

B.Tech Information Technology

2015 Regulation Curriculum and Syllabus

STUDENT OUTCOMES

The curriculum and syllabus for B.Tech programs (2015) conform to outcome based teaching learning process. In general, FOURTEEN STUDENT OUTCOMES (a-n) have been identified and the curriculum and syllabus have been structured in such a way that each of the courses meets one or more of these outcomes. Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program. Further each course in the program spells out clear instructional objectives which are mapped to the student outcomes.

The student outcomes are:

- (a) An ability to apply knowledge of computing, mathematics and basic sciences appropriate to the discipline
- (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- (c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- (d) An ability to function effectively on teams to accomplish a common goal
- (e) An understanding of professional, ethical, legal, security and social issues and responsibilities
- (f) An ability to communicate effectively with a range of audiences
- (g) An ability to analyze the local and global impact of computing on individuals, organizations, and society
- (h) Recognition of the need for and an ability to engage in continuing professional development
- (i) An ability to use current techniques, skills, and tools necessary for computing practice.
- (j) An ability to use and apply current technical concepts and practices in the core information technologies
- (k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems
- (l) An ability to effectively integrate IT-based solutions into the user environment
- (m) An understanding of best practices and standards and their application
- (n) An ability to assist in the creation of an effective project plan

C-D-I-O INITIATIVE

The CDIO Initiative (CDIO is a trademarked initialism for **Conceive — Design — Implement — Operate**) is an innovative educational framework for producing the next generation of engineers. The framework provides students with an education stressing engineering fundamentals set in the context of Conceiving — Designing — Implementing — Operating real-world systems and products. Throughout the world, CDIO Initiative collaborators have adopted CDIO as the framework of their curricular planning and outcome-based assessment. In the syllabus, every topic has been classified under one or more of C-D-I-O so that students and faculty alike are clear about the scope of learning to take place under each one of the topics.

SYMBOLS AND ABBREVIATIONS

BT	--	Biotechnology Courses
AR	--	Architecture Courses
B	--	Courses under Basic Science and Mathematics
IT	--	Information Technology Courses
C-D-I-O	--	Conceive-Design-Implement-Operate
CE	--	Civil Engineering Courses
CS	--	Computer Science and Engineering Courses
CY	--	Chemistry Courses
Dept.	--	Department of Information Technology
E with course code	--	Elective Courses
E	--	Courses under Engineering Sciences
EC	--	Electronics and Communication Engineering Courses
EE	--	Electrical and Electronics Engineering Courses
G	--	Courses under Arts and Humanities
IOs	--	Instructional Objectives
L	--	Laboratory / Project / Industrial Training Courses
LE	--	Language Courses
L-T-P-C	--	L- Lecture Hours Per Week
		T- Tutorial Hours Per Week
		P- Practical Hours Per Week
		C- Credits for a Course
M	--	Courses with Multi Disciplinary Content
MA	--	Mathematics Courses
ME	--	Mechanical Engineering Courses
NC	--	NCC- National Cadet Corps
NS	--	NSS – National Service Scheme
P	--	Professional Core Courses
PD	--	Personality Development Courses
PY	--	Physics Courses
SO/SOs	--	Student Outcomes (a-n)
SP	--	NSO- National Sports Organization
YG	--	Yoga Course

CURRICULUM

G: General programme comprising language/communication skills, humanities and social sciences, economics and principles of management, and NSS/NCC/NSO/rural development.

B: Basic sciences comprising Computer Literacy with Numerical Analysis, Mathematics, Physics, and Chemistry.

E: Engineering Sciences and Technical Arts comprising Engineering Graphics, Workshop Practice, Basic Engineering, etc.

P: Professional courses corresponding to the Branch of Studies, which will include core courses, electives, and project work.

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	C
SEMESTER I						
15LE101	G	English	2	0	0	2
15PD101	G	Soft Skills I	1	1	0	1
15MA101	B	Calculus And Solid Geometry	3	1	0	4
15PY101	B	Physics	3	0	0	3
15PY101L	B	Physics Laboratory	0	0	2	1
15CY101	B	Chemistry	3	0	0	3
15CY101L	B	Chemistry Laboratory	0	0	2	1
15BT101	B	Biology For Engineers	2	0	0	2
15CE101	E	Basic Civil Engineering	2	0	0	2
15EE101	E	Basic Electrical Engineering	2	0	0	2
15ME105L	E	Engineering Graphics	1	0	4	3
15CS101L	E	Programming Laboratory	1	0	2	2
SEMESTER II						
15LE102	G	Value Education	2	0	0	2
15PD102	G	Soft Skills II	1	1	0	1
15NC101	G	NCC- National Cadet Corps	0	0	1	1
15NS101	G	NSS- National Service Scheme	0	0	1	1
15SP101	G	NSO- National Sports Organization	0	0	1	1
15YG101	G	Yoga	0	0	1	1
15MA102	B	Advanced Calculus And Complex Analysis	3	1	0	4
15PY102L	B	Material Science	2	0	2	3
15CY102	B	Principles Of Environmental Science	2	0	0	2
15ME101	E	Basic Mechanical Engineering	2	0	0	2
15EC101	E	Basic Electronics Engineering	2	0	0	2
15IT101L	E	Computer Hardware and Troubleshooting Laboratory	0	0	3	2
15IT102	P	Program Design And Development	3	0	0	3
15IT102L	P	Program Design And Development Laboratory	0	0	2	1
SEMESTER III						
15LE201E	G	German Language I	2	0	0	2
15LE202E	G	French Language I	2	0	0	2
15LE203E	G	Japanese Language I	2	0	0	2

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	C
15LE204E	G	Korean Language I	2	0	0	2
15LE205E	G	Chinese Language I	2	0	0	2
15PD201	G	Quantitative Aptitude & Logical Reasoning –I	1	1	0	1
15MA203	B	Discrete Mathematics for Information Technology	4	0	0	4
15EC252	E	Principles of Communication systems	3	0	0	3
15IT213	P	IT Fundamentals	2	0	0	2
15CS201J	P	Data Structures	3	0	2	4
15SE201J	P	Object Oriented Programming Using C++	3	0	2	4
15IT212J	P	Computer Organisation And Architecture	3	0	2	4
SEMESTER IV			2	0	0	2
15LE207E	G	German Language II	2	0	0	2
15LE208E	G	French Language II	2	0	0	2
15LE209E	G	Japanese Language II	2	0	0	2
15LE210E	G	Korean Language II	2	0	0	2
15LE211E	G	Chinese Language II	2	0	0	2
15PD202	G	Verbal Aptitude	1	1	0	1
15IT214	G	Professional Ethics	2	0	0	2
15MA207	B	Probability And Queuing Theory	4	0	0	4
15SE205J	P	Programming in Java	3	0	2	4
15CS204J	P	Algorithm Design And Analysis	3	0	2	4
15CS205J	P	Microprocessors And Microcontrollers	3	0	2	4
15SE203	P	Object Oriented Analysis And Design	2	2	0	3
SEMESTER V						
15PD301	G	Communication & Reasoning Skills	1	1	0	1
15IT314J	P	Principles of Operating Systems	3	0	2	4
15IT311	P	System Integration And Architecture	3	0	0	3
15IT303J	P	Computer Networks	3	0	2	4
15IT302J	P	Database Management Systems	3	0	2	4
15IT375L / 15IT380L / 15IT385L / 15IT490L	P	Minor Project I / Seminar I / MOOCS I / Industrial Module I	0	0	3	2
15IT390L	P	Industrial Training (To be done after IV semester)	0	0	3	2
	P	Dept. Elective - I	3	0	0	3
	P	Open Elective - I	3	0	0	3
SEMESTER VI						
15PD302	G	Quantitative Aptitude & Logical Reasoning –II	1	1	0	2

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	C
15MA305	B	Statistics for Information Technology	4	0	0	4
15IT304J	P	Web Programming	3	0	2	4
15IT313J	P	Network Protocols And Programming	3	0	2	4
15IT321	P	Human Computer Interaction	2	0	0	2
15IT376L / 15IT381L / 15IT386L / 15IT491L	P	Minor Project II / Seminar II / MOOCS II / Industrial Module II	0	0	3	2
	P	Dept. Elective – II	3	0	0	3
	P	Dept. Elective - III	3	0	0	3
	P	Open Elective - II	3	0	0	3
SEMESTER VII						
15IT411J	P	Integrative Programming And Technology	3	0	2	4
15IT412	P	Information Assurance And Security	3	0	0	3
15IT413	P	IT Infrastructure Management	3	0	0	3
15IT415M	P	Multi Disciplinary Design	3	0	0	3
	P	Dept. Elective – IV	3	0	0	3
	P	Dept. Elective - V	3	0	0	3
SEMESTER VIII						
15IT496L	P	Major Project	0	0	24	12
ELECTIVES						
15IT322E	P	Python Programming	2	2	0	3
15IT323E	P	Game Programming	2	2	0	3
15IT324E	P	Mobile Application Development	2	2	0	3
15IT326E	P	Cloud Computing	3	0	0	3
15IT327E	P	Cryptography	3	0	0	3
15IT328E	P	Parallel Programming Using OpenCL	3	0	0	3
15IT329E	P	Database Administration	2	2	0	3
15IT330E	P	Text Mining	3	0	0	3
15IT331E	P	Computer Graphics	2	2	0	3
15IT332E	P	Software Testing	3	0	0	3
15IT340E	P	Data Warehousing And Data Mining	3	0	0	3
15IT341E	P	Enterprise Resource Planning	3	0	0	3
15IT342E	P	Management Information Systems	3	0	0	3
15IT343E	P	Multimedia Tools And Applications	2	2	0	3
15IT344E	P	Digital Audio And Computer Music	3	0	0	3
15IT345E	P	Linux Internals	3	0	0	3
15IT355E	P	Computer Animation: Algorithms And Techniques	2	2	0	3
15IT356E	P	Data Compression	3	0	0	3
15IT357E	P	Engineering Economics And Financial Management	3	0	0	3

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	C
15IT358E	P	Advanced Java Programming And Technology	2	2	0	3
15IT359E	P	Linux Administration	2	2	0	3
15IT360E	P	Fundamentals Of Virtualization	3	0	0	3
15IT361E	P	Internet Security And Computer Forensics	3	0	0	3
15IT362E	P	Information Storage and Management	3	0	0	3
15IT421E	P	Information And Network Security	3	0	0	3
15IT422E	P	Internet Of Things	2	2	0	3
15IT423E	P	Data Science And Big Data Analytics	2	2	0	3
15IT424E	P	Business Intelligence And Analytics	3	0	0	3
15IT426E	P	Parallel Architecture And Algorithms	3	0	0	3
15IT441E	P	Forensics And Incident Response	2	2	0	3
15IT443E	P	Multilayer Switching	3	0	0	3
15IT444E	P	Network Simulation And Modelling	3	0	0	3
15IT445E	P	Interactive Web Page Scripting	3	0	0	3
15IT446E	P	Programming Multimedia For The Web	2	2	0	3
15IT447E	P	Advanced Web Application Development	2	2	0	3
15IT448E	P	Cloud Application Development	2	2	0	3
15IT451E	P	Information Security	3	0	0	3
15IT452E	P	Introduction To Database Management Systems	3	0	0	3
15SE322E	P	E-Commerce	3	0	0	3
15SE329E	P	Visual Programming	2	2	0	3
15SE333E	P	Pervasive Computing	3	0	0	3
15SE427E	P	Wireless And Mobile Communication	3	0	0	3
15CS322E	P	Neuro Fuzzy And Genetic Programming	3	0	0	3
15CS323E	P	Distributed Computing	3	0	0	3
15CS324E	P	Machine Learning	3	0	0	3
15CS332E	P	Wireless Sensor Networks	3	0	0	3
15CS401	P	Artificial Intelligence	3	0	0	3
15CS421E	P	Natural Language Processing	3	0	0	3
15CS422E	P	Knowledge Based Decision Support Systems	3	0	0	3
15CS423E	P	Software Defined Networks	3	0	0	3
15CS424E	P	Semantic Web	3	0	0	3
15CS433E	P	Network Design And Management	3	0	0	3
Courses customized to other Departments						
15IT470E	P	Fundamentals of Big Data Analytics	3	0	0	3
15IT370E	P	Fundamentals of Cloud Computing	3	0	0	3

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	C
15IT371E	P	Computer Networking	3	0	0	3

Summary of Credits										
Category	I	II	III	IV	V	VI	VII	VIII	Total	%
G (Excluding open and departmental electives)	3	4	3	5	1	1	0	0	17	8.33
B (Excluding open and departmental electives)	14	9	4	4	0	4	0	0	35	19.44
E (Excluding open and departmental electives)	9	6	3	0	0	0	0	0	18	10
P (Excluding open and departmental electives)	0	4	14	15	15	10	13	0	71	39.44
P Project /Seminar /Intenship	0	0	0	0	4	2	0	12	18	10
Open Elective	0	0	0	0	3	3	0	0	6	3.33
Dep. Elective	0	0	0	0	3	6	6	0	15	8.33
Total	26	23	24	24	26	26	19	12	180	100

TOTAL CREDITS TO BE EARNED FOR THE AWARD OF THE DEGREE: 180
--

15LE101	ENGLISH	L	T	P	C
		2	0	0	2
Co-requisite:	NIL				
Prerequisite:	NIL				
Course Category	G General				
Course designed by	Department of English & Foreign Languages				
Approval	32 nd Academic Council Meeting , May 2016				

PURPOSE

To enhance the systemic and specific knowledge and skills of the learners in the use of English language by improving their ability to listen, speak, read and write

INSTRUCTIONAL OBJECTIVES

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

1. strengthen their lexical, syntactical and logical competencies
2. comprehend, speak and write on technical topics
3. fine tune their skills required to join an organization and move forward
4. be sensitive to the nuances of English language by enriching their critical and creative thinking

INTRODUCTION – Communication and Language Skills	1
---	----------

UNIT I – INVENTIONS	6
----------------------------	----------

- | | |
|--|--|
| A. Grammar and Vocabulary – Tense and Concord
B. Listening and Speaking – Common errors in Pronunciation (Individual sounds); Process description (Describing the working of a machine, and the manufacturing process)
C. Writing – Interpretation of data (Flow chart, Bar chart)
D. Reading -- (Reading Comprehension -- Answering questions) | |
|--|--|

UNIT II – ECOLOGY	6
--------------------------	----------

- | | |
|---|--|
| A. Grammar and Vocabulary – Error Analysis – Synonyms and Antonyms, Parallelisms
B. Listening and Speaking - Conducting Meetings
C. Writing – Notice, Agenda, Minutes , letters to the editor via email : Email etiquette
D. Reading Comprehension – Summarizing and Note-making | |
|---|--|

UNIT III – SPACE	6
-------------------------	----------

- | | |
|--|--|
| A. Grammar and Vocabulary – tense and concord; word formation
B. Listening and Speaking – Distinction between native and Indian English (Speeches by TED and Kalam) – accent, use of vocabulary and rendering;
C. Writing – Definitions and Essay writing
D. Reading Comprehension – Predicting the content | |
|--|--|

UNIT IV – CAREERS	6
--------------------------	----------

- | | |
|--|--|
| A. Grammar and Vocabulary –Homonyms and Homophones
B. Listening and Speaking – Group Discussion
C. Writing Applying for job, cover letter and resume
D. Reading, etymology (roots, idioms and phrases), | |
|--|--|

UNIT V – RESEARCH	5
--------------------------	----------

- | | |
|---|--|
| A. Grammar and Vocabulary – Using technical terms, Analogies
B. Listening and Speaking -- Presentation techniques (Speech by the learner)
C. Writing – Project Proposal
D. Reading Comprehension -- Referencing Skills for Academic Report Writing (Research Methodology – Various methods of collecting data) Writing a report based on IEEE Handbook | |
|---|--|

TOTAL	30
--------------	-----------

TEXT BOOK	
------------------	--

English for Engineers. Department of English and Foreign Languages. SRM University Publications. 2015.	
MATERIAL FOR FURTHER READING	
Dhanavel, S.P. English and Communication Skills for Students of Science and Engineering, Units 1-5. Chennai: Orient, .Blackswan Ltd., 2009.	
REFERENCE BOOKS	
Raman, Meenakshi and Sangeetha Sharama . Technical Communication-Principles and Practice. Oxford University Press. 2009. Day, R A. Scientific English: A Guide for Scientists and Other Professionals. 2 nd ed. Hyderabad: Universities Press, 2000	

Course Designed by		Department of English & Foreign Languages													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	L	m	n
								X							
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)			
		X													
3	Broad Area(for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction		Platform Technologies		
		Not Applicable													
4	Staff coordinator							Dr. Cauveri							

15PD101	SOFT SKILLS I	L	T	P	C
		1	0	1	1
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Course Category</i>	G General				
<i>Course designed by</i>	Career Development Centre				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	To enhance holistic development of students and improve their employability skills.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Acquire inter personal skills and be an effective goal oriented team player			d			
2.	Develop professionalism with idealistic, practical and moral values.			f			
3.	Acquire communication and problem solving skills.			g			
4.	Re-engineer their attitude and understand its influence on behavior.			i			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : SELF ANALYSIS	4			
1	Introduction, Who am I?	1	C, I	2, 4	1, 2, 6, 7
2	SWOT analysis, Detailed self introspection	1	C, I	2, 4	1, 2, 7
3	Johari window, Knowing the unknown can bring self confidence and self esteem	2	C, I	2, 4	1, 2, 7
	UNIT II : CREATIVITY	8			
4	Out of the box thinking, Possibility of innovation	2	C, I, O	2, 3	1
5	Creative thinking and Lateral thinking, Torrance test of creative thinking	3	C, I, O	2, 3	1
6	Creativity challenge	3	O	2, 3	1, 7
	UNIT III : ATTITUDE	6			
7	Factors influencing attitude, Influence of attitude on behavior, Thumb impression activity	2	C	1,2, 4	1, 2, 3, 4
8	Challenges and lessons from attitude, Synergy between knowledge, skill and attitude	2	C, D	1,2, 4	1, 2, 3, 4
9.	Personal, social and professional etiquette.	2	C, D, I	1, 2, 4	2, 4, 7
	UNIT IV : MOTIVATION	4			
10	Motivational factors, I am good at, Self image	1	C	2, 4	1, 2
11	Self talk, Tapping and tuning inner voice, Self motivation	1	C, I	2, 4	1, 2

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
12	Intrinsic and extrinsic motivators	2	C, D, I	2, 4	1, 2
	UNIT V : GOAL SETTING	8			
13	Wish list, SMART goals, Short, long, life time goals, Goal tree	2	C, D, I	1, 2	1, 2
14	Goal poster, Blueprint for success, 5W1H	2	C, D, I	1, 2	1, 2
15	Time management, Value of time, Test your Time management skill	2	C, D, I	1, 2	1, 2
16	Weekly planner, TODO list, Prioritizing work, Time management matrix	2	C, D, I	1, 2	1, 2, 7
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	SOFT SKILLS, 2015, Career Development Centre, Green Pearl Publications.
2.	Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publishers, 1998,
3.	Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998.
4.	Thomas A Harris, I am ok, You are ok, New York-Harper and Row, 1972.
5.	Daniel Coleman, Emotional Intelligence, Bantam Book, 2006.
6.	Carnegie Dale, How to stop worrying and start living, New York: Simon & Schuster, 1985.
7.	http://empower.srmuniv.ac.in (online LMS)

Course nature				Fully internal		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Activities	Extempore	LMS	Participation	Total
	Weightage	30%	25%	35%	10%	100%

Course Designed by		Department ofCareer Development Centre													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
					X		X	X		X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Ms. M. Kavitha							

15MA101	CALCULUS AND SOLID GEOMETRY			L	T	P	C
				3	1	0	4
Co-requisite:	NA						
Prerequisite:	NA						
Data Book / Codes/Standards							
Course Category	B	CORE		MATHEMATICS			
Course designed by	Department of Mathematics						
Approval	-- Academic Council Meeting -- , 2016						

PURPOSE		To acquire analytical ability on solving Calculus and Solid Geometry problems as applied to the respective all branches of Engineering.			
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES		
At the end of the course, student will be able to					
5.	Apply advanced matrix knowledge to Engineering problems.	a		E	
6.	Equip themselves familiar with functions of several variables.	a		E	
7.	Familiarize with the applications of ordinary differential equations	a		E	
8.	Improve their ability in solving geometrical applications of differential calculus problems.	a		E	
9.	Expose to the concept of three dimensional analytical geometry.	a		E	

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: MATRICES	12			
1.	Characteristic equation	1	C,I	1	1-7
2.	Eigen values and Eigen vectors of a real matrix	2	C,I	1	1-7
3.	Properties of Eigen values	2	C,I	1	1,3,4,6
4.	Cayley – Hamilton theorem orthogonal reduction of a symmetric matrix to diagonal form	2	C,I	1	1,3,4,6
5.	Orthogonal matrices	1	C,I	1	1,3,4
6.	Reduction of quadratic form to canonical form	2	C,I	1	1,3,4,6
7.	Quadratic form to canonical form by orthogonal transformations.	2	C,I	1	1,3
	UNIT II: FUNCTIONS OF SEVERAL VARIABLES	12			
8.	Function of two variables – Partial derivatives	2	C,I	2	1,3,4,6
9.	Total differential	2	C,I	2	1,3,4,6
10.	Taylor's expansion	2	C,I	2	1,3
11.	Maxima and Minima	2	C,I	2	1,3,4,6
12.	Constrained Maxima and Minima by Lagrangian Multiplier method	2	C,I	2	1,3,
13.	Jacobians	2	C,I	2	1-7
	UNIT III: ORDINARY	12			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	DIFFERENTIAL EQUATIONS				
14.	Linear equations of second order with constant and variable coefficients	2	C,I	3	2,5,7
15.	Homogeneous equation of Euler type	2	C,I	3	2,5,7,1
16.	Homogeneous equation of Legendre's Type	2			
17.	Equations reducible to homogeneous form	2	C,I	3	2,5,7
18.	Variation of parameters	2	C,I	3	1,2
19.	Simultaneous first order with constant coefficient.	2	C,I	3	1,2
	UNIT IV: GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS	12			
20.	Curvature – Cartesian coordinates	2	C,I	4	7
21.	Curvature – polar coordinates	2	C,I	4	7
22.	Circle of curvature	2	C,I	4	1
23.	Centre of curvature	2	C,I	4	7
24.	Evolutes	2	C,I	4	4,5
25.	Envelopes	2	C,I	4	7
	UNIT V: THREE DIMENSIONAL ANALYTICAL GEOMETRY	12			
26.	Equation of a sphere – Plane section of a sphere	2	C,I	5	3,4
27.	Tangent Plane – Orthogonal spheres	2	C,I	5	3,4
28.	Equation of a cone	2	C,I	5	4
29.	Right circular cone	2	C,I	5	3,4
30.	Equation of a cylinder	2	C,I	5	2,3
31.	Right circular cylinder.	2	C,I	5	3,4
	Total contact hours	60			

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS
1.	Kreyszig.E, “ <i>Advanced Engineering Mathematics</i> ”, John Wiley & Sons. Singapore, 10 th edition, 2012.
2.	K.Ganesan, Sundarammal Kesavan, K.S.Ganapathy Subramanian V.Srinivasan, “ <i>Engineering Mathematics</i> ”, Gamma publications, Revised Edition, 2013.
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	Grewal B.S, Higher Engineering Mathematics, Khanna Publications, 42 nd Edition, 2012.
4.	Veerajan. T, “ <i>Engineering Mathematics I</i> ”, Tata McGraw Hill Publishing Co, New Delhi, 5th edition, 2006.
5.	Kandasamy P etal. “ <i>Engineering Mathematics</i> ”, Vol.I (4th revised edition), S.Chand & Co., New Delhi, 2000.
6.	Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., “ <i>Advanced Mathematics for Engineering students</i> ”, Volume I (2nd edition), S.Viswanathan Printers and Publishers, 1992.

