepts of Association and CorrelationsAlgorithms.
- Understand the concepts of ClassificationAlgorithms.
- Understand the concepts of Clustering and outlierAnalysis.

UNITI DATA WARE HOUSING 9

Data Warehouse: Basic Concepts, A Multitier Architecture, Data Warehouse Models, Metadata Repository- Data Warehouse Modeling: Data Cube and OLAP, Data Cube: A Multidimensional Data Model: Schemas-Concept Hierarchies-OLAP Operations.

(TB1-CH: 4)

UNITII DATA MININGANDVISUALIZATION 8

Introduction: Kinds of Data, Kinds of Patterns- Data Objects and Attribute Types- Data Visualization: Pixel-Oriented, Geometric Projection, Icon-Based, Hierarchical, Visualizing Complex Data and Relations- Data Preprocessing.

(TB1-CH: 1&2)

UNITIII ASSOCIATIONS AND CORRELATIONS 9

Basic Concepts: Frequent Itemsets, Closed Itemsets, and Association Rules - Frequent Item set Mining Methods: Finding Frequent Itemsets by Confined Candidate Generation, Growth Approach for Mining Frequent Itemsets, Mining Frequent Itemsets Using Vertical Data Format, Mining Closed and Max Patterns - Interesting Patterns: Pattern Evaluation Methods.

(TB1-CH: 6)

UNITIV CLASSIFICATION 9

Basic Concepts- Decision Tree Induction: ID3- Bayes Classification Methods: Bayes' Theorem, Naive Bayesian Classification- Classification by Back propagation- Support Vector Machines- Techniques to improve classificationaccuracy-Prediction.

(TB1-CH: 8)

UNITV CLUSTER ANALYSIS AND DATA MINING APPLICATIONS 10

Cluster Analysis- Partitioning Methods- Hierarchical Methods: Agglomerative versus Divisive Hierarchical Clustering- Density-Based Methods: DBSCAN- Grid-Based Methods: STING: Statistical Information Grid-Outlier Detection-Data Mining Applications: Science and Engineering- Data Mining Tools: Weka& R -Web Mining-Emerging Trends in Data Mining. (TB1-CH:10)

TOTAL: 45 PERIODS

OUTCOMES:

After completing this course, the student will be able to:

- 1. Apply the Data Warehousing and Business Analyticsconcepts.
- 2. Apply the concepts of Data Mining to large datasets.
- 3. Make use of Association and CorrelationsAlgorithms.
- 4. Compare and Contrast the various classifiers.
- 5. Apply Clustering and outlier Analysis and to solve Data Mining CaseStudies.

TEXT BOOK:

1. Jiawei Han and MichelineKamber, —Data Mining Concepts and Techniques^{II}, Third Edition, Elsevier, 2012.

REFERENCES:

- 1. Pang-NingTan,MichaelSteinbachandVipinKumar,—IntroductiontoDataMiningl,Person Education,2007.
- 2. K.P. Soman, ShyamDiwakar and V. Aja, —Insight into Data Mining Theory and Practicel, Eastern Economy Edition, Prentice Hall of India,2006.
- 3. G. K. Gupta, —Introduction to Data Mining with Case Studies^{II}, Eastern Economy Edition, Prentice Hall of India, 2006.
- 4. DanielT.Larose,—DataMiningMethodsandModels|,Wiley-Interscience,2006.
- 5. Alex Berson and Stephen J.Smith, —Data Warehousing, Data Mining and OLAPI, Tata McGraw – Hill Edition, Thirteenth Reprint2008.

S	Subject Code/Subject Name: IT17E62 /Data Wareh															
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 P											PO12	PSO1	PSO2	PSO3	PSO4
IT17E62 .1	3	2	-	2	-	2	2	-	-	-	2	2	-	-	1	2
IT17E62 .2	3	2	-	2	-	2	1	-	-	-	2	1	-	-	1	2
IT17E62 .3	2	2	-	2	-	2	2	-	-	-	3	2	3	2	2	2
IT17E62 .4	2	2	-	2	2	2	1	-	-	-	2	2	3	2	2	2
IT17E62 .5	-	-	2	2	2	2	-	2	2	3	-	2	2			
	2.5	2	2	2	2	2	1.5	-	-	2.2	1.8	3	2	1.6	2	

T17E63 ADVANCEDJAVAPROGRAMMING

L T P C 3003

OBJECTIVES:

The student should be able to

- Gain knowledge on Java Fundamentalbasics
- □ Know thenetwork programming injava
- Understand the Image processing usingjava
- □ Learn the Image manipulation usingJava
- □ Learn the various cryptographic Library injava

UNIT I JAVAFUNDAMENTALS 9

Java Virtual Machine – Reflection – I/O Streaming – Filter and Pipe Streams – ByteCodes – Byte Code Interpretation – Dynamic Reflexive Classes – Threading – JavaNative Interfaces – GUI Applications.(Ref. Book 5: Chapter 2,11,13,19,21,22,23)

UNIT II NETWORK PROGRAMMINGIN JAVA 9

Stream Customization – Sockets – Secure Sockets – Custom Sockets – UDP Datagrams– Multicast Sockets – URL Classes – Reading Data From The Server – Writing Data. (Ref. Book 1: Chapter 2,5,7,8,9,10,12)

UNIT III IMAGEPROGRAMMING 9

Introduction – image warping, wavelengths, motion blur – Digital images – voxel, pixel,Java – Images in Java – Java2D, Java Advanced Imaging, imageprocessing.

UNIT IV IMAGEMANIPULATION

9

 $Grey\ level\ and\ color\ enhancement\ -\ cumulative\ frequency\ -\ Java2D\ -\ deflationalgorithm\ -\ image\ compression.$

UNIT VCRYPTOGRAPHIC LIBRARYIN JAVA9

Introduction – Secure systems – Cryptography – Platform security – Key management – Encryption – Streams and blocks. (Ref. Book 2: Chapter 1,2,3,5,6)

TOTAL: 45 PERIODS

OUTCOMES:

At the end the student will be able to

- 1. Acquire knowledge on Java Fundamentalbasics
- 2. Categorize network programming injava
- 3. Define modeling techniques for Image processing usingjava
- 4. Implement Image manipulation usingJava
- 5. Demonstrate the various cryptographic Library injava

REFERENCES:

- 1. ElliotteRustyHarold,-Java NetworkProgramming,O'ReillyPublishers, 2000.
- 2. JonathanKnudsen, –Java Cryptographyl,O'Reilly Publishers, 1998.
- 3. Douglas A. lyon, —Image Processing in Javal, Prentice Hall PTR, 1999.
- 4. Nick Efford—DigitalImageProcessing:APracticalIntroductionUsing Javal, AddisonWesley,2000.
- 5. Herbert Schildt, Java The Complete Reference, 7th Edition. Tata McGraw-HillEdition.

	Subject Code/Subject Name: IT17E63/Advanced Java Programming															
				Pro	gram	Outco	omes						Progra	m Spec	ific Out	comes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17E63.1	3	2	1	3	-	-	-	-	-	-	-	-	-	-	3	-
IT17E63.2	-	3	3	2	-	-	-	-	-	-	-	-	3	-	3	-
IT17E63.3	-	3	3	3	-	-	-	-	-	-	-	-	3	-	3	-
IT17E63.4	-	3	2	3	-	1	-	-	-	-	-	-	3	-	-	-
IT17E63.5	-	2	3	3	-	-	-	-	3	-	-	3	-	-		
	3.00	2.60	2.75	2.80	-	-	-	-	-	3.00	-	3.00	3.00	3.00	-	

CS17E63

LTP C 3003

OBJECTIVES:

The student should be made to:

- Understand the foundations of .NETframework.
- Learn the object oriented Concepts inC#.
- Understand SQL Server and ADO.NET.
- Be aware of application development in.NET.
- Learn web based applications and web services on .NET(ASP.NET).

UNITI INTRODUCTION TO .NET FRAMEWORKANDC# 9

Knowledge of .NET framework - .NET features and .NET development platform - Understanding advantages of .NET framework - Introducing C# - Literals, Variables and Data Types – Operators and Expressions - Branching and Looping – C# Methods - Implicit and Explicit casting - Arrays, Array Class and Array List - Strings, Structure and Enumerations - Boxing and Un-boxing.

UNITII OBJECT ORIENTED ASPECTSOF C# 9

Class and Objects - Constructors and its types - Inheritance – Properties and Indexers, Index overloading – Polymorphism - Abstract and Interface - Operator overloading – Delegates – Errors and Exception - Threading.

UNITIII SQL SERVER DATABASEANDADO.NET 9

Building windows application - Creating our own window forms with events and controls -Menu creation - Inheriting window forms - Dialog Box(Modal and Modeless) - Design and develop Database using SQL Server - Accessing data with ADO.NET - Dataset, Data Adapter - Updating database using storedprocedures.