7.	Venkataraman M.K., “ <i>Engineering Mathematics</i> ” – First Year (2nd edition), National Publishing Co., Chennai, 2000.
----	---

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Mathematics													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X				X									
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
					X										
3	Broad area (for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction			Platform Technologies	
		Not Applicable													
4	Staff coordinator							Dr. Sundarammal Kesavan							

15PY101	PHYSICS		L	T	P	C
			3	0	0	3
Co-requisite:	Nil					
Prerequisite:	Nil					
Data Book / Codes/Standards	Nil					
Course Category	B	BASIC SCIENCES				
Course designed by	Department of Physics and Nanotechnology					
Approval	-- Academic Council Meeting -- , 2016					

Purpose	The purpose of this course is to provide an understanding of physical concepts and underlying various engineering and technological applications. In addition, the course is expected to develop scientific temperament and analytical skill in students, to enable them logically tackle complex engineering problems in their chosen area of application.
----------------	---

Instructional Objectives		Student Outcomes					
At the end of the course, student will be able							
1.	To understand the general scientific concepts required for technology	a					
2.	To apply the Physics concepts in solving engineering problems	e					
3.	To educate scientifically the new developments in engineering and technology	k					
4.	To emphasize the significance of Green technology through Physics principles	c					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: MECHANICAL PROPERTIES Of SOLIDS And ACOUSTICS		9			
1.	Mechanical Properties of Solids : Stress-strain relationship - Hooke's law - Torsional Pendulum - Young's modulus by cantilever	1	C,D	1	1,2,3
2.	Uniform and non-uniform bending -Stress-strain diagram for various engineering materials	1	C,D	1	1,2,3
3.	Ductile and brittle materials - Mechanical properties of Engineering materials - Tensile strength, Hardness	1	C	1	1,2,3
4.	Mechanical properties of Engineering materials - Fatigue, Impact strength, Creep - Fracture -Types of fracture (Elementary ideas)	1	C	1	1,2,3
5.	Acoustics: Intensity - Loudness - Absorption coefficient and its determination	1	C,D	1	1,2,4
6.	Reverberation - Reverberation time - Factors affecting acoustics of buildings and their remedies	1	C	1	1,2,4

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
7.	Sources and impacts of noise - Sound level meter - Strategies on controlling noise pollution	1	C	1	1,2,4
8.	Ultrasonic waves and properties - Methods of Ultrasonic production (Magnetostriiction and Piezoelectric)	1	C	1	1,2,4
9.	Applications of Ultrasonics in Engineering and medicine	1	C	1	1,2,4
UNIT II: ELECTROMAGNETIC WAVES, CIRCUITS AND APPLICATIONS		8			
10.	Del operator - grad, div, curl and their physical significances - displacement current	1	C,D	2	1,2,6
11.	Maxwell's equations (derivation)	1	C,D	2	1,2,6
12.	Wave equation for electromagnetic waves	1	C	2	1,2,6
13.	Propagation in free space -Poynting theorem	1	C,D	2	1,2,6
14.	Characteristic of Transverse electric and magnetic waves -Skin depth	1	C,D	2	1,2,6
15.	Rectangular and circular waveguides	1	C,D	2	1,2,6
16.	High powered vacuum-based cavity magnetrons	1	C	2	1,2,6
17.	Applications including radars, microwave oven and lighting systems	1	C	2	1,2,6
UNIT III: LASERS AND FIBER OPTICS		9			
18.	Laser: Characteristics of Lasers - Einstein's coefficients and their relations - Lasing action	1	C,D	3	1,2,5
19.	Working principle and components of CO ₂ Laser, Nd-YAG Laser	1	C	3	1,2,5
20.	Semiconductor diode Laser- Excimer Laser and Free electron Laser	1	C	3	1,2,5
21.	Applications in Remote sensing - Holography	1	C	3	1,2,5
22.	Optical switching -Mechanism of Laser cooling and trapping	1	C	3	1,2,5
23.	Fiber Optics: Principle of Optical fiber - Acceptance angle and acceptance cone	1	C	3	1,2
24.	Numerical aperture - V-number	1	C,D	3	1,2
25.	Types of optical fibers (Material, Refractive index and mode) -Photonic crystal fibers	1	C	3	1,2
26.	Fiber optic communication - Fiber optic sensors	1	C	3	1,2
UNIT IV: QUANTUM MECHANICS AND CRYSTAL PHYSICS		8			
27.	Quantum mechanics: Inadequacies of Classical Mechanics - Duality nature of electromagnetic radiation	1	C,D	1	1,2,7

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
28.	De Broglie hypothesis for matter waves - Heisenberg's uncertainty principle - Schrödinger's wave equation	1	C,D	1	1,2,7
29.	Particle confinement in 1D box (Infinite Square well potential)	1	C,D	1	1,2,7
30.	Crystal Physics: Crystal directions - Planes and Miller indices	1	C	1	1,2,8
31.	Symmetry elements - Quasi crystals	1	C	1	1,2,8
32.	Diamond and HCP crystal structure - Packing factor -Reciprocal lattice	1	C,D	1	1,2,8
33.	Diffraction of X-rays by crystal planes - Laue method and powder method	1	C	1	1,2,8
34.	Imperfections in crystals	1	C	1	1,2,8
UNIT V: GREEN ENERGY PHYSICS		8			
35.	Introduction to Green energy - Solar energy: Energy conversion by photovoltaic principle - Solar cells	1	C	4	1,9
36.	Wind energy: Basic components and principle of wind energy conversion systems	1	C	4	1,9
37.	Ocean energy: Wave energy - Wave energy conversion devices	1	C	4	1,9
38.	Tidal energy - single and double basin tidal power plants - Ocean Thermal Electric Conversion (OTEC)	1	C	4	1,9
39.	Geothermal energy: Geothermal sources (hydrothermal, geo-pressurized hot dry rocks, magma)	1	C	4	1,9
40.	Biomass: Biomass and bio-fuels - bio-energies from wastages	1	C	4	1,9
41.	Fuel cells: H ₂ O ₂	1	C	4	1,9
42.	Futuristic Energy: Hydrogen - Methane Hydrates - Carbon capture and storage (CCS)	1	C	4	1,9
ASSESSMENT		3			
43.	Cycle Test I	1			
75.	Cycle Test II	2			
	Total contact hours	45			

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS
1.	Thiruvadigal.J. D, Ponnusamy .S, Sudha.D and Krishnamohan .M, "Physics for Technologists", Vibrant Publication, Chennai, 2015
2.	Dattu R.Joshi, "Engineering Physics", Tata McGraw- Hill, New Delhi, 2010
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	WoleSoboyejo, "Mechanical Properties of Engineered Materials", Marcel Dekker Inc" 2003
4.	Frank Fahy, "Foundations of Engineering Acoustics", Elsevier Academic Press, 2005
5.	Alberto Son "Lasers and their applications", Gordon and Breach Science Publishers Ltd., 1976
6.	David J. Griffiths, "Introduction to electrodynamics", 3 rd Edition, Prentice Hall, 1999
7.	Leonard.I. Schiff, "Quantum Mechanics", 3 rd Edition, Tata McGraw Hill' 2010
8.	Charles Kittel, "Introduction to Solid State Physics", Wiley India Pvt.Ltd, 7 th Edition, 2007
9.	Godfrey Boyle, "Renewable Energy: Power sustainable future", 2 nd Edition, Oxford University Press. UK. 2004

Course nature					Theory		
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Physics and Nanotechnology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
		X		X		X						X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)				
					X											
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction				Platform Technologies		
		Not Applicable														
4	Staff coordinator								Dr. Preferencial Kala							

15PY101L	PHYSICS LABORATORY		L	T	P	C
			0	0	2	1
Co-requisite:	Nil					
Prerequisite:	Nil					
Data Book / Codes/Standards	Nil					
Course Category	B	BASIC SCIENCES				
Course designed by	Department of Physics and Nanotechnology					
Approval	-- Academic Council Meeting -- , 2016					

Purpose	The purpose of this course is to develop scientific temper in experimental techniques and to reinforce the physics concepts among the engineering students.					
Instructional Objectives			Student Outcomes			
At the end of the course, student will be able to						
1.	Gain knowledge in the scientific methods and learn the process of measuring different Physical variables	A				
2.	Develop the skills in arranging and handling different measuring instruments	E				
3.	Get familiarized with experimental errors in various physical measurements and to plan / suggest on how the contributions could be made of the same order, so as to minimize the errors.	B				

Sl. No.	Description of Experiments	Contact Hours	C-D I-O	IOs	Reference
1.	Determination of Young's modulus of materials - Uniform bending.	2	I,O	1,2,3	1,2,3
2.	Determination of Rigidity modulus of a given material – Torsion pendulum	2	I,O	1,2,3	1,2,3
3.	Determination of dispersive power of a prism – Spectrometer	2	I,O	1,2,3	1,2,3
4.	Determination of laser parameters – divergence and wavelength for a given laser source –laser grating/ Particle size determination using laser	2	I,O	1,2,3	1,2,3
5.	Study of attenuation and propagation characteristics of optical fiber cable	2	I,O	1,2,3	1,2,3
6.	Calibration of voltmeter / ammeter using potentiometer	2	I,O	1,2,3	1,2,4
7.	Construction and study of IC regulation properties of a given power supply	2	I,O	1,2,3	1,2,4
8.	Study of V-I and V-R characteristics of a solar cell	2	I,O	1,2,3	1,2,4
9.	Mini Project – Concept based Demonstration	2	I,O	1,2,3	-
	Total contact hours (inclusive of Demo and Repeat Class)	30			

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS
1.	Thiruvadigal.J. D, Ponnusamy .S, Sudha.D and Krishnamohan .M, "Physics for Technologists", SSS Publication, Chennai, 2015
2.	Shukla R.K and Anchal Srivastava, "Practical Physics", 1 st Edition, New Age International (P) Ltd, New Delhi, 2006
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	Souires G.L., "Practical Physics:, 4 th Edition, Cambridge University, UK, 2001.
4.	Chattopadhyay D, Rakshit P. C and Saha B, "An Advanced Course in Practical Physics", 2 nd Edition., Books & Allied Ltd., Calcutta, 1990.

Course nature				Practical		
Assessment Method – Practical Internal Component (Weightage 100%)						
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/ Viva Voce	Model examination	Total
	Weightage	40%	5%	5%	10%	60%
End semester examination Weightage :						40%

Course Designed by		Department of Physics and Nanotechnology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n	
		X	X			X										
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
					X											
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies				
		Not Applicable														
4	Staff coordinator								Dr. Preferencial Kala							

15CY101	CHEMISTRY	L	T	P	C
		3	0	0	3
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	B Basic Sciences				
Course designed by	Department of Chemistry				
Approval	32 nd Academic Council Meeting , May 2016				

PURPOSE	To enable the students to acquire knowledge in the principles of Chemistry for engineering applications						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand, analyse the quality of water and its treatment methods for domestic and industrial applications	a	b				
2.	Understand the classification of polymers, different types of polymerization, preparation, properties and applications of Industrially important polymers and FRPs.	a	b	e			
3.	Understand and apply phase rule in one and two component systems.	a	b	c			
4.	Equip with the knowledge on corrosion and its prevention.	a	b	k			
5.	Acquire knowledge on classification and selection of lubricants and adhesives and their applications.	a	b				
6.	Understand the principle and instrumentation of analytical techniques for industrial application.	a					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: WATER TREATMENT	9			
1.	Water quality parameters: Physical, Chemical & Biological significance -Hardness – Introduction, Types of hardness, Units of hardness.	1	C	1	1-5
2.	Estimation of hardness , EDTA method	1	C,D	1	1-5
3.	Dissolved Oxygen-Determination by Winkler's method, Alkalinity determination	2	C,D	1	1-5
4.	Disadvantages of using hard water in boilers: Scale, sludge formation - disadvantages	1	C	1	1-5
5.	Prevention - treatment: Internal conditioning - phosphate, calgon and carbonate conditioning methods	1	C	1	1-5
6.	External: Zeolite, ion exchange methods -	1	C	1	1-5
7.	Desalination , reverse osmosis and electro dialysis	1	C	1	1-5
8.	Domestic water treatment	1	C	1	1-5

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT II: POLYMERS AND REINFORCED PLASTICS	9			
9.	Classification of polymers	1	C	2	1-5
10.	Types of polymerization reactions, Addition, Condensations&Copolymerization	1	C	2	1-5
11.	Mechanism of addition polymerization: free radical, ionic and Ziegler - Natta	2	C,D	2	1-5
12.	Effect of structure on the properties of polymers , strength, plastic deformation, elasticity and crystallinity.	1	C	2	1-5
13.	Preparation and properties of important resins: Polyethylene, PVC, PMMA, Polyester, Teflon, Bakelite and Epoxy resins -	2	C	2	1-5
14.	Compounding of plastics , moulding methods - injection, extrusion, compression and calendaring, Reinforced plastics - FRP – Carbon and Glass- applications	2	C	2	1-5
	UNIT III: PHASE EQUILIBRIA, LUBRICANTS AND ADHESIVES	9			
15.	Phase rule: Statement - explanation of the terms involved	1	C	3	1-5
16.	One component system (water system)	1	C,I	3	1-5
17.	Condensed phase rule - Thermal analysis	1	C	3	1-5
18.	Two component systems: simple eutectic, Pb-Ag; compound formation, Zn-Mg.	2	C,I	3	1-5
19.	Lubricants: Classification , solid, semi-solid, liquid, emulsion-	1	C	3	1-5
20.	Properties , selection of lubricants for different purposes	1	C	3	1-5
21.	Adhesives: classification-natural, synthetic, inorganic- Adhesive action , applications.	2	C	3	1-5
	UNIT IV : CORROSION AND ITS CONTROL	9			
22.	Corrosion: Basic concepts , mechanism of chemical, Pilling Bed worth rule	1	C	4	1-5
23.	Mechanism of electrochemical corrosion,Types of Electrochemical corrosion , galvanic corrosion - differential aeration corrosion - pitting corrosion , stress corrosion , Measurement of corrosion (wt. loss method only)	2	C,D,I	4	1-5
24.	Factors influencing corrosion.	1	C	4	1-5
25.	Corrosion control: Cathodic protection , sacrificial anodic method , corrosion inhibitors	2	C,I	4	1-5

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
26.	Protective coatings: surface preparation for metallic coatings - electro plating (copper plating) and electroless plating (Nickel plating)	2	C,I	4	1-5
27.	Chemical conversion coatings - anodizing, phosphating & chromate coating	1	C,I	4	1-5
	UNIT V: INSTRUMENTAL METHODS OF ANALYSIS	9			1-5
28.	Basic principles-instrumentation and applications of potentiometry.	3	C,I	5	1-5
29.	UV - visible spectroscopy	2	C,I	5	1-5
30.	Infrared spectroscopy	2	C,I	5	1-5
31.	Atomic absorption spectroscopy	1	C,I	5	1-5
32.	Flame Photometry	1	C,I	5	1-5
	Total Contact Hours	45			

Sl. No.	LEARNING RESOURCES
1.	Kamaraj.P & Arthanareeswari. M, "Applied Chemistry", 9 th Edition, Sudhandhira publications, 2012.
2.	R.Jeyalakshmi, 'Engineering Chemistry, Devi Publications, 2 nd ed., 2007.
3.	S.S.Dara, A Text book of Engineering Chemistry, 10 th Edition, S.Chand & Company Ltd., New Delhi, 2003
4.	Jain.P.C and Monika Jain, "Engineering Chemistry", Danpat Rai publishing company (P) Ltd, New Delhi, 2010.
5.	Helen P Kavitha, "A Text book of Engineering Chemistry" – Shine Publications, 2015.

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Chemistry													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
		X	X	X		X						X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
					X										
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Dr. Sivagami							

15CY101L	CHEMISTRY LABORATORY	L	T	P	C
		0	0	2	1
Co-requisite:	15CY101				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	B BASIC SCIENCES				
Course designed by	Department of Chemistry				
Approval	32 nd Academic Council Meeting , May 2016				

PURPOSE	To develop skills in conducting experiments and to apply the principles of Chemistry in engineering						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Equip themselves with the basic concepts and analytical skills involved in the analyses.	a	b	k			

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
1.	Preparation of standard solutions	2	C	1	1
2.	Estimation of total, permanent and temporary hardness by EDTA method	2	C,I	1	1
3.	Conductometric titration - determination of strength of an acid	2	C,I	1	1
4.	Estimation of iron by potentiometry	2	C,I	1	1
5.	Determination of molecular weight of polymer by viscosity average method	2	C,I	1	1
6.	Determination of dissolved oxygen in a water sample by Winkler's method	2	C,I	1	1
7.	Determination of Na / K in water sample by Flame photometry (Demonstration)	2	C,I	1	1
8.	Estimation of Copper in ore	2	C,I	1	1
9.	Estimation of nickel in steel	2	C,I	1	1
10.	Determination of total alkalinity and acidity of a water sample	2	C,I	1	1
11.	Determination of rate of corrosion by weight loss method.	2	C,I	1	1
Total Contact Hours		30			

Sl. No.	LEARNING RESOURCES
1.	P. Kamaraj & M. Arthanareeswari, Practical Chemistry (workbook), Sudhandira publications, 2013.

Course nature				Practical		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total
	Weightage	40%	5%	5%	10%	60%
End semester examination Weightage :						40%

Course Designed by		Department of Chemistry													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X	X									X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
					X										
3	Broad Area(for p only)	Programming		Networking		Data base		Web System	Human Computer Interaction		Platform Technologies				
		Not Applicable													
4	Staff coordinator							Dr. Sivagami							

15NS101/ 15NC101/15SP101/ 15YG101	NATIONAL CADET CORPS (NCC)/ NATIONAL SERVICE SCHEME (NSS)/ NATIONAL SPORTS ORGANIZATION (NSO) / YOGA	L	T	P	C
		0	0	1	1
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	G General				
Course designed by	Department of Civil Engineering				
Approval	32 nd Academic Council Meeting , May 2016				

PURPOSE	To imbibe in the minds of students the concepts and benefits of NCC/NSS/NSO/YOGA and make them practice the same
INSTRUCTIONAL OBJECTIVES	
To enable the students to gain knowledge about NCC/NSS/NSO/YOGA and put the same into practice	

NATIONAL CADET CORPS (NCC)

Any student enrolling as a member of National Cadet Core (NCC) will have to attend sixteen parades out of twenty parades each of four periods over a span of academic year.

Attending eight parades in first semester will qualify a student to earn the credits specified in the curriculum. Grading shall be done based on punctuality, regularity in attending the parades and the extent of active involvement

NATIONAL SERVICE SCHEME (NSS)

A student enrolling as member of NSS will have to complete 60 hours of training / social service to be eligible to earn the credits specified in the curriculum.

Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.

NATIONAL SPORTS ORGANIZATION (NSO)

Each student must select one of the following games/sports events and practice for one hour per week. An attendance of 75% is compulsory to earn the credits specified in the curriculum.

Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.

List of games/sports: Basket Ball, Football, Volley Ball, Ball Badminton, Cricket, Throw-ball, Track events Field events or any other game with the approval of faculty member.

YOGA

Benefits of Agnai Meditation -Meditation - Agnai, Asanas, Kiriyaas, Bandas, Muthras

Benefits of santhi Meditation - Meditation Santhi Physical Exercises (I & II)

Lecture & Practice - Kayakalpa Yoga Asanas, Kiriyaas, Bandas, Muthras

Analysis of Thought - Meditation Santhi Physical Exercises III & IV

Benefits of Thuriyam - Meditation Thuriyam Kayakalpa Asanas, Kiriyaas, Bandas, Muthras

Attitude - Meditation Thuriyam Kayakalpa Asanas, Kiriyaas, Bandas, Muthras

Importance of Arutkappy & Blessings - Meditation Thuriyam Kayakalpa Asanas, Kiriyaas, Bandas, Muthras

Benefits of Blessings - Meditation Santhi Kayakalpa Asanas, Kiriyaas, Bandas, Muthras

Assessment An attendance of 75% is compulsory to earn the credits specified in the curriculum. Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.

Sl. No.	LEARNING RESOURCES
1.	Yogiraj Vethathiri Maharishi, "Yoga for Modern Age", Vethathiri Publishers, 1989
2	Vethathiri Maharishi, T., "Simplified Physical Exercises", Vethathiri Publishers, 1987.

Course Designed by		Department of Civil Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
					X					X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(for p only)	Programming			Networking			Data base		Web System		Human Computer Interaction		Platform Technologies	
		Not Applicable													
4	Staff coordinator							Dr. Rajasekar/ Prof. K. Shanmugam/ Dr .K. Vaithianathan / Mr. K.Sankara moorthy							

15BT101	BIOLOGY FOR ENGINEERS			L	T	P	C
				2	0	0	2
Co-requisite:	NIL						
Prerequisite:	NIL						
Data Book / Codes/Standards	NIL						
Course Category	B	BASIC SCIENCES			BIOTECHNOLOGY		
Course designed by	Department of Biotechnology						
Approval	32 nd Academic Council Meeting - July 23, 2016						

Purpose	. The purpose of this course is to provide a basic understanding of biological mechanisms of living organisms from the perspective of engineers. In addition, the course is expected to encourage engineering students to think about solving biological problems with engineering tools.						
Instructional Objectives				Student Outcomes			
At the end of the course, student will be able to							
1.	Appreciate the basic organization of organisms and living being.	A		a			
2.	understand the machinery of the cell that is ultimately responsible for various daily activities. acquire knowledge about biological problems that requires engineering expertise to solve them	E		a		b	

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I-BASIC CELL BIOLOGY	06			
1.	Introduction to Biology	1	C	1	1
2.	The cell: the basic unit of life	1	C	1	1,3
3.	Expression of genetic information - protein structure and function	1	C	1	1,2
4.	Cell metabolism; Cells respond to their external environments	1	C	1	1,2,3
5.	Cells grow and reproduce	1	C	1	1,3
6.	Cellular differentiation	1	C	1	1,3
	UNIT II- BIOCHEMISTRY AND MOLECULAR	05			
7.	Biodiversity - Chemical bonds in Biochemistry; Biochemistry and Human biology	1	C	1,2	1,2
8.	Protein synthesis –DNA; RNA	1	C	2	1,2,3
9.	Differences between eukaryotic and prokaryotic protein Synthesis	1	C	2	1,2
10.	Stem cells and their applications	1	C	1,2	1,3
	UNIT III-ENZYMES AND INDUSTRIAL APPLICATIONS	05			
11.	Enzymes – significance, factors	1	C	2	1,2
12.	Mechanism and effective catalysis – proteases, carbonic anhydrase	1	C	2	1,2
13.	Restriction Enzymes; Nucleoside Monophosphate Kinases	1	C,I	3	1-5

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
14.	Photosynthesis and carbon fixation; Biological energyproduction	1	C	2	1,2
15.	Metabolism-anabolism and catabolism	1	C	2	1,2
	UNIT IV-MECHANOCHEMISTRY	07			
16.	Properties , selection of lubricants for different purposes	1	C	3	1-5
17.	Adhesives: classification-natural, synthetic, inorganic- Adhesive action , applications.	2	C	3	1-5
	UNIT IV : CORROSION AND ITS CONTROL	09			
18.	Protein motors convert chemical energy into mechanical work	2	C	2,3	1,2
19.	ATP synthase structure	1	C	2,3	1,3
20.	The bacterial flagellar motor	1	C	2,3	1,3
21.	Cytoskeleton	1	C	2,3	1,3
22.	Biosensors - types, applications	1	C	2,3	1,4
23.	Bioremediation	1	C	2,3	1,5
	UNIT V-NERVOUS SYSTEM, IMMUNE SYSTEMAND CELL SIGNALING	07			
24.	Basics of nervous system and “neural networks”	2	C		3
25.	The cellular basis of immunity	1	C		3
26.	The functional properties and structure of antibodies	2	C		3
27.	T cell receptors and subclasses	1	C		3
28.	General principles of cell signaling	1	C		1,3
	Total Contact Hours	30			

LEARNING RESOURCES

Sl.No.	TEXT BOOKS
1.	ThyagaRajan.S., Selvamurugan. N., Rajesh.M.P., Nazeer.R.A., Richard W. Thilagaraj, Barathi.S., and Jaganthan.M.K., “ <i>Biology for Engineers</i> ”, Tata McGraw-Hill, New Delhi, 2012.
	REFERENCE BOOKS/OTHER READING MATERIAL
2.	Jeremy M. Berg, John L. Tymoczko and Lubert Stryer, “ <i>Biochemistry</i> ”, W.H. Freeman and Co. Ltd., 6 th Ed., 2006.
3.	Robert Weaver, “ <i>Molecular Biology</i> ”, MCGraw-Hill, 5 th Edition, 2012.
4.	Jon Cooper, “ <i>Biosensors A Practical Approach</i> ”, Bellwether Books, 2004.
5.	Martin Alexander, “ <i>Biodegradation and Bioremediation</i> ”, Academic Press, 1994.
6.	Kenneth Murphy, “ <i>Janeway's Immunobiology</i> ”, Garland Science; 8th edition, 2011.
7.	Eric R. Kandel, James H. Schwartz, Thomas M. Jessell, “ <i>Principles of Neural Science</i> ”, McGraw-Hill, 5 th Edition, 2012.

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle testI	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

Course Designed by		Department of Biotechnology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X	X								X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
					X										
3	Broad Area(for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction			Platform Technologies	
		Not Applicable													
4	Staff coordinator							Dr. K. Ganesan							

15CE101	BASIC CIVIL ENGINEERING	L	T	P	C
		2	0	0	2
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	E ENGINEERING SCIENCES				
Course designed by	Department of Civil Engineering				
Approval	32 nd Academic Council Meeting , 2016				

PURPOSE	To get exposed to the glimpses of Civil Engineering topics that are essential for an Engineer.	
INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES
At the end of the course, student will be able to		
1.	Know about different materials used in civil engineering structures in general	A
2.	Understand the engineering properties of material related to the design of civil engineering structural members	A
3.	Know about terms, definitions and uses related to multifarious building components.	A
4.	Learn the importance of surveying and the transportation systems	A
5.	Comprehend rudiments of engineering related to dams, water supply, and sewage disposal	A

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I- BUILDING MATERIALS	6			
1.	Introduction to Civil Engineering and Civil Engineering materials	1	C	1	1-3
2.	Composition, classifications, properties, and uses of stones	1	C	1	1-3
3.	Classification of rocks , quarrying , dressing , properties and uses	1	C	1	1-3
4.	Properties and uses of timber and ply wood	1	C	1	1-3
5.	Types, grades, properties and uses of cement and grade, designation, properties and uses of concrete	1	C	1	1-3
6.	Types of steel, mild, medium and hard, properties and uses and market forms	1	C	1	1-3
	UNIT II- MATERIAL PROPERTIES	6			
7.	Types of stresses and strains and Hook's law	1	C	2	1-3
8.	Three moduli of elasticity and Poisson's ratio and their interrelationship , simple problems	1	C, I	2	1-3
9.	Determination of centre of gravity of plane areas	1	C, I	2	1-3

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
10.	Concept of Moment of inertia, parallel and perpendicular axis theorems and the concept of radius of gyration	1	C	2	1-3
11.	Determination of moment of inertias of rectangular, circular, I , T and channel sections	2	C, I	2	1-3
	UNIT III -BUILDING COMPONENTS	6			
12.	Factors to be considered for site selection for buildings	1	C	3	1-3
13.	Classification of buildings and their components	1	C	3	1-3
14.	Cement concrete, marble terrazzo , ceramic tiled floorings including the names of popular commercial brands	2	C	3	1-3
15.	Requirements of roofing in buildings and corresponding classification of building roofs – RCC flat roofs and sheet roofings for pitched steel buildings.	2	C	3	1-3
	UNIT IV-SURVEYING AND TRANSPORTATION	6			
16.	Objectives, classification and principles of surveying	1	C	4	1-3
17.	Classification of transportation of and cross section and components of road	1	C	4	1-3
18.	Railway – cross section and components of permanent way and its functions	1	C	4	1-3
19.	Water way, docks and harbor their classifications and components.	2	C	4	1-3
20.	Components of bridge	1	C	4	1-3
	UNIT V- WATER SUPPLY AND SEWAGE DISPOSAL	6			
21.	Purpose of dams, types of dam, selection of site for the dams, and the cross section of gravity of dams	2	C	5	1-3
22.	Objectives of water supply, estimation of quantity of water, sources of water, standards of drinking water and distribution system	2	C	5	1-3
23.	Classification of sewage , technical terms and definitions, septic tank its components and functions.	2	C	5	1-3
Total contact hours		30			

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS

1.	Raju .K.V.B, Ravichandran .P.T, “ <i>Basics of Civil Engineering</i> ”, Ayyappa Publications, Chennai, 2012.
2.	Rangwala .S.C,” <i>Engineering Material</i> ”s, Charotar Publishing House, Anand, 2012.
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	Punmia, B.C., Ashok Kumar Jain, Arun Kumar Jain, “ <i>Basic Civil Engineering</i> ”, Laxmi Publications, First edition (2003), New Delhi

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Civil Engineering													
1	Students Outcome	a	b	C	d	e	f	g	h	I	j	k	l	m	n
		X													
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
								X							
3	Broad Area (for p only)	Programming		Networking		Data base		Web System	Human Computer Interaction		Platform Technologies				
		Not Applicable													
4	Staff coordinator														

15EE101	BASIC ELECTRICAL ENGINEERING			L	T	P	C
				2	0	0	2
Co-requisite:	Nil						
Prerequisite:	Nil						
Data Book / Codes/Standards	Nil						
Course Category	P	PROFESSIONAL CORE	CIRCUITS AND SYSTEMS				
Course designed by	Department of Electrical and Electronics Engineering						
Approval	32 nd , Academic Council Meeting , 2016						

PURPOSE	This course provides comprehensive idea about circuit analysis, working principles of machines and common measuring instruments						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, the student will be able to							
1.	Understand the basic concepts of magnetic circuits, AC and DC circuits.	a	e				
2.	Gain knowledge about the working principle, construction, applications of DC, AC machines and measuring instruments.	a					
3.	Understand the fundamentals of wiring and earthing.	a					

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
1.	UNIT I : FUNDAMENTALS OF DC CIRCUITS	6			
2.	Introduction to DC and AC circuits, Active and passive two terminal elements	1	C	1	1
3.	Ohms law, Voltage-Current relations for resistor, inductor, capacitor	1	C	1	1
4.	Kirchhoff's laws, Mesh analysis	2	C	1	1
5.	Nodal analysis	1	C	1	1
6.	Ideal sources –equivalent resistor, current division, voltage division	1	C	1	1
	UNIT II : MAGNETIC CIRCUITS	6			
7.	Introduction to magnetic circuits	1	C	1	1
8.	Simple magnetic circuits	2	C	1	1
9.	Faraday's laws	2	C	1	1
10.	Induced emf and inductances	1	C	1	1
	UNIT III : AC CIRCUITS	6			
11.	Sinusoids, Generation of AC, Average and RMS values, Form and peak factors	2	C	1	1
12.	Concept of phasor representation, J operator	1	C	1	1
13.	Analysis of R-L, R-C, R-L-C circuits	2	C	1	1
14.	Introduction to three phase systems - types of connections, relationship between line and phase values	1	C	1	1

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	UNIT IV :ELECTRICAL MACHINES & MEASURING INSTRUMENTS	6			
15.	Working principle, construction and applications of DC machines	2	C	2	1
16.	Working principle, construction and applications of AC machines (1 - phase transformers, single phase induction motors: split phase, capacitor start and capacitor start and run motors)	2	C	2	1
17.	Basic principles and classification of instruments -Moving coil and moving iron instruments.	2	C	2	1
	UNIT V : ELECTRICAL SAFETY, WIRING AND INTRODUCTION TO POWER SYSTEM	6			
18.	Safety measures in electrical system- types of wiring	1	C	3	1
19.	Wiring accessories- staircase, fluorescent lamps and corridor wiring	2	C	3	1
20.	Basic principles of earthing-Types of earthing- Simple layout of generation, transmission and distribution of power	3	C	3	1
	Total contact hours	30			

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS
1.	Dash.S.S, Subramani.C, Vijayakumar.K, "Basic Electrical Engineering", First edition, Vijay Nicole Imprints Pvt.Ltd,2013
REFERENCE BOOKS/OTHER READING MATERIAL	
2.	Smarajit Ghosh, "Fundamentals of Electrical & Electronics Engineering", Second edition, PHI Learning, 2007
3.	Metha.V.K, Rohit Metha, "Basic Electrical Engineering", Fifth edition, Chand. S & Co, 2012
4.	Kothari.D.P and Nagrath.I.J, "Basic Electrical Engineering", Second edition, Tata McGraw - Hill, 2009
5.	Bhattacharya.S.K, "Basic Electrical and Electronics Engineering", First edition, Pearson Education, 2011.

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Electrical and Electronics Engineering														
1	Students Outcome	a	b	c	d	e	f	g	H	I	j	k	l	m	n	
		X				X										
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area (for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		Not Applicable														
4	Staff coordinator								Dr. K. Mohanraj							

15CS101L	PROGRAMMING LABORATORY	L	T	P	C
		1	0	2	2
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book / Codes/Standards	Nil				
Course Category	P Professional Core				
Course designed by	Department of Computer Science and Engineering				
Approval	32 nd Academic Council Meeting , 23 rd July, 2016				

PURPOSE This Lab Course will enable the students to understand the fundamentals of programming and gain knowledge on using the preliminary constructs in solving simple applications

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES					
At the end of the course, student will be able							
1.	Learn the fundamentals of programming and its environment	k					
2.	Ability to write programs using commands and functions	a					
3.	To be able to apply programming skills in their area of specialization	d					
4.	Learn to work with team members in developing mini projects	c					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	<p>Students shall be given experiments covering the following topics:</p> <ol style="list-style-type: none"> 1. Practicing the environment for programming to familiarize Workspace, Directory, Windows, Edit options, Help, Shortcuts etc. Simple exercises to familiarize Basic Commands. 2. Data types, Constants and Variables, operators, Input-output functions, reading and storing data, Assignment statements, Control Structures, Iterative statements 3. Vectors and Matrices, commands to operate on vectors and matrices, Matrix Manipulations, Arithmetic, Relational and Logical operations on Matrices. 4. Polynomial Evaluation, Roots of Polynomial, Arithmetic Operations on Polynomials. 5. Basic Graphics: 2D / 3D plots, Printing labels, Grid & Axes box, Text in plot, Bar and Pie chart, Histograms, Animation 6. Experiments in solving simple Engineering problems – To be decided by the Lab Course Coordinator. 7. Students shall be encouraged to form groups (Maximum 3) to do a mini Project covering the above mentioned topics. 	<p>Theory 15 Practical 30</p>	D, I, O	1,2, 3,4	
	Total contact hours	45			

LEARNING RESOURCES	
Sl.No.	REFERENCE BOOKS
1.	www.scilab.org
2.	Rudra Pratap., “Getting started with MATLAB”, Oxford University Press, 2010.
3.	Bansal R.K, Goel A.K.,Sharma M.K., “MATLAB and its Applications in Engineering”, Pearson Education, 2012.

Course nature				Practical	
Assessment Method (Weightage 100%)					
In-semester	Assessment tool	Observation	Model Exam	Mini Project & Report	Total
	Weightage	20%	15%	25%	60%
End semester examination Weightage :					40%

Course Designed by		Department of Computer Science and Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	i	j	k	l	m	n
		X		X	X							X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X													
		Not Applicable													
4	Staff coordinator							Ms. Sundara Kanchana							

15LE102	VALUE EDUCATION	L	T	P	C
		2	0	0	2
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book / Codes/Standards	Nil				
Course Category	G				
Course designed by	Department of English and Foreign Languages				
Approval	32 nd Academic Council Meeting , 23 rd July, 2016				

PURPOSE	To ensure the emotional and spiritual enrichment of the individual on a personal, social and professional level , the impact of which will be realized over a period of time.
INSTRUCTIONAL OBJECTIVES	
At the end of the course, student will be able	
1.	To Perceive the strengths and weaknesses – that of oneself and others
2.	To Understand/Infer the role of the Individual in Society
3.	To Analyze situations and adapt accordingly in a humanistic manner.
4.	To Be aware of the importance of Engineering Ethics and the need to apply them in their professional lives
5.	To Comprehend the role of aesthetic, moral and spiritual values

UNIT I INTRODUCTION

Definition, Relevance, Types of values, changing concepts of values, values through various genres of literature.

UNIT II INDIVIDUAL AND GROUP BEHAVIOUR

Personal values – Self – Strengths (self-confidence, self-assessment, self-reliance, self-discipline, determination, self-restraint, contentment, humility, sympathy and compassion, gratitude, forgiveness)

Weaknesses (Influences -- Peer pressure, familial and societal expectations, media)

UNIT III SOCIETIES IN PROGRESS

Definition of society; Units of society; Communities – ancient and modern – Agents of change – Sense of survival, security, desire for comfort and ease sense of belonging, social consciousness and responsibility

UNIT IV ENGINEERING ETHICS

Definition- Societies for engineers – Code of Ethics – Ethical Issues involved in cross border research -- Ethical and Unethical practices – case studies – situational decision making

UNIT V SPIRITUAL VALUES

What is religion? -- Role of religion – Misinterpretation of religion – moral policing – Consequences -- Religion as spiritual quest – Aesthetics and religion

Reference Books:

Department of English and Foreign Languages SRM University. 2015 Rhythm *of Life*. SRMUniversity Publications. **Values** (Collection of Essays), 1996. Published by:Sri Ramakrishna Math, Chennai-4.

Course Designed by		Department of English and Foreign Languages													
1	Students Outcome	a	b	c	d	e	f	g	h	i	j	k	l	m	n
							X			X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Dr. B. Cauveri							

15PD102	SOFT SKILLS II	L	T	P	C
		1	0	1	1
Co-requisite:	NIL				
Prerequisite:	NIL				
Course Category	G General				
Course designed by	Career Development Centre				
Approval	32 nd Academic Council Meeting , May 2016				

PURPOSE	To enhance holistic development of students and improve their employability skills.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Acquire inter personal skills and be an effective goal oriented team player			d			
2.	Develop professionalism with idealistic, practical and moral values.			f			
3.	Acquire communication and problem solving skills.			g			
4.	Re-engineer their attitude and understand its influence on behavior.			i			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : INTERPERSONAL SKILLS				
1	Gratitude, Being thankful, Secret of happiness, Satin ribbon activity	2	C, I	2	1, 2, 3, 4
2	Stages of dependence, Understanding the integration of leadership, networking and teamwork	2	C	1, 3, 4	1, 2, 3, 4
3	Assessing interpersonal skills, situation analysis	2	C, I	1, 3, 4	1, 2, 3, 4
4	Importance of teamwork, Teamwork activity	4	C, O	1, 3, 4	3, 4
	UNIT II : LEADERSHIP				
5	Skills needed for a good leader, Types of leadership style	2	C	1-4	1, 3, 7
6	Assessment of leadership skills, Wheel of leadership	2	C, I	1-4	1, 3, 7
	UNIT III : STRESS MANAGEMENT				
7	Causes of stress and its impact, Let it down, How to manage and de-stress,	2	C	4	1, 6
8	Circle of control, Daily life can be a stress buster, Stress activity	2	C	4	1, 6
9.	Emotional intelligence, Emotional quotient and intelligence quotient	2	C, I	1, 2, 4	1, 4, 5
10	Emotion scale, Managing emotions	2	C, I	1, 2, 4	1, 4, 5
	UNIT IV : CONFLICT RESOLUTION				
11	Conflicts in human relations, Self assessment test for conflict management	1	C	1-4	1, 3, 4

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
12	Approaches to conflict resolution	1	C	1-4	1, 3, 4
13	Case study	2	C, I	1-4	1, 7
UNIT V : DECISION MAKING					
14	Importance of decision making, Impact of decision in life	1	C	1, 2, 3	1, 2, 6
15	Weighing positives and negatives	1	C, I	1, 2, 3	1, 2, 6
16	Process and practical way of decision making	2	C, D, I	1, 2, 3	1, 2
Total Contact Hours		30			

Sl. No.	LEARNING RESOURCES
1.	SOFT SKILLS, 2015, Career Development Centre, Green Pearl Publications.
2.	Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publishers, 1998.
3.	Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998.
4.	Thomas A Harris, I am ok, You are ok, New York-Harper and Row, 1972.
5.	Daniel Coleman, Emotional Intelligence, Bantam Book, 2006.
6.	Carnegie Dale, How to stop worrying and start living, New York: Simon & Schuster, 1985.
7.	http://empower.srmuniv.ac.in (Online LMS)

Course nature				Fully internal		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Activities	Tech talk	LMS	Participation	Total
	Weightage	40%	25%	25%	10%	100%

Course Designed by		Department of Career Development Centre													
1	Students Outcome	a	b	c	d	e	f	g	H	I	j	K	l	m	n
					X		X	X		X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	broad area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Dr. S. Mathumathy							

15MA102	ADVANCED CALCULUS AND COMPLEX ANALYSIS			L	T	P	C
				3	1	0	4
Co-requisite:	NA						
Prerequisite:	15MA101						
Data Book / Codes/Standards	NA						
Course Category	B	CORE			MATHEMATICS		
Course designed by	Department of Mathematics						
Approval	-- Academic Council Meeting -- , 2016						

PURPOSE	To acquire analytical ability on solving Advanced Calculus and Complex Analysis problems as applied to the respective branches of Engineering.		
INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES	
At the end of the course, student will be able to			
1.	Apply multiple integrals knowledge to Engineering problems.	a	e
2.	Improve their ability in solving vector calculus problems.	a	e
3.	Equip themselves familiar with Laplace Transforms.	a	e
4.	Familiarize with the applications of analytic functions.	a	e
5.	Expose to the concept of complex integration.	a	e

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: MULTIPLE INTEGRALS	12			
1.	Evaluation of double integration in Cartesian and plane polar coordinates	2	C,I	1	1-7
2.	Evaluation of double integral by changing of order of integration	2	C, I	1	1,3,4,6
3.	Area as a double integral (Cartesian and polar)	2	C, I	1	1,3,4,6
4.	Triple integration in Cartesian coordinates	2	C, I	1	1,3,4,6
5.	Conversion from Cartesian to polar in double integrals	2	C, I	1	1,3,4,6
6.	Volume as a Triple Integral.	2	C, I	1	1,3,4,6
7.	UNIT II: VECTOR CALCULUS	12			
8.	Review of vectors in 2,3 dimensions ,Gradient, divergence, curl – Solenoidal and irrotational fields	2	C,I	2	1,3,4,6
9.	Vector identities(without proof) – Directional derivatives	2	C, I	2	1,3
10.	Line, surface and volume integrals	2	C, I	2	1,3
11.	Green's theorem (without proof),	2	C, I	2	1,3
12.	Gauss divergence theorem (without proof), verification and applications to cubes and parallelopipeds only	2	C, I	2	1,3

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
13.	Stoke's theorems (without proof) – Verification and applications to cubes and parallelopipeds only.	2	C, I	2	1,3
14.	UNIT III: LAPLACE TRANSFORMS	12			
15.	Transforms of standard functions –properties – Transforms of derivatives and integrals	2	C,I	3	2,5,7
16.	Initial and final value theorems (without proof)	2	C, I	3	2,5,7,1
17.	Inverse Laplace transforms	2	C, I	3	2,5,7
18.	ILT using Convolution theorem -problems only	2	C, I	3	1,2
19.	LT of periodic functions -problems only	2	C, I	3	1,2
20.	Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficient only	2	C, I	3	1,2
21.	UNIT IV: ANALYTIC FUNCTIONS	12			3.6
22.	Definition of Analytic Function – Cauchy Riemann equations	2	C,I	4	7
23.	Properties of analytic function functions	2	C,I	4	1,2
24.	Determination of analytic function using – Milne-Thomson's method	2	C, I	4	1
25.	Conformal mappings: magnification and rotation	2	C,I	4	1,2
26.	Conformal mappings: inversion and reflection	2	C, I	4	4,5
27.	bilinear transformation	2	C, I	4	1,2
28.	UNIT V: COMPLEX INTEGRATION	12			
29.	Cauchy's integral theorem (without proof) – and its applications	2	C,I	5	3,4
30.	Cauchy's integral formulae	2	C,I	5	3,4
31.	Taylor's and Laurent's expansions with simple problems	2	C, I	5	4
32.	Singularities – Types of Poles and Residues	2	C,I	5	3,4
33.	Cauchy's residue theorem (without proof)-	2	C, I	5	2,3
34.	Contour integration: Unit circle, semicircular contour.	2	C, I	5	3,4
	Total contact hours	60			

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS
1.	Kreyszig.E, “Advanced Engineering Mathematics”, John Wiley & Sons. Singapore, 10 th edition, 2012.
2.	K.Ganesan, Sundarammal Kesavan, K.S.Ganapathy Subramanian & V.Srinivasan, “Engineering Mathematics”, Gamma publications, Revised Edition, 2013.
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	Grewal B.S, Higher Engineering Mathematics, Khanna Publications, 42 nd Edition, 2012.
4.	Veerajan. T, “Engineering Mathematics P”, Tata McGraw Hill Publishing Co, New Delhi, 5th edition, 2006.
5.	Kandasamy P et al. “Engineering Mathematics”, Vol.I (4th revised edition), S.Chand & Co., New Delhi, 2000.
6.	Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., “Advanced Mathematics for Engineering students”, Volume I (2nd edition), S.Viswanathan Printers and Publishers, 1992.
7.	Venkataraman M.K., “Engineering Mathematics” – First Year (2nd edition), National Publishing Co., Chennai, 2000.

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course designed by		Department of Mathematics														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	K	l	m	n	
		X				X										
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
					X											
3	Broad area (for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		Not Applicable														
4	Staff coordinator								Dr. Sundarammal Kesavan							

15PY102L	MATERIALS SCIENCE	L	T	P	C
		2	0	2	3
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book / Codes/Standards	Nil				
Course Category	B BASIC SCIENCES				
Course designed by	Department of Physics and Nanotechnology				
Approval	-- Academic Council Meeting -- , 2016				

Purpose	The course introduces several advanced concepts and topics in the rapidly evolving field of material science. Students are expected to develop comprehension of the subject and to gain scientific understanding regarding the choice and manipulation of materials for desired engineering applications.					
Instructional Objectives			Student Outcomes			
At the end of the course, student will be able						
1.	To acquire basic understanding of advanced materials, their functions and properties for technological applications	a				
2.	To emphasize the significance of materials selection in the design process	e				
3.	To understand the principal classes of bio-materials and their functionalities in modern medical science	k				
4.	To get familiarize with the new concepts of Nano Science and Technology	d				
5.	To educate the students in the basics of instrumentation, measurement, data acquisition, interpretation and analysis	b				

Session	Description of Topic (Theory)	Contact hours	C-D I-O	IOs	Reference
Unit I: Electronic and Photonic Materials		6			
1.	Electronic Materials: Fermi energy and Fermi - Dirac distribution function	1	C,D	1	1,2,3
2.	Variation of Fermi level with temperature in intrinsic and extrinsic semiconductors	1	C,D	1	1,2,3
3.	Hall effect - Dilute Magnetic Semiconductors (DMS) and their applications	1	C,D	1	1,2,3
4.	Superconducting Materials: Normal and High temperature superconductivity - Applications	1	C	1	1,2,3
5.	Photonic Materials: LED – LCD - Photo conducting materials	1	C	1	1,2,4
6.	Photo detectors (CCD) - Photonic crystals and applications - Elementary ideas of Non-linear optical materials and their applications	1	C	1	1,2,4,5
Unit II: Magnetic and Dielectric Materials		5			

Session	Description of Topic (Theory)	Contact hours	C-D I-O	IOs	Reference
7.	Magnetic Materials: Classification of magnetic materials based on spin - Hard and soft magnetic materials - Ferrites	1	C	1,2	1,2
8.	Garnets and magnetoplumbites -Magnetic bubbles and their applications - Magnetic thin films	1	C	1,2	1,2
9.	Spintronics and devices (Giant magneto resistance, Tunnel magneto resistance and Colossal magneto resistance). Dielectric Materials: Polarization mechanisms in dielectrics Dielectric Materials: Polarization mechanisms in dielectrics	1	C	1,2	1,2,3
10.	Frequency and temperature dependence of polarization mechanism - Dielectric loss - Dielectric waveguide	1	C	1,2	1,2,3
11.	Dielectric resonator antenna - Piezoelectric, pyroelectric and ferroelectric materials and their applications	1	C	1,2	1,2,3
Unit III: Modern Engineering and Biomaterials		5			
12.	Modern Engineering Materials: Smart materials - Shape memory alloys - Chromic materials - Thermo, Photo and Electro - Rheological fluids	1	C	1,3	1,3
13.	Metallic glasses - Advanced ceramics - Composites. Bio-materials: Classification of bio-materials (based on tissue response)	1	C	1,3	1,3
14.	Comparison of properties of some common biomaterials - Metallic implant materials - stainless steel, cobalt-based and titanium-based alloys	1	C	1,3	1,7
15.	Polymeric implant materials -Polyamides, polypropylene, Acrylic resins and Hydrogels	1	C	1,3	1,7,8
16.	Tissue replacement implants - Tissue engineering - Biosensor	1	C	1,3	1,7
Unit IV: Introduction To Nanoscience and Nanotechnology		6			
17.	Basic concepts of Nanoscience and Nanotechnology - Quantum wire - Quantum well - Quantum dot - fullerenes	1	C	4	1,9,10
18.	Graphene - Carbon nanotubes	1	C	4	1,9,10
19.	Material processing by chemical vapor deposition and physical vapor deposition	1	C	4	1,9,10
20.	Principle of SEM, TEM, AFM	1	C	4	1,9,10

Session	Description of Topic (Theory)	Contact hours	C-D I-O	IOs	Reference
21.	Scanning near-field optical microscopy (SNOM) - Scanning ion-conducting microscopy (SCIM)	1	C	4	1,9,10
22.	Potential uses of nanomaterials in electronics, robotics, computers, sensors, sports equipment, mobile electronic devices, vehicles and transportation- Medical applications of nanomaterials	1	C	4	1,9,10
Unit V: Materials Characterization		5			
23.	X-ray diffraction, Neutron diffraction	1	C	5	1,11
24.	Electron diffraction - X-ray fluorescence spectroscopy	1	C	5	1,11
25.	Fourier transform Infrared spectroscopy (FTIR) -Ultraviolet and visible spectroscopy (UV-Vis)	1	C	5	1,11
26.	Thermogravimetric Analysis (TGA)	1	C	5	1,11
27.	Differential Thermal Analysis (DTA) - Differential Scanning Calorimetry (DSC)	1	C	5	1,11
Assessment		3			
28.	Cycle Test I	1	-	-	
29.	Cycle Test II	2	-	-	-
Total contact hours		30			

Sl. No.	Description of experiments	Contact Hours	C-D I-O	IOs	Reference
1.	Determination of resistivity and band gap for a semiconductor material -Four probe method / Post-office box	2	I,O	5	1
2.	Determination of Hall coefficient for a semiconducting material	2	I,O	5	1
3.	To study V-I characteristics of a light dependent resistor (LDR)	2	I,O	5	1
4.	Determination of energy loss in a magnetic material - B-H curve	2	I,O	5	1
5.	Determination of paramagnetic susceptibility - Quincke's method	2	I,O	5	1
6.	Determination of dielectric constant for a given materia	2	I,O	5	1
7.	Calculation of lattice cell parameters - X-ray diffraction	2	I,O	5	1
8.	Measurement of glucose concentration - Electrochemical sensor	2	I,O	5	1
9.	Visit to Advanced Material Characterization Laboratory	2	I,O	5	-
Total contact hours (Inclusive of Demo and Repeat Class)		30			