UNITIV WEB APPLICATION DEVELOPMENTUSINGASP.NET

Recap on HTML – JavaScript - CSS - Basics of ASP.NET - ASP.NET controls - Creation of Master Pages –Gridview control - Understand Data Binding, SQL Server with ASP.NET.

UNITV WEB DEPLOYMENT ANDWEBSERVICES

Creating virtual directory and Configuring IIS - Create web services - Passing datasets and returning datasets from web services - Handling Transaction and Exceptions - Security in .NET: 3DES, MD5 Hashing.

TOTAL: 45 PERIODS

9

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OUTCOMES:

At the end of the course, the student should be able to:

- 1. List the major elements of the .NETframework.
- 2. Analyze the basic structure of a C#application.
- 3. Debug, compile, and run a simpleapplication.
- 4. Develop programs using C# on.NET.
- 5. Design and develop Web based applications on .NET and deploy webservices.

TEXT BOOKS:

- 1. Herbert Schildt, The Complete Reference: C# 4.0, Second Edition, Tata McGraw Hill,2012.
- 2. Christian Nagel et al. Professional C# 2012 with .NET 4.5, First Edition, Wiley India,2012.
- 3. E. Balagurusamy, Programming in C#, Third Edition,Tata McGraw-Hill, New Delhi,2004.

REFERENCES:

- 1. Andrew Troelsen, Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010.
- 2. Ian Griffiths, Matthew Adams, Jesse Liberty, Programming C# 4.0, Sixth Edition, O'Reilly, 2010.

	Subject Code/Subject Name: CS17E63 /C# and .Net Programming															
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10									PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17E63 .1	2	2	3	2	3								3	3		
CS17E63 .2		2	3	2	3		2		1	1			3	3		
CS17E63 .3		2	3	2	3	1	1	1	1	1			3	3	2	1
CS17E63 .4		2	3	2	3	1						2	3	3	2	1
CS17E63 .5		2 3 2 3										2	3	3	1	1
	2	2	3	2	3	1	1.5	1	1	-	2	3	3	1.6	1	

IT17E64 MULTIMEDIASYSTEMS

L T P C 3003

OBJECTIVES:

- To understand the basic concepts of multimedia, multimedia architecture and multimedia databases.
- To acquire knowledge about Compression & Decompressiontechniques.
- To study about File format, Storage and retrievaltechnologies.
- To understand the I/O Technologies used inmultimedia.
- To study about hypermedia, messaging standards & Distributed MultimediaSystems.

UNITI MULTIMEDIA SYSTEMS DESIGN 9

Multimedia basics – Multimedia applications – Multimedia system architecture – Evolving technologies for multimedia – Defining objects for multimedia systems – Multimedia data interface standards –Multimedia databases. (Text Book 1, 2: Chapter1)

UNITII COMPRESSIONANDDECOMPRESSION 9

Compression and Decompression: Need for Data Compression – Types of Compression – Binary Image Compression Schemes – Image Compression – Video Compression – Audio Compression. (Text Book 1: Chapter7 & Text Book 2: Chapter 2)

UNITIII DATA AND FILE FORMAT STANDARDS 9

Introduction - Rich Text Format – TIFF File Format – Resource Interface File Format – MIDI File Format - JPEG DIB File Format – AVI Indeo File Format – MPEG Standards TWAIN. (Text Book 1: Chapter 3.2, 9, 11, 14 & Text Book 2: Chapter 2 & 3)

UNITIV MULTIMEDIA I/OTECHNOLOGIES 9

Introduction - Image Scanners – Digital Voice and Audio – Digital Camera – Video Images and Animation – Full Motion Video – Storage and Retrieval Technologies: Hard Disk Technology – RAID Technology – Optical Media – HierarchicalStorageManagement. (Text Book 1: Chapter 5, 6 & Text Book 2: Chapter 4 & 5)

UNITV HYPERMEDIA 9

Hypermedia Messaging: Mobile Messaging – Hypermedia Message Components -Hypermedia Linking and Embedding – Integrated Multimedia Message Standards – Distributed Multimedia Systems: Components – Multimedia Object Servers – Distributed Multimedia Databases. (Text Book 2: Chapter8-10)

TOTAL: 45 PERIODS

OUTCOMES:

At the end the student should be able to

- 1. Gain knowledge about basics of multimedia and itspurpose.
- 2. Understand about various techniques used for compressing and decompressing various forms of data.
- 3. Solve a wide range of multimedia designproblems.
- 4. Develop various multimedia file handling techniques and animation.
- 5. Gain knowledge about the various hypermedia and distributed multimedia designtechniques.

TEXT BOOKS:

- 1. Fundamendals of Multimedia, Second edition ZeNian Li, Mark S. Drew, Jiangchuan Liu Springer, ISBN 978-3-319-05289-2, ISBN 978-3-319-05290-8 (ebook),2014
- 2. PrabatKAndleighandKiranThakrar,-MultimediaSystemsandDesignl,PrenticeHallIndia, 2003, NewDelhi.

REFERENCES:

- 1. RalfSteinmetz,KlaraSteinmetz,—MultimediaComputing,Communications&Applicatio nsl Pearson education, 2004.
- 2. Tay Vaughan, -MultimediaMakingItWorkl,McGrawHill,2002.
- 3. Parekh R Principles of Multimedial Tata McGraw-Hill,2006.

	Subject Code/Subject Name: IT17E64/Multimedia Systems															
				Pro	gram	Outco	mes						Progra	um Spec	ific Out	comes
Course Outcomes	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10										PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17E64.1	2	-	2	-	-	-	-	-	-	-	-	-	1	1	-	-
IT17E64.2	2	1	2	1	-	-	-	-	-	-	1	-	2	1	-	-
IT17E64.3	1	-	1	-	-	-	-	-	-	-	-	-	1	1	-	-
IT17E64.4	1	1	1	-	-	-	-	-	-	-	-	-	1	1	1	1
IT17E64.5	1	1 2 1 1											2	2	1	1
	1.40	1.33	1.40	1.00	-	-	-	1.00	1.00	1.40	1.20	1.00	1.00			

SEMESTER VII ELECTIVE – II

CS17E83	CYBER FORENSICS	L T PC
		3003

OBJECTIVES:

The student should be made to:

- Have an introduction into the process of CyberForensics.
- Understand the Environment offorensics.
- Learn process of collectingevidences.
- Gain working knowledge of analyzing evidences usingtools.
- Learn other sources of evidences and its futurechallenges.

UNITI DIGITALFORENSICSPROCESS 9

Forensic Science, Digital Forensics, Digital Evidence, Digital Forensics Process – Identification, Collection, Examination, Analysis, Presentation Phases.Cyber Crime Law-International Legal Framework of Cybercrime Law, Digital Crime, Investigation Methods for Collecting Digital Evidence.

UNITII FORENSICS ENVIRONMENTS 9

Hardware and Software Environments – Storage Devices, Operating System, File Systems, Metadata, Locating evidence in file systems-Password security, Encryption, and Hidden files. Case study – linking the evidence to the user, Data Analysis using forensics tool ILookIX

UNITIII COLLECTINGEVIDENCES 9

Use of Digital Evidence, File Metadata and Correlation with Other Evidence, Technical Complexities of Digital Evidence.Data carving, Date and time problems, Physical Acquisition and Safekeeping of Digital Evidence.Forensic Imaging Processes. Case Study – IXImager, Understanding .ASB container

UNITIV ANALYZINGDIGITALEVIDENCE 9

Selecting and Analyzing Digital Evidence - Locating digital evidence, Categorizing files, Eliminating superfluous files, The Event Analysis tool, Cloud Analysis tool, The Lead Analysis tool, Volume Shadow Copy analysis tools, Validating the Evidence. Case study – illustrating the recovery of deleted evidence held in volume shadows.

UNITV OTHER SOURCESOF EVIDENCES

9

Windows and Other Operating Systems as Sources of Evidence, Examining Browsers, E-mails, Messaging Systems, and Mobile Phones, Internet and Cloud.-Challenges in Digital Forensics.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, student will be able to:

- 1. Identify the need for cybercrimeinvestigation.
- 2. Understand the hardware and software components responsible for seekingevidence.
- 3. Have knowledge on the techniques used for collectingevidences.
- 4. Analyze the evidence through suitabletools.
- 5. Examine other sources of evidences.

TEXT BOOKS:

1. Richard Boddington, Practical Digital Forensics, PACKT publishing, First Edition, 2016 ANDRÉ ÅRNES.

REFERENCES:

- 1. John R.Vacca, Computer Forensics, Second Edition, Cengage Learning, 2005.
- 2. Richard E.Smith, Internet Cryptography, Third Edition, Pearson Education, 2008.
- 3. MarjieT.Britz, Computer Forensics and Cyber Crime: An Introduction, Third Edition, PrenticeHall, 2013.