Learning Resources

Sl. No.	Text Books
1.	Thiruvadigal, J. D., Ponnusamy, S., Kala C.P. and Krishnamohan, M., “Materials Science”, SSS Publication, Chennai, 2015.
2.	Rajendran, V. “Materials Science”, Tata McGraw- Hill, New Delhi, 2011.
Reference Books/Other Reading Material	
3.	Rolf E. Hummel, “Electronic Properties of Materials”, 4 th Edition., Springer, New York, 2011
4.	Dennis W. Prather, “Photonic Crystals: Theory, Applications, and Fabrication”, John Wiley & Sons, Hoboken, 2009
5.	James R. Janesick, “Scientific Charge-Coupled Devices”, Published by SPIE - The International Society for Optical Engineering, Bellingham, Washington, 2001
6.	David M. Pozar, “Microwave Engineering”, 3 rd Edition., John Wiley & Sons, 2005
7.	Silver F. and Dillion C., “Biocompatibility: Interactions of Biological and Implantable Materials”, VCH Publishers, New York, 1989
8.	Severial Dumitriu, “Polymeric Biomaterials” Marcel Dekker Inc, CRC Press, Canada 2001
9.	Cao G., “Nanostructures and Nanomaterials: Synthesis, Properties and Applications”, Imperial College Press, 2004
10.	Pradeep T., “A Text Book of Nanoscience and Nanotechnology”, Tata McGraw Hill, New Delhi, 2012
11.	Sam Zhang, “Materials Characterization Techniques”, CRC Press, 2008

Course nature				Theory + Practical			
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	5%	7.5%	7.5%	2.5%	2.5%	25%
End semester examination Weightage :							25%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	20%	2.5%	2.5%	5%	30%	
End semester examination Weightage :							20%

Course Designed by		Department of Physics and Nanotechnology													
1	Students Outcome	a	b	c	d	e	f	g	h	i	j	k	l	m	n
		X	X		X	X						X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
					X										
3	Broad Area(for p only)	Programming		Networking		Data base		Web System	Human Computer Interaction		Platform Technologies				
		Not Applicable													
4	Staff coordinator							Dr. M. Krishnamohan							

15CY102	PRINCIPLES OF ENVIRONMENTAL SCIENCE	L	T	P	C
		2	0	0	2
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	B Basic Sciences				
Course designed by	Department of Chemistry				
Approval	32 nd Academic Council Meeting , May 2016				

PURPOSE	The course provides a comprehensive knowledge in environmental science, environmental issues and the management.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, students will be able to							
1.	Understand the importance of environmental education and ecosystem.	h	b				
2.	Know the sources, effects and control measures of environmental pollution.	e	j				
3.	Acquire knowledge on the treatment of wastewater and solid waste management.	h	i				
4.	Understand the importance of biodiversity, its threat, its conservation and appreciate the concept of interdependence.	f					
5.	Outline the national and international concern for environment for protecting the environment	c	j				

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : ENVIRONMENTAL EDUCATION AND ECOSYSTEMS	6			
	Environmental education: Definition and objectives.	1	C	1	1-6
1.	Structure and function of an ecosystem.	3	C	1	1-6
2.	Ecological succession, primary and secondary succession.	1	C	1	1-6
3.	Ecological pyramids, pyramid of number, pyramid of energy and pyramid of biomass.	1	C	1	1-6
	UNIT II : ENVIRONMENTAL POLLUTION	6			
4.	Environmental segments , Structure and composition of atmosphere	1	C	2	1-6
5.	Pollution : Air, water, soil , thermal and radiation	2	C	2	1-6
6.	Effects : acid rain, ozone layer depletion and greenhouse effect	1	C	2	1-6
7.	Control measures	1	C	2	1-6
8.	Determination of BOD,COD,TDS and trace metals	1	C	2	1-6
	UNIT III : WASTE MANAGEMENT	6			

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
9.	Waste water treatment (general) : primary, secondary and tertiary stages	2	C	3	1-6
10.	Solid waste management: sources and effects of municipal waste	2	C	3	1-6
11.	Bio medical waste - process of waste management	2	C	3	1-6
	UNIT IV: BIODIVERSITY AND ITS CONSERVATION	6			
12.	Introduction: definition - genetic, species and ecosystem diversity	1	C	4	1-6
13.	Bio diversity hot spots, Endangered and endemic species of India	1	C	4	1-6
14.	Values of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values	1	C	4	1-6
15.	Threats to biodiversity: habitat loss, poaching of wildlife	1	C	4	1-6
16.	Conservation of biodiversity: in-situ and ex-situ conservations.	2	C	4	1-6
	UNIT V: ENVIRONMENTAL PROTECTION	6			
17.	National concern for environment: Important environmental protection acts in India – water, air (prevention and control of pollution) act, wild life conservation and forest act	2	C	5	1-6
18.	Functions of State and Central Pollution Control Boards	1	C	5	1-6
19.	International effort, key initiatives of Rio declaration, Vienna convention, Kyoto protocol and Johannesburg summit.	3	C	5	1-6
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Kamaraj.P & Arthanareeswari.M, “Environmental Science–Challenges and Changes”, 4 th Edition, Sudhandhira Publications, 2010.
2.	R.Jeyalakshmi, Principles of environmental science, Devi publications, 2 nd ed., 2008.
3.	Kurian Joseph , R.Nagendran, ‘Essentials of Environmental Studies’, Pearson Education, 2 nd ed., 2005, ISBN-13: 978-8129704986
4.	De.A.K., “Environmental Chemistry”, New Age International, New Delhi, 1996.
5.	Helen P Kavitha, “Principles of Environmental Science”, Scitech Publications, 2 nd Edition, 2008.
6.	Sharma.B.K. and Kaur, “Environmental Chemistry”, Goel Publishing House, Meerut, 1994.

Course nature	Theory
---------------	--------

Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Chemistry													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	K	l	m	n
			X	X		X	X		X	X	X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
3	Broad area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Dr. Sivagami							

15ME101	BASIC MECHANICAL ENGINEERING			L	T	P	C
				2	0	0	2
Co-requisite:	Nil						
Prerequisite:	Nil						
Data Book / Codes/Standards	Nil						
Course Category	E	ENGINEERING SCIENCES					
Course designed by	Department of Mechanical Engineering						
Approval	Academic Council Meeting , 23 rd July 2016						

PURPOSE	To familiarize the students with the basics of Mechanical Engineering.					
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES		
At the end of the course, student should be able to understand						
1.	Basic machine elements			a	e	
2.	Sources of Energy and Power Generation			a	e	
3.	Various manufacturing processes			a	e	

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	UNIT I- MACHINE ELEMENTS	6			
1.	Springs: Helical and leaf springs, Classification, Terms, Materials	1	C	1	1
2.	Springs in series and parallel, Importance of the combination of springs, Applications of springs, numerical in springs	1	C, D	1	1
3.	Cams: Types of cams and followers , Classification, Based on Input / Output Motion, Follower configuration, Follower arrangement and Cam shape	1	C	1	1
4.	Cam profile, Cam nomenclature, Application, Motion of the follower	1	C	1	1
5.	Power Transmission , Gears terminology, Spur , Helical ,Bevel gears and gear trains applications	1	C	1	1
6.	Belt drives, Types of belt drives, Belt materials and Applications, problems on open and cross belt drives, Chain drives, Comparison of gear, belt drives and chain drives	1	C, D	1	1
	UNIT II – ENERGY SOURCES	6			
7.	Renewable and Nonrenewable Sources, Characteristics, types, Advantages and disadvantages	1	C	2	3
8.	Solar thermal systems and tower power generation, Solar photovoltaic system	1	C	2	3
9.	Wind energy, Horizontal axis wind turbines,	1	C	2	3

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	Vertical axis wind turbines, advantages and disadvantages				
10.	Geothermal energy, Indian geothermal sources, advantages and disadvantages	1	C	2	3
11.	Ocean energy, ocean thermal energy conversion	1	C	2	3
12.	Tidal energy , Single pool tidal energy conversion system	1	C	2	3
	UNIT III - POWER GENERATION	6			
13.	Power Generation: external and internal combustion engines	1	C	2	3
14.	Classification of engines, Engine operations: 2 stroke & 4 stroke, Comparison of SI & CI engines	1	C	2	3
15.	Overview of fuels, Applications, Numerical–internal combustion engines	1	C,D	2	3
16.	Thermal Power Plants: layouts, element/component description, advantages, disadvantages, applications	1	C	2	3
17.	Hydro power plants : layouts, element/component description, advantages, disadvantages, applications	1	C	2	3
18.	Nuclear power plant :layouts, element/component description, advantages, disadvantages, applications, Element/component description of boiling water reactor and pressurized water reactor	1	C	2	3
	UNIT IV: MANUFACTURING PROCESSES I	6			
19.	Sheet metal work : Introduction, equipment, Tools, accessories	1	C	3	2
20.	Sheet metal Various processes	1	C	3	2
21.	Sheet metal application, advantages and disadvantages.	1	C	3	2
22.	Welding : Types, Equipment, Tools and accessories, Techniques employed	1	C	3	2
23.	Applications of gas and arc welding , gas cutting	1	C	3	2
24.	Brazing and soldering, Advantages and disadvantages	1	C	3	2
	UNIT V: MANUFACTURING PROCESSES II	6			
25.	Lathe Practice: Types, Description of main components	1	C	3	2
26.	Lathe Cutting tools and Work holding devices ,basic operations	1	C	3	2
27.	Numerical on lathe operations	1	C, D	3	2

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
28.	Drilling Practice : Introduction, Types, Description, Drilling Tools	1	C	3	2
29.	Drilling operations, special operations on drilling machines, drill holding devices	1	C	3	2
30.	Numerical on drilling operations	1	C, D	3	2
	Total contact hours*	30			

*Excluding assessment hours

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS
4.	Merhyle F. Spotts , Terry E. Shoup “ Design of Machine Elements”, Pearson; 8 th Edition, 2003
5.	SeropeKalpakjian, Steven Schmid," Manufacturing Processes for Engineering Materials", Pearson, 2016
6.	Drbal, Larry F. Boston, Patricia G. Westra, Kayla L. Black, Veatch, "Power Plant Engineering", Kluwer Academic Pub., 1995
REFERENCE BOOKS/OTHER READING MATERIAL	
7.	Andy Walker, "Solar Energy", John Wiley & Sons, 2013
8.	John G. Edwards, "Lathe Operation and Maintenance", Carl HanserVerlag GmbH & Co, 2003.
9.	EfstathiosE.Stathis, Michaelides, “Alternative Energy Sources", Springer, 2012
10.	Kumar. T, LeenusJesu Martin and Murali. G, “Basic Mechanical Engineering”, Suma Publications, Chennai, 2007.

Course nature				Theory		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Surprise Test	Quiz / Assignment	Total
	Weightage	15%	25%	5%	5%	50%
End semester examination Weightage :						50%

Course Designed by		Department of Mechanical Engineering														
1	Students Outcome	a	b	C	d	e	f	g	h	I	j	K	l	m	n	
		X				X										
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
									X							
3	Broad area(for p only)	Programming			Networking			Data base		Web System		Human Computer Interaction			Platform Technologies	
		Not Applicable														
4	Staff coordinator								Mr.Barathraj R.K							

15ME105L	ENGINEERING GRAPHICS	L	T	P	C
		1	0	4	3
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book / Codes/Standards	First Angle Projection is to be followed - Practice with Computer Aided Drafting tools, IS STANDARD				
Course Category	E ENGINEERING SCIENCES				
Course designed by	Department of Mechanical Engineering				
Approval	Academic Council Meeting , 23 rd July 2016				

PURPOSE	1. To draw and interpret various projections of 1D, 2D and 3D objects.2. To prepare and interpret the drawings of buildings.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student should be able to understand							
1	Construction of geometrical figures			g			
2	Projection of 1D, 2D and 3D objects			g	k		
3.	Sectioning of solids and development of surfaces			g	k		
4	Preparation and interpretation of building drawing			g	k		

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
1	Introduction to Engineering Graphics and Drafting tool Introduction to Engineering drawing - Drawing instruments (including Mini drafter) - Lettering - Line type - Drawing standards and codes - Drawing sheet layout (Margins and Title block) Introduction to Drafting package - Graphical User Interface (GUI) – - Setting work area and Title block - Draw: Line, Arc, Circle - Modify: Erase, Offset, Move, Copy	2	C,D	1,2	1,2,3
	Manual Drafting - Drawing sheet layout - Alphabets of height 5 and 7 mm - Numerals 0 to 9 of height 5 and 7 mm - Drawing basic entities	1			
	Computer Aided Drafting - Draw the given figures using drafting package.	2			
2	Review of Geometric construction & Introduction to modifying commands Geometric constructions: - Dividing a line into 'n' parts - Bisecting an arc - Drawing an arc tangent to two straight lines - Construction of polygon Introduction to Modify commands - Demonstration of Modify commands in drafting package succession.	2	C	1	1,2,3
	Manual Drafting - Geometric constructions.	1	D		

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	Computer Aided Drafting - Draw the given figures using drafting package	2			
3	Layers, Dimensioning, Hatching and Text Demonstration of commands - Layers - Dimensions - Hatching - Text	2	C	2	1,2,3
	Computer Aided Drafting - Draw the given figures using drafting package	3	D		
4	Conic sections and Special curves Construction of Conic sections: - Parabola : Tangent and Rectangle method - Ellipse: Oblong method and concentric circle method – - Hyperbola – Eccentricity method - Construction of special curves: - Cycloid - Spiral	2	C	1,2	1,2,3
	Manual Drafting - Construction of conic sections and cycloid	2	D		
	Computer Aided Drafting - Draw the given figures using drafting package	1	D		
5	Introduction to orthographic projections: - I, II, III and IV angle projections - Projection of Points in different quadrants - Projection of Lines: Inclined to one plane - Projection of planes - Conceptual free hand sketching	2	C	2,3	1,2,3
	Manual Drafting - Conceptual sketching - Projection of points, lines and planes	3	D		
6	Solids I Introduction to solids : - Polyhedron - Prisms Introduction to 3D Tools: - Modeling	2	C	2	1,2,3
	Manual Drafting - Projection of solid	1	D		
	Computer Aided Drafting - Modeling of polyhedron and prisms - Generating orthographic views of solids	2	D		
7	Solids II Introduction to solids: - Pyramids - Solids of revolution Introduction to 3D Tools: - Modeling	2	C	2	1,2,3
	Manual Drafting - Projection of solids	2	D		
	Computer Aided Drafting - Modeling of pyramids & solids of revolution and generating the orthographic views	1	D		
8	Solids – III Orthographic views - Orthographic views of the given pictorial view / model - Demonstration of modeling of components using Extrude and Revolve - Boolean operations	2	C	2	1,2,3
	Manual Drafting – - Drawing orthographic views of machine components in grid sheet	1	D		

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	Computer Aided Drafting - Modeling of simple machine components and	2	D		
9	Solids – IV - Demonstration of modeling of components using Loft, Sweep, Helical sweep and Shell. Computer Aided Drafting- Modeling of components using Boolean operations and generating its orthographic views	2 3	C D	2	1,2,3
10	Section of Solids Introduction to Section of regular solids - Section plane - Sectional view Manual Drafting 2,3 1,2,3 - Section of solids Computer Aided Drafting - Modeling the regular solids and section it to obtain the sectional views	2 2 1	C D D	2,3	1,2,3
11	Development of surfaces - Introduction - Methods - Application Manual Drafting - Development of surfaces	2 3	C D	2,3	1,2,3
12	Building Drawing - Components of a building - Conventional representation of building materials - Scale Computer Aided Drafting - Drawing the plan, elevation and sectional views of a building	2 3	C D	4	1,2,3
Total contact hours		30			

Sl. No.	LEARNING RESOURCES
1	Bhatt, N.D., “Elementary Engineering Drawing (First Angle Projection)”, Charotar Publishing Co., Anand, 1999.
2	Bethune, J.D.,”Engineering Graphics with AutoCAD 2013”, PHI Learning Private Limited, Delhi, 2013.
3	Shah, M. B. and Rana, B. C., “Engineering Drawing”, Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2005.
4	Venugopal, K. and Prabhu Raja, V., “Engineering Graphics”, Eighth Edition (Revised), New Age International Publishers, Chennai, 2007.
5	Natarajan, K.V., “A Text Book of Engineering Graphics”, 21st Edition, Dhanalakshmi Publishers, Chennai, 2012
6	Jeyapooan, T., “Engineering Drawing and Graphics using AutoCAD”, Vikas Publishing House Pvt. Ltd., New Delhi, 2010
7	Narayanan, K. L. and Kannaiah, P.,”Engineering Graphics”, Scitech Publications, Chennai, 1999

Course nature					Theory		
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Mechanical Engineering													
1	Students Outcome	a	b	C	d	e	f	g	h	I	j	K	l	m	n
								X				X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
								X							
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Mr.S. Balamurugan							

15EC101	BASIC ELECTRONICS ENGINEERING	L	T	P	C
		2	0	0	2
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book / Codes/Standards	Nil				
Course Category	P Professional Core			Electronics	
Course designed by	Department of ECE				
Approval	30 th Academic Council Meeting, 24 th March, 2016				

Purpose	This course provides comprehensive idea about working principle, operation and Characteristics of electronic devices, transducers, Digital Electronics and Communication Systems.				
Instructional Objectives			Student Outcomes		
At the end of the course, the learners will be able to gain knowledge about the			H	M	L
1.	Fundamentals of semiconductor, electronic components/devices, optoelectronic devices and transducers		a		
2.	Principles of digital electronics		e		
3.	Principles of various communication systems		a	e	
	H: High correlation,	M: Medium correlation,	L: Low correlation		

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
	UNIT-I: SEMICONDUCTOR DEVICES	9			
1.	Overview of Semiconductors, PN junction diode	1	C	1	1
2.	Zener diode	1	C	1	1
3.	Diode circuits: rectifiers (bridge-type only)	1	C,D	1	1
4.	Filters	1	C	1	1
5.	Clippers and Clampers	1	C	1	1
6.	BJT construction, operation, characteristics (CB, CC, CE configurations) and uses	2	C	1	1
7.	JFET and MOSFET construction, Characteristics (CS configuration) and uses.	2	C	1	1
	UNIT – II : OPTOELECTRONIC DEVICES	4			
8.	Photoconductive cell - photovoltaic cell - solar cell	1	C	1	1
9.	Photodiode - phototransistor	1	C	1	1
10.	LED - infrared emitters	1	C	1	1
11.	LCD – opt couplers	1	C	1	1
	UNIT-III: TRANSDUCERS	4			
12.	Basic requirements of transducers - classification of transducers - passive transducers: capacitive, inductive	1	C	1	1

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
13.	LVDT, potentiometric, strain gauge	1	C	1	1
14.	Thermistor, Hall-Effect Transducer	1	C	1	1
15.	Active transducers- piezoelectric, photoelectric and thermos couple	1	C	1	1
	UNIT - IV: DIGITAL ELECTRONICS	7			
16.	Number systems	2	C,D	2	1
17.	Binary codes – Binary Arithmetic	1	C,D	2	1
18.	Logic gates	1	C,D	2	1
19.	Boolean algebra, laws and theorems	1	C,D	2	1
20.	Simplification of Boolean expressions	1	C,D	2	1
21.	Implementation of Boolean expressions using logic gates Standard forms of Boolean expression	1	C,D	2	1
	UNIT- V: COMMUNICATION SYSTEMS	6			
22.	Block diagram of a basic communication system, Frequency spectrum, Need for modulation, Methods of modulation	1	C	3	1
23.	principles of AM, FM, pulse analog and pulse digital modulation	2	C	3	1
24.	AM/FM transmitters and receivers(block diagram description only)	1	C	3	1
25.	Satellite Communication, Radar systems	1	C	3	1
26.	Data transmission and MODEM	1	C	3	1
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES														
1.	R. Muthusubramanian, S. Salivahanan, “Basic Electrical and Electronics Engineering”, Tata McGraw-Hill Education, Reprint 2012.														
2.	B. Somanathan Nair, S.R. Deepa, “Basic Electronics”, I.K. International Pvt. Ltd., 2009.														
3.	Thomas L. Floyd, “Electronic Devices”, Pearson Education, 9 th Edition, 2011.														
4.	R.K. Rajput, “Basic Electrical and Electronics Engineering”, Laxmi Publications, First Edition, 2007.														
Course nature										Theory					
Assessment Method (Weightage 100%)															
In-semester		Assessment tool	Cycle test I		Cycle test II		Cycle Test III		Surprise Test		Quiz		Total		
		Weightage	10%		15%		15%		5%		5%		50%		
End semester examination Weightage :													50%		
Course Designed by		Department of Electronics and Communication Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
		X				X									

Sl. No.	LEARNING RESOURCES						
2	Category	GENERAL (G)	BASIC SCIENCES (B)	ENGINEERING SCIENCES AND TECHNICAL ART (E)	PROFESSIONAL SUBJECTS(P)		
3	Broad Area(for p only)	Programming	Networking	Data base	Web System	Human Computer Interaction	Platform Technologies
		Not Applicable					
4	Staff coordinator			Dr. Kalimuthu			

15IT101L	COMPUTER HARDWARE AND TROUBLESHOOTING LAB	L	T	P	C
		0	0	3	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	This course is designed to enable the students to get a detailed knowledge of all the hardware components that make up a computer and to understand the different interfaces required for connecting these hardware devices.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	To understand the components on the motherboard	k				
2.	To perform system administration tasks	i				
3.	To understand different storage media	k				
4.	To understand system related problems and methods of troubleshooting	k				

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
1.	Study and identification of standard desktop personal computer.	3	C	1	1
2.	Understanding of Motherboard and its interfacing components	3	C	1	1
3.	Install and configure computer drivers and system components.	3	D	2	1
4.	Disk formatting, partitioning and Disk operating system commands	6	I,O	3	1
5.	Install,upgrade and configure Windows operating systems.	3	I,O	2	1
6.	Remote desktop connections and file sharing.	3	I,O	3	1
7.	Identify, install and manage network connections Configuring IP address and Domain name system	6	I,O	2	1
8.	Install, upgrade and configure Linux operating systems.	3	I,O	2	1
9.	Installation Antivirus and configure the antivirus.	4	I,O	2	1
10.	Installation of printer and scanner software.	3	I,O	2	1
11.	Disassembly and Reassembly of hardware.	4	I,O	2	1
12.	Troubleshooting and Managing Systems	4	I,O	2	1
Total Contact Hours		45			

LEARNING RESOURCES	
1.	Laboratory Manual
2.	Craig Zacker& John Rourke, “The Complete Reference:PC hardware”, New Delhi, Tata McGraw-Hill, 2001, ISBN-13: 978-0072125160
3.	Mike Meyers, “Introduction to PC Hardware and Troubleshooting”, New Delhi, Tata McGraw-Hill, 2003, ISBN-13: 978-0072226324
4.	B.Govindarajulu, “IBM PC and Clones hardware trouble shooting and maintenance”, New Delhi, 2002, Tata McGraw-Hill, ISBN-13: 978-0070482869

Course nature				Practical		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Experiments	Record /observation	MCQ/Quiz/Viva Voce	Model examination	Total
	Weightage	40%	5%	5%	10%	60%
End semester examination Weightage :						40%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
										X		X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
				X											
		Not Applicable													
4	Staff coordinator							Ms. Elizabeth Jesi							

15ITI02	PROGRAM DESIGN AND DEVELOPMENT	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	Knowledge of problem solving and programming concepts are essential for those who develop applications for users. Hence, to provide the required knowledge, this course imparts basic knowledge in C Programming along with the concepts of design and development of programs using C.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Apply logic and solve problems using computers	a					
2.	Understand the basic components and structure of a C program	c					
3.	Develop proficiency in basic programming skills	i					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : INTRODUCTION TO PROBLEM SOLVING AND PROGRAMMING	6			
1.	Creative thinking and problem solving skills ; Visualization and Memory	1	C	1	1
2.	Problem Solving Concepts ; Problem Solving in everyday life; Types of Problems	1	C	1	1
3.	Problem solving Concept for Computers; Algorithms and Flowcharts	2	C,D	1	1
4.	Programming Concepts; Preprocessing, Compilation, Assembling and Linking	2	C	1	1
	UNIT II : OVERVIEW OF C	9			
5.	Structure of C program, constants, variables, Data types	1	C	2	2
6.	Operators ; Evaluation of Expressions; Precedence of Operators and associativity	1	C	2	2
7.	Mathematical Functions and Managing I/O operations	2	C	2	2
8.	Decision making and branching structures ; IF statement and its variants, Switch statement ; break statement	2	C,I	3	2
9.	Decision making and Looping structures ; For loop, While statement, do while statement; Continue statement	3	C,I	3	2
	UNIT III : FUNCTIONS	9			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
10.	User defined functions and its elements; Function call ; Function definition	2	C,I	3	2
11.	Return values and its types	1	C,I	3	2
12.	Types of functions	2	C,I	3	2
13.	Scope and Visibility of variables in functions	2	C,I	3	2
14.	Calling functions within other functions ;Recursion	2	C,I	3	2
	UNIT IV : ARRAYS, STRUCTURES AND UNIONS	10			
15.	Arrays: Single Dimension , Multi-dimension, Dynamic Arrays	2	C,I	3	2
16.	Character arrays and strings	2	C,I	3	2
17.	String handling functions	1	C,I	3	2
18.	Structures and Unions ; Defining a Structure, Declaring Structure Objects, Array of Structures, Nested Structures	3	C,I	3	2
19.	Functions and Structures	2	C,I	3	2
	UNIT V : POINTERS	11			
20.	Pointers and Indirection, Defining a Pointer Variable, Pointers in Expressions	2	C,I	3	2
21.	Operations Pointers : Arithmetic Operations , Relational Operations	2	C,I	3	2
22.	Array of Pointers : character strings	2	C,I	3	2
23.	Passing Pointers to functions	2	C,I	3	2
24.	Pointers to structures	2	C,I	3	2
25.	Shell Programming : Basics	1	C,I		
	Total Contact Hours	45			

LEARNING RESOURCES	
1.	Maureen Sprankle, “Problem Solving and Programming Concepts”, 7 th Edition, Pearson, 2011, ISBN-10: 0-13-249264-4, ISBN-13: 978-0-13-249264-5
2.	E.Balagurusamy, “Programming in ANSI C”, 5 th Edition, Tata McGrawHill, 2011, ISBN-13: 978-0-07-068182-8, ISBN-10: 0-07-068182-1
3.	Y.P. Kanetkar, “Let us C”, 8 th Edition, BPB Publications, 2008, ISBN-13: 978-1934015254, ISBN-10:1934015253
4.	Steve Oualline, “ Practical C Programming”, O’Reilly Publishers, 2011, ISBN-13: 978-1-565-92306-5
5.	Byron Gottfried, “Programming with C”, 2 nd Edition, Schaum’s Outline Series, 2000, ISBN -10: 0071367993, ISBN-13: 9780071367998

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n	
		X		X						X						
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies				
		X														
		Not Applicable														
4	Staff coordinator								Mr. Nagoor Meeran							

15IT102L	PROGRAM DESIGN AND DEVELOPMENT LABORATORY	L	T	P	C
		0	0	2	1
Co-requisite:	15IT102 - Program Design and Development				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	P PROFESSIONAL CORE				
Course designed by	Department of Information Technology				
Approval	32 nd Academic Council Meeting , May 2016				

PURPOSE	To develop skills in designing and developing programs using C language					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Apply problem solving skills and logic to solve problems using computers	a				
2.	Understand the basic components and structure of a C program	c				
3.	Develop proficiency in basic programming skills	i				

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
1.	Study of Unix commands	2	C	1	1
2.	Programs using I/O functions	2	C,I	2	1
3.	Programs using decision making and branching statements	2	C,I	3	1
4.	Programs using decision making and looping statements	2	C,I	3	1
5.	Programs with arrays : Single dimensional, Multidimensional	2	C,I	3	1
6.	Programs using user-defined functions , Definition of arguments	2	C,I	3	1
7.	Programs using recursions	2	C,I	3	1
8.	Programs with strings , Function with strings as arguments	2	C,I	3	1
9.	Programs using structures ,Unions and as arguments in functions	2	C,I	3	1
10.	Programs using pointers ; Simple Programs	2	C,I	3	1
11.	Programs using pointers as parameters to functions	2	C,I	3	1
12.	Programs using pointers and Arrays	2	C,I	3	1
13.	Programs using pointers and structures	3	C,I	3	1
14.	Programs with Function pointers	3	C,I	3	1
Total Contact Hours		30			

LEARNING RESOURCES	
1.	Laboratory Manual

Course nature				Practical		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total
	Weightage	40%	5%	5%	10%	60%
End semester examination Weightage :						40%

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n	
		X		X						X						
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area(for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		X														
		Not Applicable														
4	Staff coordinator								Mr. Nagoor Meeran							

15LE201	GERMAN LANGUAGE I	L	T	P	C
		2	0	0	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Course Category</i>	G General				
<i>Course designed by</i>	Department of English & Foreign Languages				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	Germany offers infinite opportunities for students of engineering for higher studies, research and employment in Germany. B.Tech Students are offered German Language I during their second year. Knowledge of the language will be helpful for the students to adjust themselves when they go for higher studies						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	To introduce the language, phonetics and the special characters in German language	g					
2.	To introduce German culture & traditions to the students.	g					
3.	By the end of Phase – I, the students will be able to introduce themselves and initiate a conversation.	g					
4.	We endeavor to develop the ability among the students to read and understand small texts written in German.	g					
5.	To enable the students to elementary conversational skills	g					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I :WICHTIGE SPRACHHANDLUNGEN	6			
1.	Phonetics – Sich begrüßen	1	C	1,2	1
2.	Sich und andere vorstellen formell / informell	1	C	1	1,6
3.	Zahlen von 1 bis 1 Milliarde - verstehen & sprechen	1	C	1	1
4.	regelmäßige Verben im Präsens - “sein” und “haben”	2	C	1,4	1,2
5.	Personalpronomen im Nominativ	1	C	1,4	1,2
	UNIT II : WICHTIGE SPRACHHANDLUNGEN	6			
6.	Telefon Nummern verstehen und sprechen	1	C	2,4	1
7.	Uhrzeiten verstehen und sagen Verneinung “nicht und kein” (formell und informell)	1	C	3	1
8.	Wortstellung – Aussagesatz – W-Frage	1	C	3,4	1,2
9.	Satzfrage (Ja/Nein Frage) Nomen buchstabieren	1	C	3,4	1,2,6
10.	notieren bestimmter und unbestimmter Artikel	1	C	4	1,2
11.	Negativartikel im Nom. & Akkusativ	1	C	3,4	1,2
	UNIT III : WICHTIGE SPRACHHANDLUNGEN	6			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
12.	Tageszeiten verstehen und über Termine sprechen	1	C	3	1
13.	Verabredungen verstehen und Aufgaben im Haushalt verstehen	1	C	1	1
14.	Genitiv bei Personennamen	1	C	1,3,4	1,2
15.	Personalpronomen im Akkusativ	1	C	3	1,2
16.	W-Fragen “wie, wer, wohin, wo, was usw	1	C	3,4	1,2,6
17.	Modalverben im Präsens “können, müssen, möchten”	1	C	3,4	1,2
	UNIT IV :WICHTIGE SPRACHHANDLUNGEN	6			
18.	Sich austauschen	1	C	2,4	2
19.	was man kann, muss – Bezeichnungen Lebensmittel	1	C	3	1
20.	Mengenangaben verstehen	1	C	3,4	1,2,6
21.	Preise verstehen und Einkaufszettel schreiben	1	C	3,4	1,2
22.	Wortstellung in Sätzen mit Modalverben Konnektor ”und” – “noch”- kein - mehr	1	C	4	1,2
23.	wie viel, wie viele, wie alt, wie lange” – Possessivartikel im Nominativ	1	C	3,4	1,2
	UNIT V :WICHTIGE SPRACHHANDLUNGEN	6			
24.	Freizeitanzeigen verstehen	1	C	2,4	1,6
25.	Hobbys und Sportarten Anzeigen für Freizeitpartner schreiben bzw	1	C	3	1,2
26.	Verben mit Vokalwechsel im Präsens	1	C	3,5	1,2
27.	Modalverben im Präsens “ dürfen, wollen und mögen	1	C	3,4,5	1,2
28.	“haben und sein” im Präteritum	1	C	4	1,2
29.	regelmäßige Verben im Perfekt – Konnektoren “denn, oder, aber	1	C	3,4,5	1,2
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	German for Beginners, SRM University
2.	Studio d A1. Deutsch als Fremdsprache with CD.(Kursbuch und Sprachtraining)
3.	Sometimes we use CDs for practicing of Native speaking.

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of English & Foreign Languages													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
								X							
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		Not Applicable													
4	Staff coordinator							Mr. Subramaniyam							

15LE202	FRENCH LANGUAGE I	L	T	P	C
		2	0	0	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Course Category</i>	G General				
<i>Course designed by</i>	Department of English and Foreign Languages				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	To enable the student learners understand on a basic level how French as a foreign language functions aimed at the four language competences- reading, writing, listening and speaking.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the semester, the course helps							
1.	To enable students improve their grammatical competence.			g			
2.	To enhance their listening skills.			g			
3.	To enhance their lexical competence			g			
4.	To help the students introduce themselves and focus on their communication skills			g			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : L'ALPHABET FRANCAIS, LES ACCENTS ET LES PHONETIQUES	4			
1	La francophonie – démystifier le français	1	C	3	1, 4
2	Comment se présenter, les accents – é, è, ê, ç, ë, l’apostrophe et trait d’union phonétique	1	C	2	1, 2
3	L’alphabet Lexique	1	C	2,3	1, 2, 3
4	Les mots transparents en sciences et technologie et quelques prénoms français.	1	C	3	1
	UNIT II : SE PRESENTER ET LES SALUTATIONS	5			
5	Le tutoiement et le vouvoiement – la politesse “à la française”	1	C	1,2	1,2
6	Comment saluer et accueillir quelqu’un puis comment identifier et nommer une personne	1	C	1,3,4	1,3
7	Le verbe être au présent	1	C	1	1,3,4
8	Les articles indéfinis	1	C	1,2	1,4
9	La politesse, les salutations et la famille	1	C	1, 3,4	1,3
	UNIT III : LES ARTICLES ET LES PREPOSITIONS	5			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
10	Comment se présenter et présenter quelqu'un puis aborder une personne et remplir un formulaire,	2	C	1,4	1, 3,4
11	Les pronoms personnels, le féminin et le masculin, les prépositions de lieu	2	C	1,3	1, 4
12	Les articles définis la liaison obligatoire et l'accent	1	C	1,3,4	1,2,3
	UNIT IV : LES ADJECTIFS, LA NEGATION	8			
13	Comment demander des nouvelles et parler de soi- dire son âge et comment poser des questions simples.	2	C	2,3	1, 2
14	Les pronoms toniques puis l'interrogation la voyelle nasale les chiffres de 0 a 1000, les ordinaux, parler de ses activités et de ses loisirs et de ses goûts. les verbes faire et savoir, la négation	2	C	3,4	1, 2
15	les adjectifs possessifs et le partitif.	2	C	1,3	1, 2
16	Le verbe avoir et les verbes du premier groupe au présent, les adjectifs possessifs	2	C	1,3	2,3
	UNIT V :L'ORIENTATION	8			
17	Se repérer sur un plan objectifs, comment s'excuser et comprendre un mail puis comment demander son chemin et indiquer une direction et décrire son logement, et "il y a "Phonétique, l'intonation lexicque,	3	C	2,3,4	1, 2,3
18	Le verbe aller au présent, les prépositions de lieu	3	C	1, 2,3	1, 2
19	Le logement et la ville, les verbes de direction	2	C	3	1, 2, 4
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Tech French (for Science and Technology), ISBN-13: 978-8183074360
2.	French for dummies. Wiley publishing co. Inc., USA.
3.	French made easy , Goyal publishers
4.	Version Originale, Goyal publishers, ISBN 9788484435662

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of English and Foreign Languages													
1	Students Outcome	a	b	c	d	e	f	G	h	I	J	k	l	m	n
								X							
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		Not Applicable													
4	Staff coordinator							Mrs. Saradha							

15LE203	JAPANESE LANGUAGE	L	T	P	C
		2	0	0	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Course Category</i>	G General				
<i>Course designed by</i>	Japanese faculty of EFL dept				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE To enable students achieve a basic exposure on Japan, Japanese language and culture. To acquire basic conversational skill in the language.

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES					
At the end of the course, student will be able to							
1.	Read and write the Hiragana Japanese script and a few basic kanji.	g					
2.	converse in Japanese at a basic level	g					
3.	Know about Japan and Japanese culture	g					
4.	Have a better opportunity for employability by companies who have association with Japan.	g					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I :HIRAGANA SCRIPT	8			
1	Chart 1 – 46 syllables	4	C	1	1, 2
2	Chart 2 – ten-ten letters and chart 3 – combination letters.	2	C	1	1, 2
3	Double consonants and vowel elongation	2	C	1	1, 2
	UNIT II :SELF INTRODUCTION AND GREETINGS	8	C		
4	Self introduction and greetings	2	C	2, 3	1
5	Asking about someone and introducing someone	2	C	2, 3	1
6	Numbers, days of the week and months of the year	2	C	2, 3	1
7	Land, language and culture	2	C	3	1
	UNIT III :DEMONSTRATIVE PRONOUNS	5			
8	Telling the time	2	C	2	1
9	asking the price	1	C	2	1
10.	seasons	1	C	2	1
11	Kanji introduction	1	C	1	1
	UNIT IV :ADJECTIVES	5	C		
12	Introduction to i-ending and na-ending adjectives.	2	C	2, 3	1
13	Colours	1	C	2, 3	1
14	Locations	2	C	2, 3	1
	UNIT V :COUNTERS	4			
15	Some basic counters used in daily life.	2	C	2, 3, 4	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
16	Family – plain and polite forms.	2	C	2, 3, 4	1
Total Contact Hours		30			

Sl. No.	LEARNING RESOURCES
1.	A basic course in Japanese, SRM University
2.	Japanese for dummies. Wiley publishing co. Inc., USA.
3.	Kana workbook, Japan foundation
4.	Shoho-I, Japan foundation
5.	www.learnjapaneseatrm.blogspot.in

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of English and Foreign Languages													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
								X							
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(For P Only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Mr. Nirmal E							

15LE205	KOREAN LANGUAGE I	L	T	P	C
		2	0	0	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Course Category</i>	G General				
<i>Course designed by</i>	Korean faculty of EFL dept				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	To enable students achieve a basic exposure on Korea, Korean language and culture. To acquire basic conversational skill in the language.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	understand scripts from the text book	g					
2.	make the students acquire basic conversational skill	g					
3.	enable students to know about Korean culture	g					
4.	create an advantageous situation for the students to have better opportunity for employability by companies who have association with Korea	g					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I :INTRODUCTION TO KOREAN LANGUAGE	9			
1.	Introduction to Hangeul , Consonants and Vowels	5	C	1	1, 2
2.	Reading, Writing, Listening - Hangeul 1	4	C	1	1, 2
	UNIT II :GREETING	6			
3.	Expressions related to greetings	1	C	2, 3	1
4.	Introducing yourself: About myself (name, nationality, occupation, etc.)	1	C	2, 3	1
5.	Vocabulary , Occupations	1	C	2, 3	1
6.	Reading, Writing, Listening - Hangeul 2	3	C	1, 3	1
	UNIT II :INTRODUCTIONS	6			
7.	Introducing another person , obtaining personal information	1	C	2, 3	1
8.	introducing two people to each other	1	C	2, 3	1
9.	Exchanging personal information	1	C	2, 3	1
10.	Reading, Writing, Listening - Hangeul 3	3	C	1, 3	1
	UNIT IV : RESTAURANT	6			
11.	Ordering at a restaurant , Ordering food as directed, Asking for more	2	C	2, 3, 4	1
12.	Vocabulary , food and tableware	1	C	2, 3, 4	1
13.	Reading, Writing, Listening - Hangeul 4	3	C	1, 3	1
	UNIT V :NUMBERS	3			
14.	Numbers and Counting units	1	C	2, 3, 4	1
15.	Reading, Writing, Listening - Hangeul 5	2	C	2, 3, 4	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Seoul National University, <i>Active Korean I</i> , MOONJINMEDIA, 2006.
2.	THE NATIONAL INSTITUTE OF THE KOREAN LANGUAGE, <i>King Sejong Korean I</i> , THE NATIONAL INSTITUTE OF THE KOREAN LANGUAGE, 2013, ISBN-13: 978-8996994701
3.	THE NATIONAL INSTITUTE OF THE KOREAN LANGUAGE, <i>Korean Grammar for Foreigners I, 2</i> , COMMUNICATIONBOOKS, 2005.
4.	Cho H. R. et al., Master Korean basic 1-1, Darakwon, 2013.
5.	Ahn J. M. et al., Korean grammar in use beginning, Darakwon, 2010

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of English and Foreign Languages													
1	Students Outcome	a	b	c	d	E	f	g	h	I	J	k	l	m	n
								X							
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Mr. Jang Kyung							

15LE205	CHINESE PHASE I		L	T	P	C
			2	0	0	2
Co-requisite:	NIL					
Prerequisite:	NIL					
Course Category	G	General				
Course designed by	Chinese faculty by EFL department					
Approval	32 nd Academic Council Meeting , May 2016					

PURPOSE	To acquire phonetics knowledge and simple communication skills with simple Chinese characters for beginners with no knowledge of Chinese.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	To help students to acquire the phonetics knowledge.			g			
2.	To help the students learn the Chinese scripts.			g			
3.	To make the students acquire the basic conversational skill in Chinese.			g			
4.	To enable students to know about China and Chinese culture.			g			
5.	To create an advantageous situation for the students to have better opportunity for employability by companies in association with China/ Chinese market.						

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : PRONOUNCIATIONS AND TONES	8			
1	Introduction of China and Chinese languages	1	C	4	1
2	Tables of combination of initials and finals in Putonghua(Mandarin)	4	C	1	1
3	Introduction of syllables and tones	3	C	1,3	1
	UNIT II : BASIC STROKES AND GREETINGS	3			
4	Introduction of Chinese characters	1	C	2	1
5	The eight basic strokes of characters	1	C	2	1
6	Chinese characters with proper stroke orders- Basic greetings	1	C	2,3	1
	UNIT III : GRAMMAR AND BASIC CONVERSATIONS	8			
7	Pronouns Framing simple sentences	2	C	2,3,5	1
8	Making sentences in S-V-O patterns- nces in past tense	3	C	2,3,5	1
9.	Framing basic interrogativesentence- Practice basic conversations with mini dialogues- Making sentences	3	C	2,3,5	1
	UNIT IV : DAILY USING VOCABULARY	7			
10	Numbers counting in Chinese language with characters- -Family relations-	3	C	2,3	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
11	Weekdays- month- Date-Time	1	C	2,3	1
12	Chinese currency and monetary systems- Direction s – 北, 南, 东, 西	3	C	2,3	1
	UNIT V :BASIC KNOWLEDGE ABOUT CHINA	4			
13	Seasons in Chinese,major cities of china,famous festivals of China	4	C	4	1
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	New Practical Chinese Readers Textbook (1) - Beijing Language and cultural university press

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of English and Foreign Languages													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
								X							
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Ms. Poulomi Ghoshal							

15PD201	QUANTITATIVE APTITUDE AND LOGICAL REASONING I	L	T	P	C
		1	0	1	1
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	G GENERAL				
Course designed by	Career Development Centre				
Approval	32 nd Academic Council Meeting , May 2016				

PURPOSE	To give the right knowledge, skill and aptitude to face any competitive examination.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	build a strong base in the fundamental mathematical concepts	a				
2.	grasp the approaches and strategies to solve problems with speed and accuracy	e				
3.	gain appropriate skills to succeed in preliminary selection process for recruitment	i				
4.	collectively solve problems in teams & group.	d				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: PURE ARITHMETIC I	6			
1.	Types of numbers, Divisibility tests	1	C-I-O	1-4	1-5,8-11
2.	LCM and GCD	1	C-I-O	1-4	1-5,8-11
3.	Unit digit, Number of zeroes, Factorial notation	1	C-I-O	1-4	1-5,8-11
4.	Square root, Cube roots, Remainder concepts	1	C-I-O	1-4	1-5,8-11
5.	Identities	1	C-I-O	1-4	1-5,8-11
6.	Fractions and Decimals, surds	1	C-I-O	1-4	1-5,8-11
	UNIT II: COMMERCIAL ARITHMETIC ARCHES AND SUSPENSION CABLES	6			
7.	Percentage Intro	1	C-I-O	1-4	1-5,8-11
8.	Percentage Problems	1	C-I-O	1-4	1-5,8-11
9.	Profit and Loss	1	C-I-O	1-4	1-5,8-11
10.	Discount	1	C-I-O	1-4	1-5,8-11
11.	Simple Interest	1	C-I-O	1-4	1-5,8-11
12.	Compound Interest, Installments	1	C-I-O	1-4	1-5,8-11
	UNIT III: ALGEBRA I	6			
13.	Logarithms Intro	1	C-I-O	1-4	1-5,8-11
14.	Logarithms Rules	1	C-I-O	1-4	1-5,8-11
15.	Linear Equations	1	C-I-O	1-4	1-5,8-11
16.	Ages	1	C-I-O	1-4	1-5,8-11
17.	Quadratic Equations and In-equations	1	C-I-O	1-4	1-5,8-11
18.	Surprise Test I	1			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT IV: MODERN MATHEMATICS I	6			
19.	Permutations	1	C-I-O	1-4	1-5,8-11
20.	Permutations	1	C-I-O	1-4	1-5,8-11
21.	Combination	1	C-I-O	1-4	1-5,8-11
22.	Combination	1	C-I-O	1-4	1-5,8-11
23.	Probability	1	C-I-O	1-4	1-5,8-11
24.	Probability	1	C-I-O	1-4	1-5,8-11
	UNIT V: REASONING	6			
25.	Logical Reasoning , Blood relations, Directions, Cubes	1	C-I-O	1-4	6-11
26.	Logical Reasoning , Coding and Decoding	1	C-I-O	1-4	6-11
27.	Information Ordering , Arrangements	1	C-I-O	1-4	6-11
28.	Information Ordering , Analogy, Math operations	1	C-I-O	1-4	6-11
29.	Analytical Reasoning	1	C-I-O	1-4	6-11
30.	Surprise test II	1			
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1	Dinesh Khattar-The Pearson Guide to QUANTITATIVE APTITUDE for competitive examinations.
2	The Pearson Guide to Quantitative Aptitude and Data Interpretation for the CAT, by Nishit K Sinha
3	Dr. Agarwal.R.S – <i>Quantitative Aptitude for Competitive Examinations</i> , S.Chand &Company Limited 2011
4	Abhijit Guha, <i>Quantitative Aptitude for Competitive Examinations</i> ,Tata McGraw Hill, 3 rd Edition, 2011
5	Arun Sharma-Quantitative aptitude for CAT, Tata McGraw Hill
6	Edgar Thrope, <i>Test Of Reasoning for Competitive Examinations</i> , Tata McGraw Hill, 4 th Edition, 2012
7	Dr. Agarwal.R.S – <i>A modern approach to non-verbal reasoning</i> , S.Chand &Company Limited 2011
8	www.indiabix.com
9	www.lofoya.com
10	www.careerbless.com
11	www.achieversforce.com

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	10%	20%	5%	5%	50%
End semester examination Weightage :							50%

Course designed by	Department of Career Development Centre
---------------------------	--

1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
		X			X	X				X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Ms. Kavitha M							

15MA203	DISCRETE MATHEMATICS FOR INFORMATION TECHNOLOGY			L	T	P	C
				4	0	0	4
Co-requisite:	NOT APPLICABLE						
Prerequisite:	15MA102(or)15MA205B						
Data Book / Codes/Standards	NOT APPLICABLE						
Course Category	B	CORE			MATHEMATICS		
Course designed by	Department of Mathematics						
Approval	-- Academic Council Meeting -- , 2016						

PURPOSE	To acquire knowledge in discrete mathematical structures as applied to Information Technology students.
----------------	---

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES	
At the end of the course, student will be able to			
1.	To understand mathematical logic and reasoning to count or enumerate objects in systematic way.	a	e
2.	To understand set theory, relations and functions to read, understand and construct mathematical arguments.	a	e
3.	To understand recurrence relation, generating functions and algebraic systems and their applications in coding theory.	a	e
4.	To understand how to apply graph theory to solve real world problems like travelling salesmen problem and networks, problem.	a	e
5.	To understand grammars, finite state machine and Finite State Automata.	a	e

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	UNIT I: MATHEMATICAL LOGIC	12			
1.	Proposition – Connectives – Truth Tables	2	C,I	1	1,2,3,4,6,7
2.	Conditional and bi conditional propositions	1	C,I	1	1,2,3,4,6,7
3.	Tautology and contradiction using truth table	1	C,I	1	1,2,3,4,6,7
4.	Tautology and contradiction without using truth table	1	C,I	1	1,2,3,4,6,7
5.	Duality Law	1	C,I	1	1,2,3,4,6,7
6.	Algebra and laws of Algebra of propositions – Tautological Implication	1	C,I	1	1,2,3,4,6,7
7.	Theory of Inference – Direct method of proof	1	C,I	1	1,2,3,4,6,7
8.	Proof using CP Rule	1	C,I	1	1,2,3,4,6,7
9.	Rules of Inference – Inconsistency of premises.	2	C,I	1	1,2,3,4,6,7
10.	Indirect method of proof	1	C,I	1	1,2,3,4,6,7
	UNIT II: COMBINATORICS	12			
11.	Pigeonhole Principle – Generalized Pigeon hole principle	2	C,I	2	1,2,3,4,6
12.	Mathematical induction	2	C,I	2	1,2,3,4,6
13.	Generalized Mathematical induction	1	C,I	2	1,2,3,4,6