Subject Code/Subject Name: CS17E83 /Cyber Forensics (Professional Elective II)																
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	201 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10										PO12	PSO1	PSO2	PSO3	PSO4
CS17E83 .1	1	3	2	3	1	1	-	-	1	2	1	-	3	2	1	-
CS17E83 .2	-	3	3	3	2	1	-	1	1	2	1	1	3	2	1	-
CS17E83 .3	-	3	3	3	2	1	-	1	1	2	1	1	3	2	1	-
CS17E83 .4	1	3	3	3	3	1	-	1	1	2	1	1	3	2	1	-
CS17E83 .5	-	3	1	3	1	1	1	-	2	1	-	3	2	1	-	
	1	3	2.4	3	1.8	1	1	1	2	1	1	3	2	1		

WIRELESSSENSORNETWORKS

L T PC 3 00 3

OBJECTIVES:

- To provide an overview about sensor networks and emergingtechnologies.
- To study about the node and network architecture of sensor nodes and its execution environment.
- To understand the concepts of communication, MAC, routing protocols and also study about the naming and addressing inWSN.
- To learn about topology control and clustering in networks with timing synchronization for localization services with sensor tasking and control.
- To study about sensor node hardware and software platforms and understand the simulation and programmingtechniques

UNIT I OVERVIEW OF WIRELESSSENSOR NETWORKS 9

Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks

UNITII ARCHITECTURES 9

Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture -Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

UNITIII NETWORKINGSENSORS 9

Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, GeographicRouting.

UNITIV INFRASTRUCTUREESTABLISHMENT 9

Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

UNITV SENSOR NETWORK PLATFORMS ANDTOOLS 9

Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.

OUTCOMES:

Upon successful completion of this course, Students shall be able to

- 1. understand the different sensor networks and emergingtechnologies.
- 2. Design a different node and networkarchitecture
- 3. understood the concepts of communication, MAC, routing protocols and also study about the naming and addressing inWSN.
- 4. Design a system with topology control and clustering in networks along with timing synchronization for localization services, sensor tasking and control.
- 5. Familiar with sensor node hardware and software platforms and understand the simulation and programmingtechniques

TEXT BOOK

- 1. Holger Karl & Andreas Willig, "Protocols And Architectures for Wireless Sensor Networks", John Wiley,2005.
- 2. Feng Zhao & Leonidas J. Guibas, —Wireless Sensor Networks- An Information Processing Approach", Elsevier,2007.

REFERENCES

1. KazemSohraby, Daniel Minoli, &TaiebZnati, —Wireless Sensor Networks-Technology, Protocols, And Applications^{II}, John Wiley,2007.

Subject Code/Subject Name: IT17E71/Wireless Sensor Networks																	
				Pro	gram	Outc	omes						Progra	Program Specific Outcomes			
Course Outcomes	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 J											PSO1	PSO2	PSO3	PSO4	
IT17E71.1	1	-	1	-	-	-	-	-	-	-	-	-	-	1	1	1	
IT17E71.2	1	2	1	-	-	-	-	-	-	-	-	-	-	1	-	1	
IT17E71.3	2	-	2	-	-	-	-	-	-	-	-	-	-	1	1	1	
IT17E71.4	2	-	2	-	1	-	-	-	-	-	-	-	-	1	1	1	
IT17E71.5	2	-	2	-	2	-	-	-	1	-	1	2	2				
	1.60	2.00	1.60	-	1.50	-	-	-	-	-	1.00	-	1.00	1.25	1.20		

2. Anna Hac, —Wireless Sensor Network Designsl, John Wiley, 2003.
IT17E72

VIRTUALREALITY

L T PC 3 00 3

OBJECTIVES:

The student should be able to

- Gain knowledge on Virtual Realitybasics
- Know the different kinds of Input and Outputdevices
- Understand the modeling techniques and human factors involved
- Learn the VRprogramming
- Learn the various applications of VR in different domains

UNITI INTRODUCTION 9

The three F's of virtual reality, History of early VR, commercial VR technology, VR becomes an Industry, Five classic components of a VR system. (Ref. Book 1: Chapter 1)

UNITII INPUT ANDOUTPUTDEVICES 9

Three-dimensional position trackers, navigation and manipulation, interfaces and gesture interfaces, Graphics displays, sound displays & haptic feedback. (Ref. Book 1: Chapter 2 - 3)

UNITIII MODELING ANDHUMANFACTORS 9

Geometric modeling, kinematics modeling, physical modeling, behaviour modeling, model management, Methodology and terminology, user performance studies, VR health and safety issues. (Ref. Book 1: Chapter 5, 7)

UNITIV VRPROGRAMMING	9
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Introducing Java 3D, loading and manipulating external models, using a lathe to make shapes, 3D Sprites, animated 3D sprites, particle systems. (Ref. Book 2: Chapter 14, 16, 17, 18, 19 and 21)

UNITV APPLICATIONS 9

Medical, Education, Arts and Entertainment, Military, Manufacturing, Robotics. (Ref. Book 1: Chapter 8 - 9)

TOTAL: 45 PERIODS

OUTCOMES:

At the end the student will be able to

- 1. Acquire knowledge on Virtual Realitybasics
- 2. Categorize different kinds of Input and Outputdevices
- 3. Define modeling techniques and human factors involved
- 4. Implement VR programming concepts and createmodels
- 5. Demonstrate the various applications of VR in different domains

REFERENCES:

- 1. Virtual Reality Technology, Second Edition, Gregory C. Burdea& Philippe Coiffet, John Wiley &Sons,Inc.,
- 2. Killer Game Programming in Java, Andrew Davison, Oreilly-SPD,2005.
- 3. Understanding Virtual Reality, interface, Application and Design, William R.Sherman, Alan Craig, Elsevier(MorganKaufmann).
- 4. 3D Modeling and surfacing, Bill Fleming, Elsevier(MorganKauffman).
- 5. 3D Game Engine Design, David H.Eberly, Elsevier.

		S	ubje	ct Co	de/S	ubjec	t Na	me: I	T17E	E72/V	irtual	Realit	y			
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO11	PO12	PSO1	PSO2	PSO3	PSO4		
IT17E72.1	2	2	2	1	1	-	-	-	3	2	2	2	2	2	2	2
IT17E72.2	2	3	2	1	1	-	-	-	3	2	3	2	2	2	2	3
IT17E72.3	2	3	2	2	2	-	-	-	-	-	-	2	2	3	2	3
IT17E72.4	2	-	-	2	3	-	-	-	-	-	-	-	2	2	-	-
IT17E72.5	2	2	-	3	3	-	1	2	3	2	1	3	2	3	-	3
	2.00	2.50	2.00	1.80	2.00	-	1.00	2.00	3.00	2.00	2.00	2.25	2.00	2.40	2.00	2.75

6. Virtual Reality Systems, John Vince, PearsonEducation.

8

IT17E73 INFORMATIONRETRIEVALTECHNIQUES

OBJECTIVES:

The student should be made to:

- Understand the basics of Information Retrieval with pertinence to modeling, query operations and indexing.
- Get an understanding of machine learning techniques for text classification and clustering.
- Understand the various applications of Information Retrieval giving emphasis to Multimedia IR, Web Search.
- Understand the concepts of digitallibraries.

UNITI INTRODUCTION

Motivation – Basic Concepts – Practical Issues - Retrieval Process – Architecture – Boolean Retrieval–Retrieval Evaluation – Open Source IR Systems–History of Web Search – Web Characteristics–The impact of the web on IR —IR Versus Web Search–Components of a Search engine

UNITII MODELING 10

Taxonomy and Characterization of IR Models – Boolean Model – Vector Model – Term Weighting – Scoring and Ranking –Language Models – Set Theoretic Models – Probabilistic Models – Algebraic Models – Structured Text Retrieval Models – Models for Browsing – **Text Operations**

UNITIII INDEXING 9

Static and Dynamic Inverted Indices – Index Construction and Index Compression. Searching- Sequential Searching and Pattern Matching. Query Operations -Query Languages – QueryProcessing - Relevance Feedback and Query Expansion - Automatic Local and Global Analysis – Measuring Effectiveness and Efficiency

UNITIV CLASSIFICATIONANDCLUSTERING

Text Classification and Naive Bayes – Vector Space Classification – Support vector machines and Machine learning on documents. Flat Clustering – Hierarchical Clustering – Matrix decompositions and latent semantic indexing – Fusion and Meta learning

UNITV SEARCHINGANDRANKING 10

Searching the Web –Structure of the Web –IR and web search – Static and Dynamic Ranking - Web Crawling and Indexing – Link Analysis - XML Retrieval Multimedia IR: Models and Languages – Indexing and Searching Parallel and Distributed IR – Digital Libraries

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, student will be able to:

- 1. Build an Information Retrieval system using the availabletools.
- 2. Identify and design the various components of an Information Retrievalsystem.
- 3. Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval.
- 4. Analyze the Web content structure.
- 5. Design an efficient search engine.