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
14.	Recurrence relation – Formation of Recurrence Relation	2	C,I	2	1,2,3,4,6
15.	Solving Homogeneous Recurrence Relation	1	C,I	2	1,2,3,4,6
16.	Non Homogeneous Recurrence Relation	2	C,I	2	1,2,3,4,6
17.	Generating Function Method to solve Recurrence relation	2	C,I	2	1,2,3,4,6
	UNIT III: GROUP THEORY AND CODING THEORY	12			
18.	Group – Definition, examples	1	C,I	3	1,2,3,6
19.	Properties of Groups	1	C,I	3	1,2,3,6
20.	Subgroups – Cyclic groups – Properties	2	C,I	3	1,2,3,6
21.	Group Homomorphism – Cosets	1	C,I	3	1,2,3,6
22.	Normal subgroups and properties	2	C,I	3	1,2,3,6
23.	Lagrange's Theorem	1	C,I	3	1,2,3,6
24.	Encoders and Decoders – Group code	2	C,I	3	1,2,3,6
25.	Hamming codes – Error correction - Decoding Group codes	2	C,I	3	1,2,3,6
	UNIT IV: GRAPH THEORY	12			
26.	Basic Definitions – Special Graphs	1	C,I	4	1,2,3,4
27.	Matrix Representation of Graphs	1	C,I	4	1,2,3,4
28.	Properties of graphs using Matrix representation	1	C,I	4	1,2,3,4
29.	Paths, Circuits - Shortest path: Definition & Examples	1	C,I	4	1,2,3,4
30.	Shortest path algorithm: Warshall's Algorithm	2	C,I	4	1,2,3,4
31.	Eulerian and Hamiltonian Graphs	1	C,I	4	1,2,3,4
32.	Tree	1	C,I	4	1,2,3,4
33.	Properties of trees	2	C,I	4	1,2,3,4
34.	Spanning Trees	1	C,I	4	1,2,3,4
35.	Minimum Spanning Tree - Krushkal's Algorithm	1	C,I	4	1,2,3,4
	UNIT V: FORMAL LANGUAGES AND AUTOMATA THEORY	12			
36.	Phrase structure Grammar – Types of Grammar	2	C,I	5	1,2,3,4,6
37.	Backus-Naur Form-Finite state machine-Input and output string for FSM	2	C,I	5	1,2,3,4,6
38.	Finite state Automata – Definition-Language Accepted by FSA	2	C,I	5	1,2,3,4,6
39.	Deterministic FSA	2	C,I	5	1,2,3,4,6
40.	Non deterministic FSA	1	C,I	5	1,2,3,4,6
41.	Language Accepted NFA	2	C,I	5	1,2,3,4,6
42.	Conversion of an NFA to an equivalent DFA.	1	C,I	5	1,2,3,4,6
	Total contact hours	60			

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS
1.	J.P. Tremblay, R.Manohar, “Discrete Mathematical Structures with applications to Computer Science” Tata McGraw-Hill Publishing company pvt.Ltd.,New Delhi,35 th edition,2008
2.	Veerajan T., Discrete Mathematics with Graph Theory and Combinatorics”, 10 th edition,Tata McGraw Hill Companies,2010
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	Dr.M.K.Venkataraman, Dr.N.Sridharan N.Chandrasekaran, “Discrete Mathematics”, The National Publishing company,2003
4.	Kenneth H.Rosen, “Discrete Mathematics and its Application”, Fifth edition, Tata McGraw-Hill Publishing company pvt.Ltd., New Delhi,2003
5.	Narsing Deo, “Graph Theory with applications to Engineering and Computer science”, Prentice-Hall of India pvt. Ltd.,New Delhi, 2004
6.	Bernard Kolman, Robert C. Busby, Sharon Culter Ross, Nadeen-ur-Rehman “Discrete Mathematical Structures ”, Pearson Education,5 th edition,2004
7.	Alan Doerr and Kenneth Levasseur, "Applied Discrete Structures for Computer Science", Galgotia Publications (P) Ltd, 1992.

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Mathematics													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
		X				X									
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
					X										
3	Broad Area(for p only)	Programming			Networking		Data base		Web System	Human Computer Interaction			Platform Technologies		
		Not Applicable													
4	Staff coordinator							Ms. Thanga Rasathi							

15EC252	PRINCIPLES OF COMMUNICATION SYSTEMS(COMMON TO IT, CSE, EEE)	L	T	P	C
		3	0	0	3
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book /Codes/Standards	Nil				
Course Category	P	Professional Core			Communication
Course designed by	Department of Electronics and Communication Engineering				
Approval	30 th Academic Council Meeting, 24 th March , 2016				

Purpose	To gain the knowledge on basic concepts of conventional analog and digital communication systems and to get knowledge on the importance of radiocommunication systems.				
Instructional Objectives			Student Outcomes		
At the end of the course, the learner will be able to			H		
1.	Understand the concepts of analog communication techniques.	e	M	L	
2.	Know different types of radio transmitters and receivers Understand the concept of Pulse and data communication system	e	a		
3.	Gain knowledge on different digital communication techniques.	e	a	b	
4.	Understand the fundamentals of various radio communication systems.	e			
H-High Correlation, M-Medium Correlation, L-Low correlation					

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	Unit-I: Analog Communication	9			
1.	Introduction to Communication Systems: Modulation ,Need for Modulation ,Types of modulation, Principles of Amplitude Modulation, Types of Amplitude Modulation	3	C	1	1,2,3
2.	Generation of AM waves, Linear Modulation, Switching modulator, Collector Modulation method, Non-linear Modulation, Balanced Modulator	3	C	1	1
3.	Angle modulation, FM and PM waveforms,	3	C	1	1,2,3

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	Phase deviation and Modulation index , Frequency deviation and Percent modulation, FM modulators, Direct Method, Varactor diode modulator, Indirect method, Comparison between AM and FM				
	Unit-II: Radio Transmitters and Receivers	9			
4.	Demodulation of AM waves, Linear diode detector, AM Transmitters, Low power level and High power level transmitters, AM Receivers, TRF receiver, super heterodyne receiver	4	C	2	1
5.	FM Demodulators, Slope detector, Foster seely discriminator	3	C	2	1
6.	FM Transmitters, Direct and indirect FM transmitters, FM super heterodyne receiver	2	C	2	1
	Unit-III: Pulse and Data Communication	9			
7.	Pulse Communication: Pulse Amplitude Modulation (PAM), Pulse Time Modulation (PTM)	3	C	3	1,3
8.	Pulse code Modulation (PCM), Comparison of various Pulse Communication System (PAM,PTM,PCM)	2	C	3	1,3
9.	Data Communication: Standards Organizations for Data Communications, Data Communication Circuits, Data Communication Codes, Error Detection and Correction Techniques.	4	C	3	1
	Unit-IV: Digital Communication	9			
10.	Digital Pass band Transmission and Reception: Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Binary Phase Shift Keying(BPSK)	3	C	4	1,2

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
11.	Quadrature Phase Shift Keying (QPSK), 8-PSK, Quadrature Amplitude Modulation (QAM), 8-QAM	4	C	4	1,2
12.	Bandwidth efficiency, Comparison of various Digital Communication System	2	C	4	1,2
	Unit-V: Radio Communication Systems (Elementary Treatment Only)	9			
13.	Microwave Communication: Introduction to microwave transmission, Advantages and disadvantages of microwave radio, Analog versus digital microwave, Frequency modulated microwave radio system	2	C	5	2,4
14.	Fiber optical communication: Elements of an optical fiber, Principles of light transmission in a fiber, Modes in optical fiber waveguides, Advances in optical fiber communication	3	C	5	1
15.	Mobile communication: Cellular Concept and Frequency Reuse, Channel Assignment and Hand off, A Basic cellular network, GSM,GPRS, UMTS	4	C	5	1,5
	Total contact hours	45	Exclusive of assessment hours		

LEARNING RESOURCES

Sl. No.	TEXT BOOKS
1.	R.P.Singh, S.D.Sapre, "Communication Systems, Analog and Digital", Tata McGraw Hill 5th Reprint 2015.
2.	Wayne Tomasi, "Electronic Communications Systems Fundamentals Through Advanced", Pearson Education Asia, 5th Edition, 2009.
3.	Simon Haykin, "Communication Systems", John Wiley and Sons, Inc., 4 th Edition, 2001.
4.	Samuel Y. Liao, "Microwave Devices and Circuits", 3rd edition, Pearson education, 2011 reprint.
5.	Jochen Schiller, "Mobile Communications", 2 nd edition, Pearson education Ltd, United Kingdom 2012.

Course nature					Theory		
Assessment Method(Weightage100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle test III	Surprise test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Electronics and Communication Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
		X	X			X									
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
				X											
		Not Applicable													
4	Staff coordinator							Ms. S. Krithiga							

15IT213	IT FUNDAMENTALS	L	T	P	C
		2	0	0	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, May 2016				

PURPOSE	Any discipline of engineering, when learned through formal education programs, necessitates having a specially designed course which covers the fundamentals of various focus areas of that discipline. With this in mind, the course on IT fundamentals is designed to provide the students with fundamental know-how's of different topics in Information Technology in addition to stressing the need for interpersonal skills development.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Describe the components of IT systems and their interrelationships	g					
2.	Describe the relationship between IT and other computing disciplines	g					
3.	Describe the elements of an IT application and Business process integration	g					
4.	Develop and follow the professional skills that are expected out of an IT professional	f	h				
5.	Understand the application domain of IT	g					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : PERVASIVE THEMES IN IT	8			
1.	Components of IT systems(hardware,software,network,user)	1	C	1	1
2.	Data and Information, Information management	1	C	1	1
3.	ICT,Networking	1	C	1	1
4.	HCI design principles; Programming;Web Systems and Technologies; Data versus Information	2	C	1	1,5
5.	Web and multimedia foundations	1	C	1	1
6.	Information assurance and security	2	C	1	1
	UNIT II : IT AND ITS RELATED DISCIPLINES	5			1
7.	Problem Space of Computing	1	C	2,2 2,2	1
8.	Computing Disciplines; Definition of IT	2	C	2	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
9.	Relationship between IT and other computing disciplines	1	C	2	1,2
10.	Relationship between IT and other non computing disciplines	1	C	2	1,2
	UNIT III : ORGANIZATIONAL ISSUES	7			1
11.	Emergence of complexity in IT	1	C	3	1
12.	Tools and techniques to handle Complexity	1	C	3	1
13.	Elements of an IT application	1	C	3	1,4
14.	Business Processes	1	C	3	1
15.	Project Management	1	C	3	1
16.	Cost Benefit Analysis	1	C	3	1
17.	Integration of Processes	1	C	3	1
	UNIT IV: CHARACTERISTICS OF IT PROFESSIONAL	5			1
18.	Professionalism, Responsibility	1	C	4	1,3
19.	Interpersonal Skills	1	C	4	1,3
20.	Life-long Learning	1	C	4	1,3
21.	Computing Ethics	1	C	4	1,3
22.	Crime, Law, Privacy and Security	1	C	4	1,3
	UNIT V: APPLICATION DOMAINS	5			1
23.	Medical and Business applications	1	C	5	1
24.	Law Enforcement and Political Processes	1	C	5	1
25.	E-Commerce, Manufacturing	1	C	5	1
26.	Education, Entertainment	1	C	5	1
27.	Agriculture, Bioinformatics	1	C	5	1
	Total Contact Hours	30			

LEARNING RESOURCES	
1.	Compilation Notes, Department of Information Technology, SRM University
2.	“Introduction to Information Technology”, ITL Education Solutions Ltd., IInd Edition, 2006, Pearson Education,
3.	http://www.ischool.utexas.edu/~adillon/BookChapters/sociotechnical.html (User Centeredness and Advocacy)
4.	http://www.veryard.com/orgmgt/vsm.pdf (IT Systems Model)
5.	www.hcibib.org/

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
							X	X	X						
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X		X		X		X		X					
		Not Applicable													
4	Staff coordinator							Mr. Rajasekar P							

15CS201J	DATASTRUCTURES	L	T	P	C
		3	0	2	4
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book/Codes/Standards	Nil				
CourseCategory	P Professional Core				
Coursedesignedby	DepartmentofComputerScienceandEngineering				
Approval	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	Data structure is a particular way of storing and organizing information in a computer so that it can be better processed. This course introduces different kinds of data structures like stack, queue, linked list, tree and graphs suitable for different kinds of applications. Specific data structures are most important for many efficient algorithms.
----------------	---

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES					
At the end of the course, student will be able to							
1.	Understand analysis of algorithm and its time complexity	a	b				
2.	Be familiar with and implement the Linked list data structure	a	b	c			
3.	Be familiar with and implement the Stack and Queue data structure	a	b	c			
4.	Have a comprehensive knowledge of Trees and their implementations	a	b	c			
5.	Learn advanced data structures like Graphs and their implementation, hash tables and Hashing methods	a	b	c			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION TO DATA STRUCTURES		6			
1.	Introduction : Basic terminology - Data structures – Data structure operations	1	C	1	1
2.	ADT – Algorithms: Complexity, Time – Space tradeoff	1	C	1	1
3.	Mathematical notations and functions	1	C	1	1
4.	Asymptotic notations – Linear and Binary search	1	C,I	1	1
5.	Asymptotic notations – Bubble sort	1	C,I	1	1
6.	Asymptotic notations - Insertion sort	1	C,I	1	1
UNIT II: ARRAYS AND LIST		9			
7.	Array: Operations on Arrays, Applications of Arrays	1	C,I	2	1,2,3
8.	Multidimensional Arrays : Sparse Matrix	2	C	2	1,2,3
9.	LinkedList: Insertion, Deletion and Search, Cursor based implementation	2	C,I	2	1,2
10.	Polynomial Arithmetic	1	C,I	2	1,2
11.	Circular LinkedList – Applications – Josephus Problem	1	C,I	2	1,2
12.	Doubly linked list: Insertion, Deletion and Search	2	C,I	2	1,2
UNIT III: STACK AND QUEUE		9			

Session	Description ofTopic	Contact Hours	C-D-I-O	IOs	Reference
13.	Stack:Arrayimplementation,Linkedlistimpleme ntation	1	C	3	1,2
14.	Applications ofStack– Infix to Postfix – EvaluationofPostfix	2	C,I	3	1,2
15.	ApplicationofStack– Balancingsymbols – Nestedfunctioncalls	1	C,I	3	1,2
16.	Recursion–Towers ofHanoi	1	C,I	3	1,2
17.	Queue – Arrayimplementation, LinkedListimplementation	1	C,I	3	1,2
18.	CircularQueue	1	C	3	1,2
19.	Applications ofQueue – Priorityqueue – Doubleended queue	2	C	3	1
UNIT IV:TREES		11			
20.	Generaltrees –Terminology– Representation oftrees– Treetraversal	1	C,D,I	4	1,2
21.	Binarytree –Representation – Expression tree – Binarytree traversal,ThreadedBinaryTree	1	C,D,I	4	1,2
22.	BinarySearchTree– Construction -Searching, Deletion	2	C,D,I	4	1,2
23.	AVL trees – Rotation,Insertion	2	C,D,I	4	1,2
24.	B-Trees,construction,searching,deletion	2	C,D,I	4	1,2
25.	Splaytrees	1	C	4	1,2
26.	Red-BlackTrees	2	C	4	1,2
UNIT V:GRAPHSANDHASHTABLES		10			
27.	GraphTerminology,GraphTraversal,Topologica lsorting	1	C,D,I	5	1,2,4
28.	Minimumspanningtree –Prims -Kruskals	2	C,D,I	5	1,2,3
29.	Networkflowproblem	1	C	5	1,2,4
30.	ShortestPathAlgorithm:Dijkstra	2	C,D,I	5	1,2,3
31.	GraphSearch:DepthFirstSearch,BreadthFirstSea rch	1	C,D,I	5	1,2
32.	Hashing:Hashfunctions,Collisionavoidance,Sep aratechaining	1	C,D,I	5	1,2
33.	Openaddressing:Linearprobing,QuadraticProbin g, Double hashing,Rehashing,ExtensibleHashing	2	C	5	1,2
TotalContactHours		45			

Session	Description oftheExperiments	Contacthours	C-D-I-O	IOs	Reference
1.	Implementation ofSorting,searching	4	D,I	1	1,2,3,4,5
2.	Implementation ofLinkedList(Singly, Doubly,Circular)	4	D,I	2	1,2,3,4,5
3.	Implementation ofstackusingarray,linkedlist	4	D,I	2	1,2,3,4,5
4.	Implementation ofqueueusingarray,linkedlist	4	D,I	2	1,2,3,4,5
5.	Applications ofstack,queue	4	D,I	3	1,2,3,4,5

Session	Description of the Experiments	Contact hours	C-D-I-O	IOs	Reference
6.	Binary Tree Traversal, Binary Search Tree Implementation	4	D,I	4	1,2,3,4,5
7.	Minimum Spanning Tree	4	D,I	5	1,2,3,4,5
8.	Shortest path algorithm using Dijkstra	3	D,I	5	1,2,3,4,5
	Total Contact Hours	30*			

LEARNING RESOURCES

Sl.No.	TEXT BOOKS
1.	Seymour Lipschutz, "Data Structures with C", McGraw Hill Education, Special Indian Edition, 2014.
2.	R.F. Gilberg, B.A. Forouzan, "Data Structures", Second Edition, Thomson India Edition, 2005.
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	A.V. Aho, J.E Hopcroft and J.D. Ullman, "Data structures and Algorithms", Pearson Education, First Edition Reprint 2003.
4.	Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 2011.
5.	Reema Thareja, "Data Structures Using C", Oxford Higher Education, First Edition, 2011

Course nature				Theory +Practical			
AssessmentMethod– TheoryComponent (Weightage50%)							
In-semester	Assessmenttool	CycletestI	CycletestI	CycleTestIII	SurpriseTest	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%
AssessmentMethod–PracticalComponent (Weightage50%)							
In-semester	Assessmenttool	Experiment	Record	MCQ/Quiz/VivaVoc	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semesterexamination Weightage :							40%

* Excluding Assessment Hours

Course Designed by		Department of Computer Science and Engineering													
1	Students Outcome	a	b	c	D	e	f	g	h	I	J	k	l	m	n
		X	X	X											
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area (for p only)	Programmin g		Networkin g		Data base		Web System		Human Computer Interaction		Platform Technologie s			
		X													
		Not Applicable													
4	Staff coordinator							Ms. Razia Sultana							

15SE201J		OBJECT ORIENTED PROGRAMMING USING C++		L	T	P	C
				3	0	2	4
Co-requisite:		NIL					
Prerequisite:		NIL					
Data Book / Codes/Standards		NIL					
Course Category		P	PROFESSIONAL CORE				
Course designed by		Department of Software Engineering					
Approval		32 nd Academic Council Meeting, May 2016					
PURPOSE	Real world is full of objects and problems can be best solved using object oriented approach. The pioneer programming language to implement object oriented features is C++. This course aims at building object oriented skills through programming in C++.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Apply the basic object oriented features			a	c		
2.	Develop Generic programming skills			a	c		
3.	Apply appropriate data structures and solve complex problems by applying the skills acquired so far			a	b	i	
4.	Design problem into classes and develop a full working code			a	c		
5.	Develop programs using Streams, files, templates and handle exceptions			a	c	i	

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING	10			
1.	Need of Object-Oriented Programming - Comparison of procedural programming and Object-Oriented Programming	1	C	1	1
2.	Characteristics of Object-Oriented Languages	1	C	1	1
3.	C++ Programming Basics: Basic Program Construction	1	C	1	1
4.	Data Types, Variables, Constants	1	C	1	1
5.	Type Conversion, Operators, Library Functions	1	C	1	1
6.	Loops and Decisions, Structures	2	C	1,2	1
7.	Functions : Simple Functions, Passing arguments, Returning values, Reference Arguments	1	C	1,2	1
8.	Recursion, Inline Functions, Default Arguments Storage Classes	1	C	1,2	1
9.	Arrays , Strings	1	C	1,2	1
	UNIT II: FEATURES OF OBJECT-ORIENTED PROGRAMMING	11			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
10.	Introduction to Classes and Objects	1	C	1	1,2,3
11.	Constructors and its types, Destructors	1	C,I	1,2	1,2,3
12.	Passing Objects as Function arguments and Returning Objects from Functions	1	C,I	1,3,4	1,2,3
13.	Operator Overloading	1	C,I	1,2	1,2,3
14.	Inheritance	2	C,I	1,3,4	1,2,3
15.	Overloading Member Functions	1	C,I	1,2	1,2,3
16.	Pointers	2	C,I	1,3,4	1,2,3
17.	Virtual Functions – Friend Functions, Static Functions	2	C,I	1,2	1,2
	UNIT III : STREAMS AND FILES	7			
18.	Streams: Classes and Errors	1	C	5	1,3,4
19.	Disk File I/O with Streams	1	C,I	5	1,3,4
20.	Files: File Pointers, Error handling in File I/O, File I/O with member Functions	3	C,I	3,5	1,3,4
21.	Overloading the extraction and Insertion Operators	1	C,I	5	1,3,4
22.	Multi File Programs	1	C,I	5	1,3,4
	UNIT IV: TEMPLATES, EXCEPTIONS	7			
23.	Templates : Function templates, Class templates	2	C	5	1,3,4
24.	Exceptions: Need of Exceptions, keywords, Simple and Multiple Exceptions	3	C,I	5	1,3,4
25.	Re-throwing Exception and Exception Specifications, Custom Exception	2	C,I	5	1,3,4
	UNIT V: STANDARD TEMPLATE LIBRARY	10			
26.	Introduction to STL: Containers, Algorithms, iterators - potential problems with STL	2	C,I	5	1
27.	Algorithms: find(), count(), sort(),search(),merge()	1	C,I	5	1
28.	Function Objects: for_each() , transform()	1	C,I	5	1
29.	Sequence Containers: vectors, Lists, Deques	2	C,,I	3,5	1
30.	Iterators and specialized iterators	1	C,I	5	1
31.	Associative Containers: Sets and MultisetsMaps and multimaps	2	C,I	3,5	1
32.	Storing User, Defined Objects , Function Objects	1	C	5	1
	Total Contact Hours	45			

Sl. No.	LEARNING RESOURCES
1.	Robert Lafore, “ <i>Object-Oriented Programming in C++</i> ”, 4th edition, SAMS Publishing, 2008, ISBN-13: 978-0672323089

Sl. No.	LEARNING RESOURCES
2.	Deitel, “C++ How to Program”, 6th edition, PHI publication, 2008, ISBN-13: 978-8120334960
3.	R. Subburaj, “Object Oriented Programming With C++ ”, Vikas Publishing House, New Delhi, Revised Edition 2013.
4.	E.Balaguruswamy “Object Oriented Programming with C++”, 6th edition, Tata McGraw Hill Education, 2015, ISBN-13: 978-1259029936
5.	Joyce Farrell, “Object Oriented Programming”, 4th edition, Cengage learning, 2009, ISBN-13: 978-8131505175
6.	Nicolai M. Jossutis, “Object-Oriented Programming in C++”, Wiley Publications, 2002, ISBN-13: 978-0470843994
7.	Bjarne Stroustrup, ”The C++ Programming Language”, 4th Edition, Addison Wesley, 2015, ISBN-13: 978-0321563842
8.	Stanley Lippman, JoseeLajoie, Barbara E. Moo, ”C++ Primer”, 5th Edition, Addison Wesley, 2015, ISBN-13: 978-0321714114
9.	Bhusan Trivedi, “Programming with ANSI C++”, 2nd edition, Oxford higher education,2014,ISBN:978-0198083962

Sl. No.	Description of Experiments	Contact Hours	C-D-I-O	IOs	Reference
	Each student is assigned with an application in Session 1. Students have to complete the below listed experiments with respect to the assigned application.				
1.	Identifying appropriate data types, variables and simple programs to understand the basic program structure	2	C,D,I	1	1-8
2.	Programs for control structures and loops	2	C,D,I	1	1-8
3.	Simple Programs to construct a class structure with methods and arguments	2	C,D,I	1,2	1-8
4.	Programs to develop their skills on Inheritance	2	C,D,I	1,4	1-8
5.	Programs to improve their skills on polymorphism	2	C,D,I	1,4	1-8
6.	Programs to construct Functions, Inline functions, and Virtual functions	4	C,D,I	1,4	1-8
7.	Develop a complete logic for the assigned application including all the concepts done so far	4	C,D,I	3,4	1-8
8.	Programs to improve the skills on reading and storing from and to files	2	C,D,I	5	1-8
9.	Programs for manipulating pointers	4	C,D,I	1,2,4	1-8
10.	Programs to construct templates and handle exceptions	2	C,D,I	5	1-8
11.	Programs to construct a STL for Sequential containers and iterators	2	C,D,I	5	1-8
12.	Programs to construct a STL for Associative containers	2	C,D,I	5	1-8
	TOTAL CONTACT HOURS			30	

Course nature					Theory + Practical		
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

Course designed by		Department of Software Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	n
		X	X	X						X					
2	Category	GENERAL(G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X													
4	Staff coordinator							Ms. G. Saranya							

15IT212J	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
		3	0	2	4
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, May 2016				