TEXT BOOKS:

- 1. Ricardo Baeza Yates, BerthierRibeiro Neto, –Modern Information Retrieval: The conceptsandTechnologybehindSearch(ACMPressBooksI),SecondEdition,2011
- 2. ChristopherD.Manning,PrabhakarRaghavan,HinrichSchutze,-IntroductiontoInformatio n Retrievall, Cambridge University Press, First South Asian Edition2012

REFERENCES:

1. Stefan Buttcher, Charles L. A. Clarke, GordonV. Cormack, -Information Retrieval Implementing and Evaluating Search Engines^{II}, The MIT Press, Cambridge, Massachusetts London, England, 2010

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				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17E73.1	2	2	3	-	2	-	2	-	2	2	-	2	1	3	-	2
IT17E73.2	2	3	-	2	2	1	-	1	-	1	2	-	-	2	-	-
IT17E73.3	2	-	1	-	1	1	-	-	1	1	-	1	2	-	-	2
IT17E73.4	2	2	-	2	-	2	1	-	-	2	2	-	-	-	1	-
IT17E73.5	2	-	-	1	1	-	1	-	-	1	1	-	2	1	-	2
	2.00	2.33	2.00	1.67	1.50	1.33	1.33	1.00	1.50	1.40	1.67	1.50	1.67	2.00	1.00	2.00

2. http://www.search-engines-book.com/slides/.

6

IT17E76COMPREHENSION IN INFORMATION TECHNOLOGYL T P C3 3 0 3

Course Objectives:

The student should be made to:

- To explain the concepts of computer organization and architecture
- To describe the concepts of programming, data structures and algorithms
- To explore the concepts of compiler design
- To emphasize the concepts of operating systems and databases
- To explain the computer network concepts

UNIT I COMPUTER ORGANIZATION AND ARCHITECTURE

Machine instructions and addressing modes, ALU, data-path and control unit, Instruction pipelining, pipeline hazards Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

UNIT II PROGRAMMING, DATA STRUCTURES AND ALGORITHMS 9

Programming in C. Recursio,. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs. Searching, sorting, hashing, Asymptotic worst case time and space complexity, Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph traversals, minimum spanning trees, shortest paths

UNIT III COMPILER DESIGN 9

Lexical analysis, parsing, syntax-directed translation. Runtime environments, Intermediate code generation, Local optimization, Data flow analyses: constant propagation, livens analysis, common subexpression elimination.

UNIT IV OPERATING SYSTEM AND DATABASES

System calls, processes, threads, inter-process communication, concurrency and synchronization, Deadlock, CPU and I/O scheduling, Memory management and virtual memory, File systems, ER-model, Relational model: relational algebra, tuple calculus, SQL, Integrity constraints, normal forms, File organization, indexing (e.g., B and B+ trees), Transactions and concurrency control.

UNIT VCOMPUTER NETWORKS12

OSI and TCP/IP Protocol Stacks; Basics of packet, circuit and virtual circuit-switching; framing, error detection, Medium Access Control, Ethernet bridging; Routing protocols: shortest path, flooding, distance vector and link state routing; Fragmentation and IP addressing, IPv4, CIDR notation, Basics of IP support protocols (ARP, DHCP, ICMP),

Network Address Translation (NAT); Transport layer: flow control and congestion control, UDP, TCP, sockets; Application layer protocols: DNS, SMTP, HTTP, FTP, Email.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- be expert in computer organization and architecture concepts
- implement programming, data structures and algorithms
- explore operating systems and database concepts
- design computer networks concepts

Text Books

- 1. Carl Hamacher, ZvonkoVranesic and SafwatZaky, "Computer Organization", Fifth Edition, Tata McGraw Hill, 2002.
- 2. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Pearson Education, 1988
- 3. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 1997
- 4. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, Ninth Edition, John Wiley and Sons Inc., 2012.
- 5. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2011.
- 6. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.

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				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO2	PO3	PO11	PO12	PSO1	PSO2	PSO3	PSO4								
IT17E76 .1	2	-	3	-	1	-	-	-	-	-	1	-	3	3	2	-
IT17E76 .2	3	3	3	2	2	-	-	-	-	-	1	-	3	3	2	-
IT17E76 .3	3	2	3	2	2	-	1	-	2	-	1	-	3	3	2	-
IT17E76 .4	3	2	3	2	2	-	1	-	2	-	1	-	3	3	2	-
IT17E76 .5	3	2	3	2	2	-	1	-	2		1	-	3	3	2	-
	2.8	2.25	3	2	1.8	-	1	-	2	-	1	-	3	3	2	-

7

SEMESTER VII ELECTIVE – III

IT17E74	DESIGN THINKING	L T PC
		3 00 3

OBJECTIVES:

Student will be able to:

- 1. Understand the background and driving of Innovation and DesignThinking
- 2. Understand the Design Thinking practices and models
- 3. Use DT tools to aid design thinking for agile softwaredevelopment.
- 4. Learn DT in the context of user experiencedesign
- 5. Learn the implications of DT in various domains

UNITI INTRODUCTION

Design Thinking- History of Design Thinking - Need for DT – Benefits –Skills for Design Thinking–Design Thinking and Its Relevance to Innovation–Governance Innovation - Principles of Good Design

UNITII DESIGNTHINKINGPROCESSES 12

Design Thinking Models –Stanford's Design Thinking Model, IBMs Model, MVJ Model and Royal Civil Service Commission's Model – Google Sprint - Double Diamond Method-Design Thinking Processes: Stages of Thinking – Research –Idea Generation – Refinement – Prototyping – Implementation –Essential Methods and Tools - Case Studies

UNITIII DESIGN THINKING AND UX DESIGN PROCESS 9

Design thinking and Ux Design – usability — impact of human psychology on design - Conducting user Interviews -7 influencing factors for Ux – Research tools for Ux – Interaction Design – Mobile Web Design - Current Trends

UNITIV DESIGN THINKING FORSOFTWAREDEVELOPMENT 10

Roles of DT in SW engineering - Design thinking and agile development - Design thinking and Scrum –Tools for Design Thinking –CaseStudies

UNITV APPLIEDDESIGNTHINKING 9

Applied Design Thinking and Strategy -10 principles for business management- DT in innovation Business, Education -DT in Society -DT in Engineering - Caseswhere on DT doesn't work.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student will be able to;

- 1. Explain and Understand key concepts of DesignThinking
- 2. Understand the Design Thinking Models and practices
- 3. Understand applications of DT to variousdomains
- 4. Investigate and think creatively about design problems and opportunities in SW Engineering
- 5. Apply design thinking skills to solve real time user experienceproblems

TEXT BOOKS:

- 1. http://asimetrica.org/wp-content/uploads/2014/06/design-thinking.pdf(e-book)
- 2. http://www.rcsc.gov.bt/wp-content/uploads/2017/07/dt-guide-book-master-copy.pdf (e- book)
- 3. IdrisMootee,-DesignThinkingforStrategicInnovation:WhatTheyCan'tTeachYouatBusi ness or Design Schooll, Wiley, 2017.(e-book)
- 4. Basics Design 8: Design Thinking by Gavin Ambrose, Paul Harris, AVA Publishing (UK) Ltd.,2010.
- 5. The Basics of User Experience Design BY INTERACTION DESIGN FOUNDATION (unit V)[e-book]

REFERENCES:

1. Tim Brown, Barry Katz -Change by Design - How Design Thinking Transforms Organizations and Inspires Innovation^{||}, First Edition, HapperCollins,2009Thomas Lockwood, -Design Thinking – Integrating, Innovation, Customer experience and Brand value^{||}, First Edition, Allworth Press,200

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						Progra	m Spec	ific Ou	tcomes							
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO11	PO12	PSO1	PSO2	PSO3	PSO4		
IT17E74.1	2	2	2	1	1	-	-	-	-	-	-	3	-	-	-	3
IT17E74.2	1	2	2	-	-	2	2	2	-	-	-	3	3	3	3	3
IT17E74.3	1	2	2	-	2	2	2	2	-	-	-	3	3	3	3	3
IT17E74.4	1	-	2	3	2	2	2	2	-	-	3	3	3	3	3	3
IT17E74.5	-	-	2	3	2	-	2	2	3	-	-	-	3	3	3	3
	1.25	2	2	2.3	1.75	2	2	2	3	-	3	3	3	3	3	3

L T PC 3003

OBJECTIVE:

GE17E51

UNITV

• To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights ofothers.

HUMAN VALUES ANDPROFESSIONALETHICS

UNITI HUMANVALUES 10

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNITII ENGINEERINGETHICS 9

Senses of _Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories

UNITIII ENGINEERING ASSOCIALEXPERIMENTATION 9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law-Case studies

UNITIV SAFETY, RESPONSIBILITIES ANDRIGHTS 9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) - Discrimination

GLOBAL ISSUES

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students:

- 1. Should be able to apply ethics insociety,
- 2. Discuss the ethical issues related to engineering
- 3. Realize the responsibilities and
- 4. Realize the rights in thesociety
- 5. Understand the global issues and itsimpact.

TEXTBOOKS:

- 1. Mike W. Martin and Roland Schinzinger, —Ethics in Engineeringl, Tata McGraw Hill, New Delhi,2003.
- 2. GovindarajanM,NatarajanS,SenthilKumarV.S,—EngineeringEthics|,PrenticeHallof India, New Delhi,2004.

REFERENCES:

- 1. Charles B. Fleddermann, –EngineeringEthicsl,PearsonPrentice Hall, NewJersey, 2004.
- 2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, —Engineering Ethics – Concepts and Casesl, Cengage Learning,2009
- 3. John R Boatright, —Ethics and the Conduct of Business^{II}, Pearson Education, New Delhi, 2003
- 4. Edmund G Seebauer and Robert L Barry, —Fundamentals of Ethics for Scientists and Engineers^I, Oxford University Press, Oxford,2001
- Laura P. Hartman and Joe Desjardins, —Business Ethics: Decision Making for Personal Integrity and Social Responsibility McGraw Hill education, India Pvt. Ltd., New Delhi 2013.
- 6. World Community Service Centre, "Value Education", Vethathiri publications, Erode,2011

Sub	ject (Code	/Subj	ject N	lame	: GE	17E5	51/Hu	ıman	value	s and	Profes	sional	Ethics		
				Pro	gram	Outo	comes	5					Р	rogram Outc	Specif: omes	ic
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3	PSO4
GE17E51.1	-	-	-	-	-	-	2	3	2	-	-	3	-	-	3	_
GE17E51.2	-	-	-	-	-	-	3	3	-	-	-	3	-	2	3	-
GE17E51.3	-	-	-	-	-	-	3	3	-	-	-	3	-	2	3	-
GE17E51.4	-	-	-	-	-	-	3	3	2	-	-	3	-	-	3	-
GE17E51.5	-	-	-	-	-	-	3	3	2	-	-	3	-	-	3	-
	-	-	-	-	-	-	2.8 0	3.0 0	2.0 0	-	-	3.00	-	2.00	3.00	-

IT17E75 SOFTWAREPROJECTMANAGEMENT L T PC 3 0 0 3

OBJECTIVES:

The Student should be made to:

- Learn the fundamentals of software projectmanagement
- □ Learn about the stages in the software development lifecycle and associated processes.
- □ Know about the quality standards for project management, process maturitymodels
- Explore estimation techniques, schedule, monitor and control theproject.
- Discuss and where appropriate apply the principles of project riskmanagement.

UNITIPROJECT EVALUATION ANDPROJECTPLANNING

9

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

UNITII PROJECT LIFE CYCLE ANDEFFORTESTIMATION9

Software process and Process Models – Choice of Process models - mental delivery –Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – Staffing Pattern. – Case Studies on Effort Estimation.

UNITIII ACTIVITY PLANNING ANDRISKMANAGEMENT

9

Objectives of Activity planning - Sequencing and Scheduling Activities - Network Planning Models Forward Pass - Backward Pass & Activity Float - Critical path (CRM) method - Risk identification – Assessment – Monitoring - PERT technique - Resource Allocation - Creation of critical patterns - Cost schedules. – Case Studies on RiskManagement.

UNITIV MANAGEMENTANDCONTROL 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. Managing people: Organizational behavior –Best methods of staff selection –Motivation –Ethical and Programmed concerns –Working in teams –Case Studies.

UNITV STAFFING INSOFTWAREPROJECTS 9

Introduction -Managing people -Understanding Behavior - Organizational Behavior: A Background Selecting The Right Person For The Job - Instruction In The Best Methods – Motivation - The Oldman - Hackman Job Characteristics Model - Working In Team - Decision Making -Team Structures & Organizational Structures - Communications Genres, Plans – CaseStudies

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Know about software projects and to evaluate them.
- 2. Perform estimation for softwareprojects.
- 3. Know activity planningtechniques.
- 4. Demonstrate Project scheduling and risk evaluationskills.
- 5. Handle staffing relatedproblems.

TEXT BOOKS:

1. BobHughes, MikeCotterell,-SoftwareProjectManagement^{||}, Fifthedition, TataMcGraw Hill, 2011.

REFERENCES:

1. WalkerRoyce-SoftwareProjectManagementAUnifiedFrameworkl,PearsonEducation,2004

- 2. RishabhAnand ,"Software Project Management"' S.K. Kataria& Sons;2013.
- 3. S.A. Kelkar, "Software Project Management: A Concise Study Paperback ", Phi2013.
- 4. RameshGopalaswamy,—ManagingGlobalSoftwareProjectsl,TataMcGrawHill,2001.
- 5. Humphrey Watts, —Managing the software process, Addison Wesley, 1989.
- 6. Ashfaque Ahmed "Software Project Management Process Driven Approach", Auerbach Pub., 2011.

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				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17E75.1	2	-	-	-	2	-	2	-	2	-	-	2	1	3	-	2
IT17E75.2	2	3	-	2	2	1	-	1	-	1	2	-	-	2	-	-
IT17E75.3	-	-	1	-	1	1	-	-	1	-	-	1	2	-	1	2
IT17E75.4	2	2	-	3	-	2	1	-	-	2	-	-	-	1	-	-
IT17E75.5	-	-	-	1	-	-	1	-	-	1	1	-	1	1	-	-
	2.00	2.50	1.00	2.00	1.67	1.33	1.33	1.00	1.50	1.33	1.50	1.50	1.33	1.75	1.00	2.00

GE17451

TOTAL QUALITY MANAGEMENT

L T P C 3 0 0 3

OBJECTIVES:

- To facilitate the understanding of basic quality management inengineering.
- To facilitate the understanding of various principles of TQM.
- To be acquainted with management tools, six sigma andbenchmarking.
- To be acquainted with quality functions, TPM concepts &continuous improvement tools.
- To learn various quality systems and TQM implementation in manufacturing and service sectors.

UNITI INTRODUCTION

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Costs of quality.

UNITII TQMPRINCIPLES

Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Quality circles, Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, SupplierRating.

UNITIII TQM TOOLS ANDTECHNIQUES I 9

The seven traditional tools of quality - New management tools - Six sigma, Lean Six Sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNITIV TQM TOOLS ANDTECHNIQUES II 9

Control Charts - Process Capability - Concepts of Six Sigma - Quality Function Deployment (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures. POKA- YOKE.

UNITV QUALITYSYSTEMS 9

Need for ISO 9000 - ISO 9001:2015 Quality System - Elements, Documentation, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits – ISO 9000:2005, ISO 9004:2009 - TQM Implementation in manufacturing and service sectors.Quality System for Automotive Supplier TS 16949, Quality System for Telecom Industries - TL9000

TOTAL: 45 PERIODS

OUTCOMES:

- 1. Ability to explain the importance of quality inengineering.
- 2. Ability to explain various principles inTQM.
- 3. Explore the knowledge of implementing various TQMtools.
- 4. Ability to create rapport among workers to form a qualityteam.
- 5. Ability to explain the benefits of implementing ISO-9000 & ISO-14000 in manufacturing and servicesectors.

9

TEXT BOOK:

1. Dale H. Besterfiled, et al., "Total quality Management", Third Edition, Pearson Education Asia, Indian Reprint, 2011.

REFERENCES:

- James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8thEdition, First Indian Edition, Cengage Learning, 2012.
- 2. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd.,2006.
- 3. Janakiraman. B and Gopal .R.K., "Total Quality Management Text and Cases", Prentice Hall(India) Pvt. Ltd., 2006.

	Su	bject	Cod	e/Sub	ject	Nam	e: GE	E174:	51/T	otal Q	uality	Mana	igemen	ıt		
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
GE17451.1	-	-	-	-	-	1	1	-	-	-	-	-	1	1	1	
GE17451.2	-	-	-	-	-	2	2	-	-	-	-	-	-	1	2	1
GE17451.3	1	1	-	-	2	-	1	1	-	-	-	-	-	1	2	1
GE17451.4	2	1	-	1	2	-	1	1	-	-	-	-	-	1	2	1
GE17451.5	2	-	-	1	1	2	-	-	-	-	-	-	-	1	1	1
	1.67	1.00	-	1.00	1.67	1.67	1.25	1.00	-	-	-	-	-	1.00	1.60	1.00

SEMESTER VIII ELECTIVE - IV

IT17E81 SERVICEORIENTEDARCHITECTURE L T PC

3 00 3

OBJECTIVES:

The student should be made to:

- Learn XMLfundamentals.
- Be exposed to build applications based onXML.
- Understand the key principles behindSOA.
- Be familiar with the web services technology elements for realizingSOA.
- Learn the various web servicestandards.