PURPOSE	To provision the basic understanding of various digital circuits which aid in the design of various functional blocks of a computer, learn the characteristics of various peripheral systems and techniques of processor performance optimization						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Represent digital data in different forms and simplify logic expressions	a					
2.	Perform arithmetic operations based on algorithmic techniques and design different digital circuits using basic digital electronic components	c					
3.	Discuss the functions of various blocks of a computer	i					
4.	Understand the principle of operation of IO subsystem and memory organization	i					
5.	Understand the techniques for optimizing processor performance	c					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: DIGITAL DATA REPRESENTATION	7			
1.	Introduction to Number Systems, Number Base Conversions	2	C,I	1	1,3
2.	Signed number representation, fixed and floating point representations, character representation	2	C,I	1	1,3
3.	Logical operations using gates, logic expression minimization	3	C,I	1	1,3
	UNIT II: ARITHMETIC OPERATIONS AND LOGIC CIRCUITS	11			
4.	Computer arithmetic-integer addition and subtraction, ripple carry adder, carry look-ahead adder	3	C,I	2	1,5
5.	Multiplication-shift-and-add, Booth multiplier, carry save multiplier	3	C,I	2	1,5
6.	Division-non-restoring and restoring techniques, floating point Arithmetic	2	C,I	2	1,5

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
7.	Combinational circuits and flip-flops	3	C,I	2	1,5
	UNIT III: FUNCTIONAL BLOCKS OF A COMPUTER	9			
8.	CPU, Memory, Input-Output subsystems, Control unit	2	C	3	4
9.	Instruction set architecture of a CPU, Registers, Instruction execution cycle, RTL interpretation of instructions	2	C	3	4
10.	Addressing modes, Instruction set	2	C	3	4
11.	Hardwired and micro-programmed design approaches. Case study–Design of a simple hypothetical CPU2. Instruction sets of some common CPUs	3	C,D	3	4
	UNIT IV: PERIPHERAL DEVICES AND THEIR CHARACTERISTICS	8			
12.	Input-output Subsystems, I/O Transfers-program controlled, interrupt driven and DMA, Privileged and Non-privileged instructions, Software Interrupts and Exceptions	3	C	4	1,4
13.	Programs and Processes–Role of interrupts in process state Transitions	3	C	4	2
14.	Concept of hierarchical memory organization and description of various memories (Limited Scope).	2	C	4	2
	UNIT V: OPTIMIZATION OF PROCESSOR PERFORMANCE	10			
15.	Basic concepts of pipelining, throughput and speedup, Pipeline hazards	2	C	5	2
16.	Understanding modern processors	3	C	5	2
17.	Reducing loop overhead	2	C	5	2
18.	Fundamentals of parallel computer architecture (Limited Scope)-Enhancing parallelism	3	C	5	2
19.	Study of fundamental and derived logic gates	2	C,I	2	1
20.	Design of Half adder and full adder, Ripple Carry adder and Carry look ahead adder	4	I	2	1,3,4
21.	Design of Binary Incrementer and Decrementer	4	I	2	1,3,4
22.	Design of Array Multiplier, Binary multiplier	4	I	2	1,3,4
23.	Design of Decoders and Encoders, Multiplexers and De multiplexers	4	I	2	1,3,4
24.	Design of SR Flip Flop and D Flip Flop, JK Flip Flop and T Flip Flop	4	I	2	1,3,4
25.	Design of a primitive processing Unit	4	I	3	1,3,4
26.	Program to carry out Booth algorithm, carry-save multiplication	2	I	2	1

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
27.	Model Examination	2			
	Total Contact Hours			45	
	Total Contact Hours			30	

Sl. No.	LEARNING RESOURCES
1.	M.Morris Mano ,”Computer System Architecture”, 3 rd Edition, 2007, Pearson Education, ISBN: 0131755633
2.	R.E.Bryant, D.R.O Hallaron, “Computer Systems- A Programmer’s Perspective”, 2 nd Edition, 2010, Addison Wesley, ISBN:9780136108047
3.	William Stallings,”Computer Organization and Architecture”, 10 th Edition, 2016, Pearson Higher Education, , ISBN:9780134102061.
4.	John.P.Hayes, “Computer Architecture and Organization”, Third Edition, 2012 McGraw Hill, ISBN: 9780070273559
5.	Carl Hamachar,Zvoncovranesic ,Safwatzaky,”Computer Organization and Embedded Systems”, 6 th Edition, 2011McGraw Hill, ISBN: 9780073380650.

Course nature					Theory + Practical		
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	G	h	I	J	k	l	m	n
		X		X						X					
2	Category	GENERAL(G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming			Networking		Data base	Web System		Human Computer Interaction		Platform Technologies			
												X			
4	Staff coordinator							Dr. S. Magesh							

15LE207	GERMAN LANGUAGE II	L	T	P	C
		2	0	0	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	GERMAN LANGUAGE I				
<i>Course Category</i>	G General				
<i>Course designed by</i>	Department of English & Foreign Languages				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	The Engineering students continue to learn German language in Phase II. As already stated, the students will obtain extra profile in the field of employment opportunities in addition to their Engineering degree.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	To enable the students to read, understand technical literature, read German newspapers & short stories and also to write short notes	g					
2.	By introduction of Modal verbs and Perfect tense in Grammar, the students will definitely be able to converse well in German.	g					
3.	Developing easy conversation, writing e-mails and letters in conventional German Language	g					
4.	Dativ Präpositionen , Wechsel Präpositionen , Konnektoren , Partizip Perfekt, Akkusativ Verben , Dativ Verben und Modal Verben.	g					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : WICHTIGE SPRACHHANDLUNGEN	6			
1.	Wiederholung	1	C	1,2	1,2
2.	Modal Verben	1	C	1,2	1,2
3.	Trennbar verben	2	C	1,2	1,2
4.	Wortschatz	2	C	3	1,2
	UNIT II : WICHTIGE SPRACHHANDLUNGEN	6			
5.	Dativ Präpositionen	2	C	2,4	1
6.	Wohin-Wann- Wie lange	1	C	2	1
7.	Untrennbare Verben	1	C	2,4	1
8.	Possessiv Artikel	2	C	3,4	1,2
	UNIT III : WICHTIGE SPRACHHANDLUNGEN	6			
9.	Akkusativ verbs	2	C	3,4	1,2
10.	Partizip Perfekt	3	C	3,4	1,2
11.	Wortschatz	1	C	3	1,2
	UNIT IV : WICHTIGE SPRACHHANDLUNGEN	6			
12.	Dativ verbs	1	C	3,4	1,2
13.	Akkusativ prepositions	1	C	2,4	1
14.	Personal pronomen – Dativ	1	C	2,4	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
15.	Konnektoren(aber,und,oder,denn,sondern)	1	C	2,4	1,2,3
16.	Nom , Akku & dativ pronomen	2	C	2,4	1
	UNIT V : WICHTIGE SPRACHHANDLUNGEN	6			
17.	Dativ prepositions	1	C	2,4	1
18.	Dativ Artikel mit nomen	1	C	4	1
19.	Das Prateritum	1	C	4	1
20.	Wechselpreposition (an, auf, hinter, neben, in, über, unter, vor, zwischen	1	C	3,4	1,2
21.	Dialoge	1	C	2,3	1,2
22.	Prüfungen Gespräch	1	C	1,2,3,4	1,2
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	German for Beginners, SRM University
2.	Studio d A1. Deutsch als Fremdsprache with CD.(Kursbuch und Sprachtraining)
3.	Sometimes we use CDs for practicing of Native speaking.

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of English & Foreign Languages													
1	Students Outcome	a	b	c	d	e	f	G	h	I	J	k	l	m	n
								X							
2	Category	GENERAL(G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		Not Applicable													
4	Staff coordinator							Mr. Subramaniyam							

15LE208	FRENCH LANGUAGE II	L	T	P	C
		2	0	0	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	French – I				
<i>Course Category</i>	G General				
<i>Course designed by</i>	Department of English and Foreign Languages				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	Language skills coupled with technical skills enables the French students in career orientation. An advanced level of the language helps the students get to know to access information on the internet and to send and receive mails and are in a position to communicate effectively with any French speaker					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the semester, the course helps						
1.	Consolidate the knowledge of French grammar with examples provided from different angles: from present day literature, day to day conversation.	g				
2.	Improve their oral and written skills through practice.	g				
3.	The learner acquires the concept of general French for everyday interactions	g				
4.	The student get to know the particularities of French culture and life styl	g				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : L'HEURE, LES PREPOSITIONS DE TEMPS	8			
1	Le calendrier universitaire français. scientifiques.	2	C	3	1, 4
2	Comprendre et présenter un emploi du temps et comment dire l'heure, puis s'informer sur les horaires	2	C	2	1, 2
3	Le deuxième groupe des verbes comme finir et les prépositions de temps.	2	C	1,2,3	1, 2, 3
4	Les jours de la semaine, les mois de l'année, les matières, l'heure, les spécialités	2	C	3	1,4
	UNIT II : LES ADJECTIFS ET LES NATIONALITES	8			
5	Les noms de scientifiques célèbres. les adjectifs de nationalité et le féminin et le masculin des noms de métiers scientifiques.	3	C	1,2	1,2,3
6	Les noms de pays, les nationalités, les métiers scientifiques, proposer et accepter une sortie et un rendez-vous	3	C	1,3	1,3

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
7	Le futur proche, les adjectifs démonstratifs.	2	C	1,4	1,3,4
	UNIT III :LES ARTICLES PARTITIFS	6			
8	Les habitudes alimentaires et la cuisine française.	2	C	1,4	1, 3,4
9	Comment faire les courses et commander au restaurant, exprimer ses besoins, comprendre une étiquette et demander le prix,	2	C	1,3,4	1, 4
10	Les verbes manger et boire au présent et l'article partitif.	2	C	2,4	1,4
	UNIT IV : LES VERBES ET LES VERBES PRONOMINAUX	4			
11	Les fêtes et les jours fériés français.	2	C	3,4	1, 2
12	Les prépositions de lieu et les verbes pronominaux.	2	C	2,3,4	1, 2
	UNIT V: LA NOMINALISATION	4			
13	Comment exprimer un souhait professionnel		C	2,4	1, 2
14	Formuler un projet, la nominalisation		C	1, 2,3	1, 2
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Tech French (for Science and Technology)
2.	French for dummies. Wiley publishing co. Inc., USA.
3.	French made easy , Goyal publishers
4.	Version Originale, Goyal publishers

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of English and Foreign Languages													
1	Students Outcome	a	b	c	d	e	f	G	h	I	J	k	l	m	n
								X							
2	Category	GENERAL(G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		Not Applicable													
4	Staff coordinator							Ms. Saradha							

15LE209	JAPANESE LANGUAGE II		L	T	P	C
			2	0	0	2
Co-requisite:	NIL					
Prerequisite:	Japanese language I					
Course Category	G	General				
Course designed by	Japanese faculty of EFL dept					
Approval	32 nd Academic Council Meeting , May 2016					

PURPOSE	To enable students to learn a little advanced grammar in order to improve their conversational ability in Japanese.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	read and write the Katakana Japanese script and a few more kanji.	g					
2.	improve their conversational skill in Japanese	g					
3.	know about Japan and Japanese culture	g					
4.	have a better opportunity for employability by companies who have association with Japan	g					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : KATAKANA SCRIPT	8			
1	Chart 1 – 46 syllables	4	C	1	1, 2
2	Chart 2 – ten-ten letters and chart 3 – combination letters.	2	C	1	1, 2
3	Double consonants and vowel elongation	2	C	1	1, 2
	UNIT II : VERBS AND ASSOCIATED PARTICLES	8			
4	Commonly used verbs and their associated particles.	2	C	2, 3	1
5	Verbs indicating destination, time and objects.	2	C	2, 3	1
6	Verbs in past tense	2	C	2, 3	1
7	Common expressions used in daily life	1	C	2, 3, 4	1
8	Kanji for verbs	1	C	2, 3, 4	1
	UNIT III : ADJECTIVES	6			
9	Introduction to i-ending and na-ending adjectives	2	C	2, 3, 4	1
10	Non-past and present, affirmative and negative forms	2	C	2, 3, 4	1
11	Combining two adjectives and contrasting adjectives (use of ~kute, de and ga)	2	C	2, 3, 4	1
	UNIT IV : INVITATION	4			
12	Use of ~masen ka and ~mashou.	2	C	2, 3, 4	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
13	Kanji – time and people related	2	C	2, 3, 4	1
	UNIT V : VERB FORMS	4			
14	Use of ~te form and ~tai form	2	C	2, 3, 4	1
15	Kanji – ookii, chiisai, gaku and go (language)	2	C	2, 3, 4	1
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	A basic course in Japanese, SRM University
2.	Japanese for dummies. Wiley publishing co. Inc., USA.
3.	Kana workbook, Japan foundation
4.	Shoho-I, Japan foundation
5.	www.learnjapaneseatrm.blogspot.in

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of English and Foreign Languages													
1	Students Outcome	a	b	c	d	e	f	G	h	I	j	k	l	m	n
								X							
2	Category	GENERAL(G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System	Human Computer Interaction		Platform Technologies				
		NotApplicable													
4	Staff coordinator							Mr. Nirmal E							

15LE210	KOREAN LANGUAGE II	L	T	P	C
		2	0	0	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	Korean Language I				
<i>Course Category</i>	G General				
<i>Course designed by</i>	Korean faculty of EFL dept				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	To enable students achieve a basic exposure on Korea, Korean language and culture. To acquire basic conversational skill in the language.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	understand scripts from the text book	g				
2.	make the students acquire basic conversational skill	g				
3.	enable students to know about Korean culture	g				
4.	To enable students to buy items at a store and talk about daily schedules	g				
5.	create an advantageous situation for the students to have better opportunity for employability by companies who have association with Korea	g				

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	UNIT I : DESCRIBING THINGS	6			
1.	Review of Vowels and Consonants	2	C	1	1, 2
2.	Asking if someone has an item - Asking the name of things with demonstratives	2	C	1	1, 2
3.	Basic Conversation and Listening	2	C	1	1,2
	UNIT II : SHOPPING	9			
4.	Asking prices – Selling and Buying items at a store	3	C	2, 3	1
5.	Vocabulary , Basic verb, Basic adjective, noun “place”	3	C	2, 3	1
6.	Korean culture “money”	3	C	2, 3	1
	UNIT III : DAILY LIFE	6			
7.	Talking about daily life - Expressing movement	2	C	2, 3	1
8.	Talking about daily life -Expressing negation	2	C	2, 3	1
9.	Basic Conversation and Listening – Describing a person or a thing	2	C	2, 3	1
	UNIT IV – INTERROGATIVE	6			
10.	Getting information about someone – One’s likes and dislikes, About my friends	2	C	2, 3, 4	1
11.	Linking two sentences	2	C	2, 3, 4	1
12.	Basic Conversation and Listening	2	C	1, 3	1
	UNIT V : TIME	3			
13.	Telling time - Expressing days of the week	1	C	2, 3, 4	1

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
14.	Basic Conversation and Listening – Expressing days of the week	2	C	2, 3, 4	1
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Seoul National University, <i>Active Korean I</i> , MOONJINMEDIA, 2006.
2.	The National Institute of The Korean Language, <i>King Sejong Korean I</i> , The National Institute Of The Korean Language, 2013.
3.	The National Institute Of The Korean Language, <i>Korean Grammar for Foreigners I, 2</i> , Communicationbooks, 2005.
4.	Cho H. R. et al., Master Korean basic 1-1, Darakwon, 2013.
5.	Ahn J. M. et al., Korean grammar in use beginning, Darakwon, 2010

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of English and Foreign Languages														
1	Students Outcome	a	b	c	D	e	f	G	h	I	j	k	l	m	n	
								X								
2	Category	GENERAL(G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)				
		X														
3	Broad Area(for p only)	Programming			Networking			Data base		Web System		Human Computer Interaction		Platform Technologies		
		NotApplicable														
4	Staff coordinator							Mr. Jang Kyung								

15LE211	CHINESE PHASE II	L	T	P	C
		2	0	0	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Course Category</i>	G General				
<i>Course designed by</i>	Chinese faculty by EFL department				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	To acquire communication and writing skills for beginners with basic knowledge of Chinese						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	To make the students improve their Chinese conversational skills, character writing skills and language knowledge.	g					
2.	To help students extend their Chinese grammar and vocabulary.	g					
3.	To enable students to improve their knowledge about China and Chinese culture.	g					
4.	To improve their employability by companies associated with China/ Chinese market.	g					

Sessi on	Description of Topic	Cont act Hour s	C - D - I- O	IOs	Refere nce
	UNIT I : INTRODUCING ONESELF	3			
1.	Introducing people to each other, conversations	2	C	1,2	1
2.	Self-introduction-introducing oneself	1	C	1	1
	UNIT II : DAILY USING CONVERSATIONS	10			
3.	Receiving a guest	2	C	1,2, 3,4	1
4.	Question and answer about nationality-Question and answers about places	2	C	1,2, 4	1
5.	Expressing apology -Question and answer about time-Making proposal-Expressing affirmation/ negation	2	C	2,3	1
6.	Telling age-Making requests	2	C	2,3	1
7.	Question and answer about postcodes and telephone number	2	C	1,2, 3	1
	UNIT III : GRAMMAR	8			
8.	Interrogative questions	2	C	2,3. 5	1
9.	Sentence with a verbal and an adjectival predicate-Verbal measure words-Optative verbs	2	C	2,3, 5	1
10.	Making sentences in future tense- Usage of (还是,但是, 可是, 以后, 以前, 后来, 每,, 如果)-	2	C	2,3, 5	1

Sessi on	Description of Topic	Cont act Hour s	C - D - I- O	IOs	Refere nce
11.	Usage of the basic verbs and adjectives, sentence with a nominal predicate, sentence with a subject verbconstruction as its predicate	2	C		1
	UNIT IV : DAILY USING VOCABULARY	7			
12.	Colours - Different kinds of professions -	2	C	2	1
13.	Name of the places- Vegetables and fruits	2	C	2	1
14.	Body parts- Sports	3	C	2	1
	UNIT V : CONSTRUCTIONS	2			
15.	Introduction and application of few frequently used constructions in Chinese Language like跟。。。一样,是。。。的,从。。。到,正在。。 。呢,除了。。。以外。	2	C	2,3	1
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	New Practical Chinese Readers Textbook (1) - Beijing Language and cultural university press

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of English and Foreign Languages													
1	Students Outcome	a	b	c	d	e	f	G	h	I	j	k	l	m	n
								X							
2	Category	GENERAL(G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
		X													
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Ms. Poulomi Ghoshal							

15PD202	VERBAL APTITUDE	L	T	P	C
		1	0	1	1
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NA				

<i>Course Category</i>	G	GENERAL VERBAL APTITUDE
<i>Course designed by</i>	Career Development Centre	
<i>Approval</i>	32 nd Academic Council Meeting , May 2016	

PURPOSE	To impart knowledge and equip with skills and aptitude that will enable learner's ace competitive exams and placement tests with speed and precision.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, the student will be able to							
1.	Enhance lexical skills through systematic application of concepts and careful analysis of style, usage, syntax, semantics and logic	G	i				
2.	Build vocabulary through methodical approaches and nurture passion for learning new words	g	i				
3.	Sharpen logical reasoning through skilful conceptualization, identification of relationships between words based on their function, usage and characteristics	i					
4.	Hone critical thinking skills by analyzing the arguments with explicit and implicit premises to validate the author's point of view	i					
5.	Inculcate problem solving and decision making skills through case studies on work ethics, decision making, organizational behavior	d	f	g	j		

Sl. No.	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : CRITICAL REASONING I	4			
1.	Overview of the syllabus, Introduction to Different Parts of an Argument in Reasoning	1	C	3,4	1,2
2.	Assumption of an Argument	1	C,I,O	3,4	1,2
3.	Strengthening of an Argument	1	C,I,O	3,4	1,2
4.	Weakening of an Argument	1	C,I,O	3,4	1,2
	UNIT II : VOCABULARY ENRICHMENT	6			
5.	Synonyms	2	I,O	2	1,3,4,5
6.	Antonyms	1	I,O	2	1,3,4,5
7.	Odd Words	1	C,I	2	1,7,8
8.	Idioms and Phrasal Verbs	1	C,I,O	2	1,13
9.	Same Word-Different Parts of Speech	1			
	UNIT III : VERBAL REASONING	6			

Sl. No.	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
10.	Word Analogy	2	C,D,I, O	2,3	1,7,8
11.	Sentence Completion & Text Completion	2	I,O	2,3	1,9,10,17
12.	Sentence Equivalence	2	I,O	2,3	1,9,10,17
	UNIT IV : ERROR ANALYSIS	6			
13.	Identification of Error/s	2	I,O	1	1,7,8
14.	Sentence Correction	4	I,O	1,3	1,6
	UNIT V : PARA JUMBLE	4			
15.	Logical Rearrangement of Sentences	4	C,D,I	3	1,7,14,16
	UNIT VI : PROBLEM SOLVING SKILLS	4			
16.	Case Study	4	C,I,O	5	15
	Total Contact Hours			30	

Sl. No.	LEARNING RESOURCES
1.	Verbal Aptitude :A Quantum Leap to Empowerment
2.	Manhattan GMAT - Critical Reasoning GMAT Strategy Guide, 12 th Edition
3.	Charles Harrington Elstor, Verbal Advantage: Ten Easy Steps to a Powerful Vocabulary, Large Print, September 2000.
4.	Norman Lewis, Word Power Made Easy, WR Goyal Publications, 2011
5.	GRE Word List 3861 – GRE Words for High Verbal Score, 2016 Edition
6.	Manhattan GMAT Sentence Correction Guide, 5 th Edition
7.	R.S.Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning. S.Chand Publications, 2010
8.	Thorpe Edgar and Thorpe Showich, Objective English. Pearson Education, 2012
9.	GRE Text Completion and Sentence Equivalence Practice Questions, Vibrant Publishers, USA, 2013
10.	Green Sharon Weiner M.A & Wolf Ira K.Barron's New GRE, 19th Edition. Barron's Educational Series, Inc, 2011.
11.	Manhattan Prep GRE : Reading Comprehension and Essays, 5th Edition
12.	Sujith Kumar, Reading Comprehension for the CAT, Pearson
13.	Sam Phillips, 3000 Idioms and Phrases (English Improvement for Success), Goodwills Publications, 2014
14.	Sharma Arun, Verbal Ability and Reading Comprehension for the CAT, Mc.Graw Hill Publication, 2014
15.	Ellet William. The Case Study Handbook : How to Read, Discuss and Write Persuasively About Cases
16.	Nishit K Sinha, VARC for the CAT, 3rd Edition, Pearson Publication, 2015
17.	The Official Guide to the GRE-General Revised Test, 2 nd Edition, Mc Graw Hill Publication

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Career Development Centre													
1	Students Outcome	a	b	c	d	e	f	G	h	I	J	k	l	M	n
					X		X	X		X	X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		Not Applicable													
4	Staff coordinator							Dr. S. Madhumathu							

15IT214	PROFESSIONAL ETHICS	L	T	P	C
		2	0	0	2
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	G General Core				
Course designed by	Department of Information Technology				
Approval	32 nd Academic Council Meeting , May 2016				

PURPOSE	Today's engineers are surrounded with lot of social, moral and ethical issues. Inorder to make them proficient in skills related to resolving the aforementioned issues, this course will serve as a fundamental knowledge building base.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Appreciate the importance of Engineering Ethics	e					
2.	Understand the code of ethics required in professional life	e					
3.	Gain knowledge about engineers' responsibilities and training on safety	g					
4.	Understand rights and global issues related to ethics	g					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I : ENGINEERING ETHICS	5			
1.	Senses of 'Engineering Ethics', Variety of moral Issues	1	C	1	1
2.	Types of Inquiry, Moral Dilemmas, Moral Autonomy	1	C	1	1
3.	Kohlberg's Theory, Gilligan's Theory	1	C	1	1
4.	Consensus and Controversy, Professions and Professionalism, Professional Ideals and Virtues Theories About Right Action	1	C	1	1
5.	Self-Interest, Customs and Religion, Uses of Ethical Theories	1	C	1	1
	UNIT II : ENGINEERING AS SOCIAL EXPERIMENTATION	7			
6.	Engineering as Experimentation	1	C	1	1
7.	Engineers as Responsible Experimenters	1	C	1	1
8.	CYCLE TEST I	1			
9.	Codes of Ethics	1	C	2	1
10.	A Balanced Outlook on Law	2	C	2	1
11.	The Challenger Case Study	1	C	2	1
	UNIT III : ENGINEER'S RESPONSIBILITY FOR SAFETY	6			
12.	Safety and Risk	1	C	3	1
13.	Assessment of Safety and Risk	2	C	3	1
14.	Risk Benefit Analysis	1	C	3	1
15.	Reducing Risk	1	C	3	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
16.	Case Study	1	C	3	1
	UNIT IV: RESPONSIBILITIES AND RIGHTS	6			
17.	Collegiality and Loyalty	1	C	3	1
18.	Respect for Authority, Collective Bargaining	1	C	3	1
19.	Confidentiality, Conflicts of Interest, Occupational Crime	1	C	3	1
20.	CYCLE TEST II	1		3	
21.	Professional Rights, Employee Rights	1	C	3	1
22.	IPR, Discrimination	1	C	3	1
	UNIT V: GLOBAL ISSUES	6			
23.	Multinational Corporations	1	C	4	1
24.	Environmental Ethics, Computer Ethics	1	C	4	1
25.	Weapons Development	1	C	4	1
26.	Engineers as Managers, Consulting Engineers, Engineers as Experts Witnesses and Advisors	1	C	4	1
27.	Moral Leadership, Sample Code of Conduct	1	C	4	1
28.	CYCLE TEST III	1			
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Mike Martin and Roland Schinzinger, "Ethics in Engineering", 4 th edition, McGraw Hill, 2005, ISBN-13: 978-0071112932
2.	Govindarajan M. Natarajan S. Senthil Kumar V. S. "Engineering Ethics", PHI, 2005, ISBN-13: 978-8120325784
3.	Charles D. Fleddermann, "Engineering Ethics", 4 th Edition, Prentice Hall, New Mexico, 2011, ISBN-13: 978-0132145213