UNITI INTRODUCTIONTOXML 9

XML document structure – Well formed and valid documents – Namespaces – DTD – XML Schema - X-Files. (Ref. Book 1: Chapter2-5)

UNITII BUILDING XML-BASEDAPPLICATIONS

Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL Formatting – Modeling Databases in XML (Ref. Book 1: Chapter 7-9)

UNIT III SERVICEORIENTEDARCHITECTURE 9

Characteristics of SOA, Comparing SOA with Client-Server and Distributed architectures – Benefits of SOA -- Principles of Service orientation – Service layers.

(Ref. Book 2: Chapter 3-4,8-9)

UNIT IV WEB SERVICES

Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Message Exchange Patterns – Orchestration – Choreography –WS Transactions

(Ref. Book 2: Chapter 4, 6, 13,14)

UNIT V BUILDINGSOA-BASEDAPPLICATIONS 9

Service Oriented Analysis and Design – Service Modeling – Design standards and guidelines -- Composition – WS-BPEL – WS-Coordination – WS-Policy – WS-Security – SOA support in J2EE. (Ref. Book 2: Chapter 11, 13,14-18)

TOTAL: 45 PERIODS

OUTCOMES:

Upon successful completion of this course, students will be able to:

- 1. Build applications based onXML.
- 2. Develop web services using technologyelements.
- 3. Build SOA-based applications for intra-enterprise and inter-enterpriseapplications.
- 4. Design SOAP based applications
- 5. Understand WS policies and Security.

TEXTBOOKS:

- 1. Ron Schmelzer et al. XML and Web Services^I, Pearson Education,2002
- 2. Thomas Erl, —Service Oriented Architecture: Concepts, Technology, and Designl, Pearson Education,2005.

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REFERENCES:

- 1. FrankP.Coyle, -XML, WebServices and the DataRevolution, Pearson Education, 2002.
- 2. Eric Newcomer, Greg Lomow, —Understanding SOA with Web Services^{II}, Pearson Education, 2005.
- 3. SandeepChatterjee and James Webber, —Developing Enterprise Web Services: An Architect's Guidel, Prentice Hall,20044.
- 4. JamesMcGovern,SameerTyagi,MichaelE.Stevens,SunilMathew,IJavaWeb. Services ArchitectureI, Morgan Kaufmann Publishers,2003

	Sub	ject (Code	/Subj	ject N	lame	:IT17	E81	/Ser	vice O	riente	d Arc	hitectu	re		
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO11	PO12	PSO1	PSO2	PSO3	PSO4		
IT17E81.1		3	3	3	3	2	2		3	2	3		3			
IT17E81.2		2	2	3	3	2				2	2	2	3			
IT17E81.3	2		2	2	2		2		3		3	3			3	
IT17E81.4	2	2	3	3	3		2					3		3	2	3
IT17E81.5	2	2	2	3	3		3			3		3				3
	2	2.25	2.4	2.8	2.8	2	2.25	-	2.6	2.5	2.6	2.75	2.5	3	2.5	3

CS17E75

HUMANCOMPUTERINTERACTION

L T PC 3 00 3

OBJECTIVES:

The Student should be made to:

- Learn the foundations of Human ComputerInteraction.
- Be familiar with the design technologies and softwareprocess
- Learn human interaction models and theories
- Be aware of Design thinkingconcepts.
- Learn the guidelines of design thinking and applyit.

UNITI FOUNDATIONS OFHCI

9

The Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity.

UNITII DESIGN & SOFTWAREPROCESS

9

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. HCI Patterns

UNITIII MODELS ANDTHEORIES 9

Cognitive models –Socio-Organizational issues and stake holder requirements – Communication and collaboration models

UNITIV FOUNDATIONS OF DESIGNTHINKING 9

Why Design Thinking – The Design Process – Design Criteria – Visualization – Journey Mapping – Value Chain Analysis – Mind Mapping – Case Studies

UNITV APPLYINGDESIGNTHINKING 9

Brainstorming - Concept Development –Assumption Testing – Rapid Prototyping – Customer Co- creation – Learning launch – Free mind (Mind – Mapping Tool) – Case Studies

TOTAL 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Describe the foundations of Human ComputerInteraction.
- 2. Demonstrate with the design technologies and softwareprocess.
- 3. Apply the concepts of human interaction models and theories
- 4. Describe the foundations of design thinkingconcepts.
- 5. Apply the concepts of design thinking in mind mappingtools

TEXT BOOKS:

- 1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, Human Computer Interaction, Third Edition, Pearson Education,2004
- 2. Jeanne Liedtka, Tim Ogilvie, and Rachel Brozenske, The Designing for Growth Field Book: A Step-by-Step Project Guide, First Edition (New York: Columbia University Press,2014).

REFERENCES:

- 1. Tim Brown, Barry Katz Change by Design How Design Thinking Transforms Organizations and Inspires Innovation, First Edition, HapperCollins,2009
- 2. Thomas Lockwood, Design Thinking Integrating, Innovation, Customer experience and Brand value, First Edition, Allworth Press,2009
- 3. Jenny Preece, Helen Sharp, Yvonne Rogers, Interaction Design beyond humancomputer interaction, Fourth Edition, John Wiley & Sons, Inc, 2015

	Sub	ject (Code/	Subj	ect N	ame:	CS1	17E7	5/Hu	man C	Compi	iter In	teracti	on		
				Pro	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS17E75.1	3	2	1	1	1	-	-	-	-	-	-	-	1	1	-	-
CS17E75.2	2	1	1	1	-	-	-	-	-	-	-	1	2	-	-	
CS17E75.3	2	1	1	1	-	-	-	-	-	-	-	-	2	1	1	1
CS17E75.4	2	1	1	1	-	-	-	-	-	-	-	-	1	1	-	-
CS17E75.5	3	2	1	1	-	-	-	-	-	-	1	1	1	1	1	1
	2.40	1.40	1.00	1.00	-	-	-	-	-	-	1.00	1.00	1.20	1.20	1.00	1.00

IT17E82

INTERNETOFTHINGS

L T P C 3003

OBJECTIVES:

The student should be able to:

- Learn the Fundamentals of IOT.
- Know the DesignMethodology.
- Apply the concept of Internet of Things in real worldscenario
- Build a small low cost embedded system using present day embeddedplatforms
- Apply the concept of Internet of Things in real worldscenario

UNITI FUNDAMENTALS 9

Introduction to Embedded system- Evolution of IoT- Difference between embedded system and IoT- IIoT and Industry 4.0- IoT Characteristics – IoTVs M2M- IoT Levels and Domain Specific IoTs

UNITII ARCHITECTURE

IoT Architecture-State of the Art – Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Four important key elements of IoT- Real-World Design Constraints, Technical Design constraints: Data representation and visualization, Interaction and remote control.

UNITIII IoT DESIGNANDCHALLENGES 9

Devices and gateways- IoT Edge: Sensors and activators, Communication modules ,Zigbee , RFID, Wi-Fi, Power sources-Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management- Challenges in IoT: Design challenges, Development challenges, Security challenges, Otherchallenges

UNITIV BUILDING IOT WITHHARDWAREPLATFORMS

Present day embedded platforms: Arduino /Intel Galileo/Raspberry Pi- Physical device – IoT Software – NOOBS/ENERGIA/MQTT -Interfaces – CommunicationsProgramming.

UNITV CASESTUDIES 9

Domain specific applications of IoT Home automation, Industry applications, Surveillance applications, Other IoT applications -Connecting IoT to cloud- - Software & Management Tools for IoT

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the students should be able to:

- 1. Understand the Reference architecture and various IoTlevels
- 2. Design a portable IoT using present day embedded platforms and relevantprotocols
- 3. Develop web services to access/control IoTdevices
- 4. Developing Cloud based applications usingIoT
- 5. Develop applications inEnergia/Noobs/MQTT

TEXT BOOK:

- 1. ArshdeepBahga, Vijay Madisetti, "Internet of Things-A hands-on approach", Universities Press, 2015.
- 2. Dr. OvidiuVermesan, Dr. Peter Friess, —Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems^{II}, RiverPublishers

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REFERENCES:

- 1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, —From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligencell, 1st Edition, Academic Press,2014.
- 2. Peter Waher, —Learning Internet of Thingsl, PACKT publishing, BIRMINGHAM MUMBAI
- BerndScholz-Reiter,FlorianMichahelles,—ArchitectingtheInternetofThingsl,ISBN978-3-19156-5 e-ISBN 978-3-642-19157-2,Springer
- 4. Daniel Minoli, —Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications^{II}, ISBN: 978-1-11847347-4, WillyPublications

		Su	bject	Cod	e/Suł	oject	Nam	e: IT	17E8	32/Inte	ernet c	of Thir	ngs			
				Prog	gram	Outc	omes						Progra	m Spec	ific Ou	tcomes
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17E82.1	2	I	-	_	_	_	_	I	_	_	_	_	2	_	-	2
IT17E82.2	_	2	3	2	_	_	_	1	_	_	_	_	-	_	3	_
IT17E82.3	_	2	2	_	_	-	_	-	_	_	_	_	1	_	2	_
IT17E82.4	1	2	3	-	-	-	-	-	_	-	-	-	2	2	_	1
IT17E82.5	-	_	3	_	_	_	_	_	_	_	_	_	3	_	_	-
	0.75	1.20	2.75	0.50	_	_	_	_	_	_	_	_	1.60	0.40	1.00	0.75

IT17E83

SOCIALNETWORKANALYSIS

L T PC 3 00 3

OBJECTIVES:

The student should be made to:

- Understand the components of the social network.
- Model and visualize the social network.
- Mine the users in the social network.
- Understand the evolution of the social network.
- Mine the interest of theuser.

UNITI INTRODUCTION

9

Introduction to Web - Limitations of current Web – Development of Semantic Web – Emergence of the Social Web – Statistical Properties of Social Networks -Network analysis – Development of Social Network Analysis - Key concepts and measures in network analysis – Discussion networks - Blogs and online communities - Web-based networks-Data Mining in SocialNetworks.

UNIT II MODELINGANDVISUALIZATION 9

Visualizing Online Social Networks - A Taxonomy of Visualizations - Graph Representation - Centrality- Clustering - Node-Edge Diagrams - Visualizing Social Networks with Matrix-Based Representations- Node-Link Diagrams - Hybrid Representations - Modeling and aggregating social network data – Random Walks and their Applications –Use of Hadoop and Map Reduce - Ontological representation of social individuals and relationships.

UNITIII MININGCOMMUNITIES

Aggregating and reasoning with social network data, Advanced Representations – Extracting evolution of Web Community from a Series of Web Archive - Detecting Communities in Social Networks - Evaluating Communities – Core Methods for Community Detection & Mining - Applications of Community Mining Algorithms - Node Classification in Social Networks- **Optmization**

UNITIV EVOLUTION

Evolution in Social Networks – Framework - Tracing Smoothly Evolving Communities – Models and Algorithms for Social Influence Analysis - Influence Related Statistics - Social Similarity and Influence - Influence Maximization in Viral Marketing - Algorithms and Systems for Expert Location in Social Networks - Expert Location without Graph Constraints - with Score Propagation – Expert Team Formation - Link Prediction in Social Networks -Feature based Link Prediction - Bayesian Probabilistic Models - Probabilistic Relational Models.

UNITV TEXT AND OPINION MINING 9

Text Mining in Social Networks -Opinion extraction – Sentiment classification and clustering - Temporal sentiment analysis - Irony detection in opinion mining –**Opinion Spam Detection**- Wish analysis - Product review mining – Review Classification – Tracking sentiments towards topics over time.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Work on the internals components of the social network.
- 2. Model and visualize the social network.
- 3. Mine the behavior of the users in the social network.

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- 4. Predict the possible next outcome of the socialnetwork.
- 5. Mine the opinion of theuser.

TEXT BOOKS:

- 1. Peter Mika, Social Networks and the Semantic Web, Springer, First edition, 2007.
- 2. BorkoFurht, Handbook of Social Network Technologies and Applications, Springer, First edition,2010.

REFERENCES:

- 1. Charu C. Aggarwal, Social Network Data Analytics, Springer;2011
- 2. GuandongXu ,Yanchun Zhang and Lin Li, Web Mining and Social Networking Techniques and applications, Springer, First edition,2011.
- 3. Giles, Mark Smith, John Yen, Advances in Social Network Mining and Analysis, Springer, 2010.
- 4. Ajith Abraham, Aboul Ella Hassanien, VaclavSnašel, Computational Social Network Analysis: Trends, Tools and Research Advances, Springer,2009.
- 5. Toby Segaran, Programming Collective Intelligence, O'Reilly,2012
- 6. Bing Liu. Sentiment Analysis and Opinion Mining, Morgan & Claypool Publishers, May 2012.

Subject Code/Subject Name:IT17E83/Social Network Analysis																
		Program Outcomes										Program Specific Outcomes				
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17E83.1	-	2	2	2	2	1	2	1	2	-	1	2	2	2	2	2
IT17E83.2	-	1	2	2	2	1	2	1	2	-	2	1	1	1	2	2
IT17E83.3	-	1	1	-	-	2	1	1	1	-	-	2	2	1	2	2
IT17E83.4	-	2	-	2	2	1	-	1	-	-	1	1	1	2	2	2
IT17E83.5	-	2	2	2	2	1	2	1	2	-	1	2	2	2	2	2
		1.6	1.75	2	2	1.2	1.75	1	1.75		1.25	1.6	1.6	1.6	2	2

SEMESTER VIII ELECTIVE - V

MG17E81

LEAN STARTUPMANAGEMENT

L T PC 3 00 3

OBJECTIVES:

• The objective of the course is to make a student to create and commercialize theproduct

UNIT I

Creativity and Design Thinking (identify the vertical for business opportunity, understand your customers, and accurately assess market opportunity)

UNIT II

Minimum Viable Product (Value Proposition, Customer Segments, Build-measure-learn process)

UNIT III

Business Model Development(Channels and Partners, Revenue Model and streams, Key Resources, Activities and Costs, Customer Relationships and Customer Development Processes, Business model canvas –the lean model-templates)

UNIT IV

Business Plan and Access to Funding(visioning your venture, taking the product/ service to market, Market plan including Digital & Viral Marketing, start-up finance - Costs/Profits & Losses/cash flow, Angel/VC,/Bank Loans and Key elements of raising money)

UNIT V

Legal, Regulatory, CSR, Standards, Taxes

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student shall be able to

- 1. Create design for Business and MarketOpportunity
- 2. Measure the viability of theproduct.
- 3. Develop BusinessModels
- 4. Understand and develop the business splans
- 5. Execution of the BusinessModels

TEXT BOOKS:

1. Steve Blank, K & S Ranch , The Startup Owner's Manual: The Step-By-Step Guide for Building a Great Company, 1st edition, 2012

- 2. SteveBlank, TheFourStepstotheEpiphany I, K&SRanch; 2ndedition, 2013
- 3. Eric Ries , The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses , Crown Business, 2011

REFERENCE BOOKS:

- 1. Steve Blank-HoldingaCatbytheTaill,, K&S RanchPublishingLLC, 2014
- 2. KaralTUlrich,-ProductDesign and Developmentl, SDEppinger, McGraw Hill
- 3. Peter Thiel, Zero to One: Notes on Startups, or How to Build the Futurel, Crown Business 2014
- 4. Lean Analytics: Use Data to Build a Better Startup Faster (Lean Series), Alistair Croll& Benjamin Yoskovitz, O'Reilly Media; 1stEdition
- 5. MartyCagan,-Inspired:How ToCreateProductsCustomersLovel,SVPGPress;1stedition, 2008

Subject Code/Subject Name:MG17E81 /Lean Startup Management																
		Program Outcomes											Program Specific Outcomes			
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
MG17E81 .1	2	1	-	2	1	-	1	-	1	1	1	-	1	-	-	-
MG17E81 .2	3	1	-	1	-	-	-	-	-	1	-	-	3	3	-	-
MG17E81 .3	1	-	-	1	-	-	-	-	-	2	-	-	-	3	-	3
MG17E81 .4	-	2	-	3	1	-	-	-	-	3	-	-	2	-	-	3
MG17E81 .5	-	1	-	2	-	-	-	-	-	-	-	-	-	2	-	3
	2	1.25	-	1.8	1	-	1	-	1	1.75	1	-	2	2.6	-	3

IT17E84 SOFTWARE TESTING ANDQUALITY ASSURANCE LT PC

3 00 3

OBJECTIVES:

The student should be able to:

- Know what is software quality and various defect removalprocesses.
- Know various testingtechniques.
- Aware of various types oftesting
- Learn to manage testing and testautomation.
- Quality Metrics of variousSoftware

9

UNITI INTRODUCTION

Introduction to Software Quality - Challenges – Objectives – Quality Factors – Components of SQA – Contract Review – Development and Quality Plans – SQA Components in Project Life Cycle – SQA Defect Removal Policies – Reviews.

UNITII TESTINGTECHNIQUES

Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing.

UNITIII TEST LEVELSANDMETHODOLOGIES 9

Levels of Testing - Unit Testing - Integration Testing - Defect Bash Elimination- System Testing– System and Acceptance Testing – Testing Strategies – White Box and Black Box Approach- Compatibility testing-Performance Testing – Regression Testing - Internationalization Testing – Ad- hoc Testing – Website Testing –Usability and Accessibility Testing – Configuration Testing - Compatibility Testing - Case study for White box testing and Black box testing techniques.

UNITIV TEST AUTOMATIONANDMANAGEMENT 9

Test plan – Management – Execution and Reporting – Software Test Automation – Automated Testing tools - Hierarchical Models of Software Quality – Configuration Management – DocumentationControl.

UNITV SQA INPROJECTMANAGEMENT 9

Project progress control – costs – quality management standards – project process standards – management and its role in SQA – SQA unit.

TOTAL: 45 PERIODS

OUTCOMES

At the end of the course, the student should be able to:

- 1. Analyze the product Quality.
- 2. Apply suitable type of testingmethodology.
- 3. Test the product with white and black box testingstrategies.
- 4. Perform test management withdocumentation.
- 5. Understand quality managementstandards

TEXTBOOKS:

- 1. Daniel Galin, —Software Quality Assurance from Theory to Implementation, Pearson Education, 2009
- 2. Yogesh Singh, —Software Testingl, Cambridge University Press, 2012
- 3. SrinivasanDesikan, Gopalaswamy Ramesh, Software Testing Principles and Practices, Pearson Education, 2006
- 4. William Perry, —Effective Methods of Software Testingl, Third Edition, Wiley Publishing 2007

REFERENCES:

- 1. AdityaMathur,—FoundationsofSoftwareTestingl,PearsonEducation,2008
- 2. Ron Patton, Software Testing, Second Edition, Pearson Education, 2007
- 3. Robert Furtell, Donald Shafer and Linda Shafer, —Quality Software Project Managementl, Pearson Education Asia,2002.

Subject Code/Subject Name: IT17E84/Software Testing and Quality Assurance																
		Program Outcomes										Program Specific Outcomes				
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
IT17E84.1	2	2	3	-	2	-	2	-	2	2	-	2	1	3	-	2
IT17E84.2	2	3	-	2	2	1	-	1	-	1	2	-	-	2	-	-
IT17E84.3	2	-	1	-	1	1	-	-	1	1	-	1	2	-	-	2
IT17E84.4	2	2	-	2	-	2	1	-	-	2	2	-	-	-	1	-
IT17E84.5	2	-	-	1	1	-	1	-	-	1	1	-	2	1	-	2
	2.00	2.33	2.00	1.67	1.50	1.33	1.33	1.00	1.50	1.40	1.67	1.50	1.67	2.00	1.00	2.00

CS17E72FOUNDATION SKILLSININTEGRATEDPRODUCTL TPCDEVELOPMENT3 0 0 3

OBJECTIVE:

This program can be offered with all Undergraduate programs/courses for all engineering streams. The FSIPD program aims to improve students' awareness and understanding of the basic concepts involved in integrated product Development (IPD) by providing exposure to the key product development concepts. After completing this program, the student will be ableto:

Understand and analyze various global trends and decide on the scope of the new

productdesign.

Conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems

Understand requirement engineering and know how to collect, analyze and arrive at requirement for new product development and convert them in to designspecification

- Understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- Gain knowledge of the Innovation & Product Development process in the BusinessContext.

UNIT IFUNDAMENTALS OFPRODUCTDEVELOPMENT9

Global Trends Analysis and Product decision - Types of various trends affecting product decision - Social Trends - Technological Trends - Political/Policy Trends - Economic Trends - Environmental Trends - PESTLE Analysis(Requirements, Aim, Process), Various factors of Pestle analysis(Political, Technological, Legal). Introduction to Product Development Methodologies and Management - Overview of Products and Services - Types of Product Development - Overview of Product Development methodologies - Product Life Cycle - Product Development Planning and Management.

UNITII REQUIREMENTS AND SYSTEM DESIGN 9

Requirement Engineering: Types of Requirement - Requirement Engineering (Gathering, Analysis, Design Specification) - Traceability Matrix and Analysis – RequirementManagement. System Design & Modelling: Introduction to System Modeling - System Optimization (Problem Formulation), Optimization Techniques (Bracketing method, Fibonacci search method, Cubic interpolation, Random jumping method) - System Specification - Sub-System Design - Interface Design

UNITIII DESIGNANDTESTING 13

Conceptualization -Industrial Design and User Interface Design - Introduction to Concept generation Techniques – Challenges in Integration of Engineering Disciplines - Concept Screening & Evaluation Detailed Design: Component Design and Verification – Software Subsystems - High Level Design/Low Level Design of S/W Program. Prototyping - Types of Prototypes, Introduction to Rapid Prototyping and Rapid Manufacturing, Testing and Certification - Manufacturing/ Purchase and

Assembly of Systems, Integration of Mechanical, Embedded and Software systems, Introduction to Product Verification Processes, Validation Processes and Stages, Product

Testing Standards Certification, S/W Testing- Hardware Schematic, Component design, Layout and Hardware Testing – Product Documentation.

UNIT IV SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL) SUPPORT 5

Sustenance - Maintenance and Repair – Enhancements. Product EoL - Obsolescence Management - Configuration Management - EoL Disposal

UNITVBUSINESS DYNAMICS – ENGINEERINGSERVICESINDUSTRY 9

The Industry - Engineering Services Industry - Product development in Industry versus Academia - The IPD Essentials - Introduction to vertical specific product development processes - Product development Trade-offs - Intellectual Property Rights and Confidentiality - Security and configuration management.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- 1. Define, formulate and analyze aproblem
- 2. Solve specific problems independently or as part of ateam
- 3. Develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineeringcustomer
- 4. Work independently as well as inteams
- 5. Manage a project from start tofinish

TEXT BOOK [INDIAN ECONOMY EDITIONS]:

1. Foundation Skills in Integrated Product Development (FSIPD), First Edition, 2013, NASSCOM.

REFERENCES:

- 1. Karl T Ulrich and Stephen D Eppinger, Product Design and Development, Tata McGraw Hill, Fifth Edition, New Delhi,2011
- 2. John W Newstorm and Keith Davis, Organizational Behaviour, Tata McGraw Hill, Eleventh Edition, New Delhi,2005.
- 3. Mark S Sanders and Ernest J McCormick, Human Factors in Engineering and Design, McGraw Hill Education, Seventh Edition, New Delhi,2013.

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OGE1702 INTELLECTUALPROPERTYRIGHTS

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OBJECTIVE:

• To give an idea about IPR, registration and itsen for cement.

UNITI INTRODUCTION

Introduction to IPRs, Basic concepts and need for Intellectual Property - Patents, Copyrights,Geographical Indications, IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO –TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.

UNITII REGISTRATIONOFIPRs 10

Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad

UNIT III AGREEMENTS ANDLEGISLATIONS 10

International Treaties and Conventions on IPRs, TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act.

UNITIV DIGITAL PRODUCTSANDLAW 9

Digital Innovations and Developments as Knowledge Assets – IP Laws, Cyber Law and DigitalContent Protection – Unfair Competition – Meaning and Relationship between Unfair Competition and IP Laws – CaseStudies

UNIT V ENFORCEMENTOFIPRs 7

Infringement of IPRs, Enforcement Measures, Emerging issues – Case Studies

TOTAL: 45 PERIODS

OUTCOMES:

The students have the:

- 1. Ability to understand the basics of Intellectual Propertyright.
- 2. Able to understand the registration procedures of IPRs.
- 3. Able to know the different agreements and legislation related to IPRs.

- 4. Able to know the digital IPlaws.
- 5. Able to understand the Violation and enforcement measures of IPRs

TEXT BOOKS

- 1. S.V. Satarkar, -Intellectual Property Rights and Copy Rightsl,EssEssPublications, New Delhi,2002.
- 2. V. ScopleVinod,-ManagingIntellectualPropertyl, Prentice HallofIndia pvtLtd, 2012

REFERENCES

- 1. Deborah E. Bouchoux, —Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets, Cengage Learning, Third Edition, 2012.
- 2. PrabuddhaGanguli, Intellectual Property Rights: Unleashing the Knowledge Economy, McGrawHill Education, 2011.
- 3. Edited by Derek Bosworth and Elizabeth Webster, The Management of Intellectual Property, Edward Elgar Publishing Ltd., 2013.

IT17811	PROJECT WORK	LTPC
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OBJECTIVE:

• To enable the students to do industry- relevant and real-time projects on various core domains of information technology.

Course Outcomes	Course Outcome Statements
CO1	Analyze complex Engineering problems related Information Technology to reach substantiated conclusions by applying knowledge of Mathematics, Engineering fundamentals and Engineering specialization.
CO2	Create research based solutions for complex computer Engineering or multidisciplinary problems, and design system components or processes by applying appropriate techniques, resources, and modern IT tools.
CO3	Apply contextual computer science engineering solutions in the sustainable development towards environmental, societal, health, safety, legal, cultural issues and needs
CO4	Apply ethical principles and commit to professional ethics and responsibilities

	and norms of the engineering practice.
CO5	Perform effectively as an individual, and as a member or leader in diverse teams, Communicate effectively and write effective reports and design documentation, ability to engage themselves in life-long learning