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	M	n
						X		X							
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
		X													
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
										X					
4	Staff coordinator							Dr. Ganapathy							

15MA207	PROBABILITY AND QUEUEING THEORY			L	T	P	C
				4	0	0	4
Co-requisite:	NOT APPLICABALE						
Prerequisite:	15 MA102 (or) 15MA205B						
Data Book / Codes/Standards	STATISTICAL TABLES						
Course Category	B	CORE			MATHEMATICS		
Course designed by	Department of Mathematics						
Approval	-- Academic Council Meeting -- , 2016						

PURPOSE	To acquire analytical ability in solving mathematical problems as applied to the respective branches of engineering
----------------	---

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES	
At the end of the course, student will be able to			
1.	Be through with probability concepts	a	E
2.	To acquire knowledge on Probability Distributions	a	E
3.	Get exposed to the testing of hypothesis using distributions	a	E
4.	Gain strong knowledge in principles of Queueing theory	a	E
5.	Get exposed to Discrete time Markov chain	a	E

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	UNIT I: RANDOM VARIABLES	14			
1.	Review of probability concepts, Types of Events, Axioms, Conditional probability, Multiplication theorem, Applications.	2	C,I	1	1-5
2.	Discrete and continuous Random Variables – Discrete case, Probability Mass function, Cumulative distribution function, Applications	2	C,I	1	1-5
3.	Characteristics of random variables – Continuous case, Probability density function, Cumulative distribution function, Applications	2	C,I	1	1-5
4.	Expectation, Variance.	2	C,I	1	1-5
5.	Higher Order Moments	2	C,I	1	1-5
6.	Moment Generating Function, Functions of Random Variable (One dimensional only)	2	C,I	1	1-5
7.	Chebychev's Inequality – (Statement only). Applications of Chebychev's Inequality	2	C,I	1	1-5
	UNIT II: THEORETICAL DISTRIBUTIONS	12			
8.	Discrete Probability distribution: Binomial distribution – MGF, Mean, Variance, Applications of Binomial distribution, Fitting a Binomial distribution	2	C,I	2	1-5
9.	Poisson distribution – MGF, Mean, Variance, Applications of Poisson distribution, Fitting a Poisson distribution	2	C,I	2	1-5

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
10.	Geometric distribution – MGF, Mean, Variance, Memoryless Property , Applications of Geometric distribution	2	C,I	2	1-5
11.	Continuous Probability Distributions: Uniform distribution – MGF, Mean, Variance & Applications	1	C,I	2	1-5
12.	Exponential Distribution - MGF, Mean, Variance, Memoryless Property Applications of Exponential distribution	2	C,I	2	1-5
13.	Normal distribution – Mean, Variance	1	C,I	2	1-5
14.	Standard Normal distribution and Applications of Normal distribution	2	C,I	2	1-5
	UNIT-III - TESTING OF HYPOTHESIS	14			
15.	Introduction to Sampling Distributions, Population and Sample, Null Hypothesis and Alternative Hypothesis, Single and Two Tailed Test.	2	C,I	3	1-5
16.	Testing of Hypothesis, Level of Significance, Critical Region, Procedure for Testing of Hypothesis	1	C,I	3	1-5
17.	Large Sample Test- Test For Single Proportion, Two Sample Proportions	2	C,I	3	1-5
18.	Large Sample Test- Test For Single Mean, Two Sample Means	2	C,I	3	1-5
19.	Small Sample Tests – ‘t’ Test For a Single Mean	1	C,I	3	1-5
20.	‘t’ Test For The Difference Of Means, Paired ‘t’ Test	2	C,I	3	1-5
21.	F Test – Test of Significance of The Difference Between Two Population Variances	2	C,I	3	1-5
22.	Chi Square Test For Goodness of Fit, Independence of Attributes	2	C,I	3	1-5
	UNIT-IV : QUEUEING THEORY	10			
23.	Introduction to Markovian queueing models	2	C,I	4	1-5
24.	Single Server Model with Infinite system capacity, Characteristics of the Model (M/M/1) : (∞ /FIFO)	2	C,I	4	1-5
25.	Problems on Model (M/M/1) : (∞ /FIFO)	2	C,I	4	1-5
26.	Single Server Model with Finite System Capacity, Characteristics of the Model (M/M/1) : (K/FIFO)	2	C,I	4	1-5
27.	Problems on Model (M/M/1) : (K/FIFO)	2	C,I	4	1-5
	UNIT-V : MARKOV CHAINS	10			

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
28.	Introduction to Stochastic process, Markov process, Markov chain one step & n-step Transition Probability.	2	C,I	5	1-5
29.	TPM and Applications	1	C,I	5	1-5
30.	Chapman Kolmogorov theorem (Statement only), Applications on Chapman Kolmogorov theorem	1	C,I	5	1-5
31.	Transition probability	2	C,I	5	1-5
32.	Transition probability - Applications	1	C,I	5	1-5
33.	Classification of states of a Markov chain	2	C,I	5	1-5
34.	Classification of states of a Markov chain – Applications	1	C,I	5	1-5
	Total contact hours	60			

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS
1.	Veerarajan T., Probability, Statistics and Random Processes, Tata McGraw Hill, 1st Reprint 2004.
2.	S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 9th extensively revised edition, Sultan Chand & Sons, 1999.
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	Trivedi K S, “Probability and Statistics with reliability, Queueing and Computer Science Applications”, Prentice Hall of India, New Delhi, 1984
4.	Gross.D and Harris.C.M. “Fundamentals of Queueing theory”, John Wiley and Sons, 1985.
5.	Allen.A.O., “Probability Statistics and Queueing theory”, Academic Press, 1981.

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Mathematics													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	N
		X				X									
2	Category	GENERAL(G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
					X										
3	Broad Area(for P only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator							Mr. E. P. Siva							

15SE205J	PROGRAMMING IN JAVA		L	T	P	C
			3	0	2	4
Co-requisite:	NIL					
Prerequisite:	15SE201J Object Oriented Programming using C++					
Data Book / Codes/Standards	NIL					
Course Category	P	Professional Core				
Course designed by	Department of Software Engineering					
Approval	32 nd Academic Council Meeting, May 2016					

PURPOSE	Java is a mature and solidly engineered programming language that is extensively built on object oriented programming concepts. Its in-built security and safety features together support for advanced programming tasks like networking, database connectivity, rich web applications, mobile applications . This course is designed around the fundamental concepts of Java that enable the students to design and build more complex Java applications.
----------------	---

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES					
At the end of the course, student will be able to							
1.	Acquaint themselves with the fundamental concepts and programming environment.	l					
2.	Design classes and efficiently use the IO streams	c					
3.	Implement object oriented concepts like inheritance, reusability, and encapsulation.	i					
4.	Apply custom exceptions and employ concurrency.	b					
5.	Exploit the power of advanced data structures and basic GUI design.	i					

Session	Description of Topic (Theory)	Contact Hours	C-D - I-O	IOs	Reference
	UNIT I : FUNDAMENTALS OF JAVA TECHNOLOGY AND PROGRAMMING	6			
1.	Java platform features, Java technologies-JSR, JCP.	1	C	1	1,2
2.	Data types, Key words, Scoping rules	2	C	1	1,2
3.	Automatic Type Conversion , Type Casting and Arrays	1	C	1	1,2
4.	Operators Precedence & Associativity, Expression. Flow control, new features from Java5 to Java 7	1	C	1	1,2
5.	Enhanced for loop, switch statements, handling Strings, Entry Point for Java Programs	1	C	1	1,2
	UNIT II : CLASSES, OBJECTS AND STREAMS	12			
6.	Class fundamentals: Declaring objects, Assigning object reference variable, Methods & Method Signatures, Method retuning Values, Method with parameters, Variable arguments in Java 5	2	D	2	1,2

Session	Description of Topic (Theory)	Contact Hours	C-D - I-O	IOs	Reference
7.	I/O Basics: Byte stream& Character Stream, Getting user input: Reading console input & Writing console output, Reading and Writing files-new file system API NIO2	2	C	2	3
8.	Constructors: Default Constructor, Parameterized constructor. this keyword, Garbage Collector, finalize() method, Overloading methods and constructors	2	C	2	3
9.	Using object as parameters, returning object in methods, recursion, Access control, static and final keyword,	2	C	2	3
10.	Nested and Inner classes , Command Line argument	2	D	2	3
11.	String and String Buffer class, Java Bean standards, Naming conventions	2	D	2	3
	UNIT III : INFORMATION HIDING & REUSABILITY	9			
12.	Inheritance basics. Using super, Method Overriding. Constructor call. Dynamic method dispatch	3	D	3	4
13.	Abstract class, Using final with inheritance, Default Package. Path & Class Path EnvironmentVariables	2	D	3	4
14.	Package level access ,Importing Packages, Interface: Multiple Inheritance in Java	2	D	3	4
15.	Extending interface, Wrapper Class, Auto Boxing	2	D	3	4
	UNIT IV: EXCEPTION , CONCURRENCY, ENUMERATION AND ANNOTATIONS	9			
16.	Exception handling mechanism. new look try/catch mechanism in Java 7	2	C	4	3
17.	Thread class & Runnable Interface. Inter Thread Communication, Synchronization of threads using Synchronized keyword and lock method	2	I	4	3
18.	Thread pool and Executors framework, Futures and callable, Fork-Join in Java. Deadlock conditions	2	I	4	3
19.	Enumeration in Java 5 - usage. Annotations: basics of annotation.	1	C	4	3
20.	The Annotated element Interface. Using Default Values, Marker Annotations. Single-Member Annotations. The Built-In Annotations-Some Restrictions.	2	I	4	3

Session	Description of Topic (Theory)	Contact Hours	C-D - I-O	IOs	Reference
	UNIT V: GENERICS , COLLECTIONS FRAME WORK AND GUI PROGRAMMING	9			
21.	Generics: Basics , Generics and type safety	2	I	5	4
22.	Collections Interfaces – Collection, Set, List, Queue, Collections Classes – Array List, Hash Set, Tree Set. Accessing a Collection via Iterators. Map Interfaces. Map Classes – Abstract Map, Hash Map, Tree Map	2	I	5	4
23.	Introduction to Swing, MVC Connection, Containers – JFrame, JDialog, JPanel, JRootPane, JLayeredPane	2	I	5	4
24.	Placing components into containers, Event Handling, Components – JButton, JLabel, JTextField, JComboBox, JList, JTable, JTabbedPane	3	I	5	4
	Total Contact Hours	45			

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
1.	Program to implement Operators, Flow Controls concepts	3	I	1	1-5
2.	Program to implement Classes, Constructors, Overloading and Access Control	3	I	2	1-5
3.	Program using Nested & Inner Classes, Static and Final	3	I	2	1-5
4.	Program using File Streams and IO Streams	3	I	2	1-5
5.	Program to implement Strings, StringBuffer Concept	3	I	2	1-5
6.	Program using Interfaces, Abstract Classes	3	I	3	1-5
7.	Program to implements Exceptions Concepts	3	I	4	1-5
8.	Program using Threads	3	I	4	1-5
9.	Program using Collections, Generics concepts	3	I	5	1-5
10.	Program to implement Swing Application	3	I	5	1-5
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Herbert Schildt, “The Complete Reference(Fully updated for jdk7)”, Oracle press Ninth Edition, 2014, ISBN-13: 978-0071808552
2.	Cay S. Horstmann, “Core Java Volume –I Fundamentals”, Prentice Hall , 10th Edition, 2015, ISBN-13: 978-0134177304
3.	Deitel&Deitel, “Java How to Program”, Prentice Hall, 10th Edition, 2016, ISBN-13: 978-0133807806
4.	Herbert Schildt, “Java: A Beginner's Guide”, Sixth Edition, Oracle Press, 2014, ISBN-13: 978-0071809252
5.	https://docs.oracle.com/javase/tutorial

Course nature					Theory + Practical		
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

Course Designed by		Department of Software Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	m	N
			X	X						X			X		
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X													
4	Staff coordinator							Ms. Kayalvizhi							

15CS204J	ALGORITHM DESIGN AND ANALYSIS	L	T	P	C
		3	0	2	4
Co-requisite:	Nil				
Prerequisite:	15CS201J				
Data Book / Codes/Standards	Nil				
Course Category	P Professional Core				
Course designed by	Department of Computer Science and Engineering				
Approval	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	To acquire the ability of applying various algorithmic concepts for all domains and efficient interpretation of real life problems.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Apply Mathematical concepts and notations to define a problem	a				
2.	Apply divide and conquer method to solve a problem	b				
3.	Ability to solve a real life problems with these algorithmic techniques	j				
4.	Familiarize the concept of multidisciplinary functions	d				
5.	Interpret data using NP problems and applications of various algorithms to solve real life problems	b	j			

Session	Description of Topic	Contact hours	C-D-I-O	IOs	References
UNIT I: INTRODUCTION TO ALGORITHM DESIGN		10			
1.	Introduction, Fundamentals of algorithm(Line count, operation count)	1	C	1	2,3,6
2.	Algorithm Design Techniques (Approaches, Design Paradigms)	1	C	1	1,2,3,6
3.	Designing an algorithm and its Analysis(Best ,Worst & Average case)	2	C,D	1,3	1,2,3,6
4.	Asymptotic Notations (O , Ω , Θ) based on Orders of Growth	1	C,I	1	1,2,3,6
5.	Mathematical Analysis - Induction	1	C	1	3,4
6.	Recurrence Relation - Substitution method	1	C	1	3,2
7.	Recurrence Relation - Recursion method	2	C	1	2,3
8.	Recurrence Relation - Master's Theorem	1	C	1	2
UNIT II: DIVIDE AND CONQUER		8			
9.	Introduction, Binary Search	1	D,I	2	1,3
10.	Merge sort and its algorithm analysis	1	C,D	2	1,3
11.	Quick sort and its algorithm analysis	2	D,I	2	1,3
12.	Strassen's Matrix multiplication	1	C	2	1,3
13.	Finding Maximum and minimum	1	D,I	2,3	1,3
14.	Algorithm for finding closest pair	1	C,I	2	3,5
15.	Convex Hull Problem	1	C	2	1,3
UNIT III: GREEDY AND DYNAMIC PROGRAMMING		9			
16.	Introduction - Greedy- Huffman Coding	1	C	3	1
17.	Greedy - Knapsack Problem	1	C,D,I	3	1,3

Session	Description of Topic	Contact hours	C-D-I-O	IOs	References
18.	Greedy - Minimum Spanning Tree(Kruskals Algorithm)	2	C,D,I	3	1,3
19.	Introduction - Dynamic Programming - 0/1 Knapsack Problem	1	C,D	3	1,3
20.	Dynamic Programming - 0/1 Knapsack Problem	1	C	3	1,3
21.	Dynamic Programming- Travelling Salesman Problem	1	C,D	3	1,3
22.	Dynamic Programming- Multistage Graph- Forward path and backward path	2	C,D,I	3	1
UNIT IV: BACK TRACKING		9			
23.	Introduction - NXN Queen's Problem	1	C	4	1,2
24.	NXN Queen's Problem	1	D,I	4	1,2
25.	Sum Of Subsets	1	D,I	4	1,3
26.	Graph Coloring	2	D,I	3,4	1
27.	Hamiltonian's Circuit	1	C	3,4	1
28.	Travelling Salesman Problem	2	C	3,4	1,3
29.	Generating Permutation	1	C	1	2,4
UNIT V: BRANCH BOUND AND RANDOMIZED ALGORITHM		9			
30.	Branch and bound - 0/1 Knapsack	1	D,I	4	1,3
31.	Branch and Bound - Travelling Sales man Problem	1	C,I	3,4	1,3
32.	Randomized algorithm- Hiring Problem	1	C,I	3,4	2
33.	Randomized algorithm- Matrix Chain Multiplication	1	C,I	3,4	1,2
34.	Randomized Quick Sort	1	C	4	2
35.	Introduction to PN problems	1	C	5	5
36.	Introduction to NP problems	1	C	5	5
37.	NP Complete	2	C	5	4,5
Total Contact Hours		45*			

Session	Description of the Experiments	Contact Hours	C-D-I-O	IOs	References
Divide and conquer Technique		10			
1.	Binary Search	2	I	2	1,3,6
2.	Quick Sort	2	C,I	2	1,3,6
3.	Merge sort	2	I	2	1,3,6
4.	Min Max Problem	4	I	2	1,3,6
Greedy and Dynamic Programming Technique		14			
5.	Knapsack Problem	2	C	3	1,3,5,6
6.	Huffman Coding	4	C,I	3	1,3,5,6
7.	Minimum Spanning Tree(Kruskal Algorithm)	4	C,I	3	1,3,6
8.	Multistage Graph (Forward path & Backward path)	4	C,I	3	1,6
Backtracking Technique		4			
9.	NXN Queens problem	2	C,I	4	1
10.	Graph Coloring	2	C,I	3,4	1
Randomized Algorithm		2			
11.	Hiring Problem	2	I	5	2
Total Contact Hours		30*			

LEARNING RESOURCES

Sl.No.	TEXT BOOKS
1.	Ellis Horowitz, Sartaj Sahni, Sanguthevar, Rajesekaran, “ <i>Fundamentals of Computer Algorithms</i> ”, Galgotia Publication Pvt. Ltd., Reprint, 2010.
2.	Thomas H Cormen, Charles E Leiserson, Ronald L Rivest, Clifford Stein, “ <i>Introduction to Algorithms</i> ” 3 rd Edition, The MIT Press Cambridge, Massachusetts London, England, 2014
3.	S.Sridhar, “Design and Analysis of Algorithms”, Oxford University Press, 2015
REFERENCE BOOKS/OTHER READING MATERIAL	
4.	Richard Johnsonbaugh, Marcus Schaefer, “ <i>Algorithms</i> ”, Pearson Education, 2004
5.	Mark Allen Weiss, “ <i>Data Structures and Algorithm Analysis in C</i> ”, 2 nd Edition, Pearson Education, Inc., 2006
6.	Rajesh K Shukla, “ <i>Analysis and Design of Algorithms-A Beginner’s Approach</i> ”, Wiley publisher, 2015

Course nature				Theory + Practical			
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

* Excluding Assessment Hours

Course Designed by		Department of Computer Science and Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	J	k	l	M	N
		X	X		X					X	X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X													
		Not Applicable													
4	Staff coordinator							Mr. K. Venkatesh							

15CS205J	MICROPROCESSORS AND MICROCONTROLLERS		L	T	P	C
			3	0	2	4
Co-requisite:	Nil					
Prerequisite:	15CS202 (or) 15IT212J					
Data Book / Codes/Standards	Nil					
Course Category	P	Professional Core				
Course designed by	Department of Computer Science and Engineering					
Approval	32 nd Academic Council Meeting , 23 rd July 2016					

PURPOSE The purpose of this course is to develop Assembly Language Programs and build a Microprocessor based system for various applications.

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES					
At the end of the course, student will be able to							
1.	To learn the basics of 8086 Microprocessor to Pentium-core Microprocessor and their functions	a	b				
2.	To understand and implement the 8086 family Assembly Language Programming	a	c				
3.	To explore the I/O interfacing and advanced Microprocessors	a	c				
4.	Expose to the functional architecture of 8051 and its basic programming using C	a	c				

Session	Description of Topic (Theory)	Contact hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION TO MICROPROCESSOR AND FAMILY		8			
1.	Introduction –Microprocessors and Microcontrollers-its computational functionality and importance - overview of syllabus	1	C	1,4	1-5
2.	8086 architecture and Historical background	2	C,D	1,2	1,2
3.	The Microprocessor–Based Personal Computer Systems	1	C	1	1
4.	Internal Microprocessor Architecture	2	C,D	1,2	1
5.	Real mode memory Addressing–Protected mode Memory Addressing	2	C	1,2	1
UNIT II: 8086 Family Assembly Language Programming		10			
6.	Machine language instruction format-Addressing modes-Data addressing	1	C	2	1,2
7.	Program memory and stack addressing modes	2	C	2	1
8.	Instruction Set: Data Movement Instructions	2	C	2	1
9.	Arithmetic and Logic Instructions	2	C	2	1
10.	Program control Instructions	2	C	2	1
11.	Assembler Directives of 8086	1	C	2	1
UNIT III: PROGRAMMING CONCEPTS		10			
12.	Using Assembly Language with C/C++ for 16-Bit DOS Applications and 32-Bit Applications	4	C	2	1

Session	Description of Topic (Theory)	Contact hours	C-D-I-O	IOs	Reference
13.	Modular Programming	2	C	2	1
14.	Using the Keyboard and Video Display	2	C,D	2,3	1
15.	Data Conversions–Example Programs: Binary to ASCII- ASCII to Binary	2	C	2	1
UNIT IV: I/O INTERFACE & ADVANCED MICROPROCESSORS		9			
16.	Introduction to I/O Interface	1	C	2,3	1
17.	Programmable Peripheral Interface architecture-modes	2	C	2,3	1
18.	Basic DMA Operations- 8237 DMA Controller architecture-- software commands	2	C,D	2,3	1,2
19.	Disk Memory Systems	1	C	2,3	1
20.	Introduction to Pentium - Pentium Pro Microprocessor-Pentium II- Pentium III- Pentium-IV & Core2	3	C	1,2	1
UNIT V: ARCHITECTURE AND PROGRAMMING 8051		8			
21.	Architecture of 8051-Signal Descriptions-Registered-Program Status Word	2	C,D	4	2,3,5
22.	Memory and I/O Addressing-Addressing modes-Instruction set	2	C	4	2,3,5
23.	Timer/Counter-Serial-Interrupt	2	C	4	2,3,5
24.	Basic Programming	2	C	4	2,6
Total contact hours		45*			

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
Assembly Language Programs Using TASM/MASM					
1	Program involving Arithmetic Instructions on 16 bit data i. Addition & Subtraction ii. Multiplication & Division iii. Factorial of a given number	6	C,I	2	1-4
2	Program involving Data Transfer Instructions on 16 bit data i. Byte and Word data transfer in different addressing modes ii. Block Data Transfer	2	I	2	1-4
3	Program involving Bit Manipulation Instructions on 16 bit data - Given data is positive or negative	2	I	2	1-4
4	Implementation of Bubble Sort Algorithm	2	I	2	1-4

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
5	Program involving String Instructions on 16 bit data i. Reverse a given string and check whether it is a palindrome ii. String Display using Display Interrupt (Read your name from the keyboard and displays it at a specified location on the screen after the message “What is your name?” You must clear the entire screen before display)	4	I	2	1-4
6.	Time display using Interrupt (Read the current time from the system and display it in the standard format on the screen)	4	C,I	2,3	1-4
Basic 8051 programming using C					
7	Port Programming	4	C,I	4	2,6
8	Timer-Counter Programming	2	I	4	2,6
9	Serial Programming	2	I	4	2,6
10	Interrupt Programming	2	I	4	2,6
Total contact hours		30*			

LEARNING RESOURCES

Sl.No.	TEXT BOOKS
1.	Barry B. Brey, “THE INTEL Microprocessors-Architecture, Programming and Interfacing”, 8 th Edition, Pearson, 2012.(Units I-IV)
2.	A.K.Ray and K.M. Bhurchandi, “Advanced Microprocessor and Peripherals” Tata McGraw Hill, 3 rd Edition, 2013(Unit-5).
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	N.Senthilkumar, M.Saravanan, S.Jeevanathan, “Microprocessors and Microcontrollers”, Oxford University Press, 2011
4.	Kenneth J Ayala, “The 8086 Microprocessor: Programming and Interfacing the PC”, Cengage Learning, Reprint 2014
5.	Kenneth J Ayala, “The 8051 Microcontroller”, 3rd edition, Cengage Learning, Reprint 2014..
6.	Muhammed Ali Mazidi, Janice GillispleMaidi, Rolin.D. McKinlay, “The 8051 Microcontroller and Embedded Systems, Using Assembly and C”, Second edition, Pearson Prentice Hall, 2015.

Course nature					Theory + Practical		
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

* Excluding Assessment Hours

Course Designed by		Department of Computer Science and Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	M	N
		X	X	X											
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
													X		
4	Staff coordinator							Dr. Suresh							

15SE203	OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	C
		2	2	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Software Engineering				
<i>Approval</i>	“32 nd Academic Council Meeting”, May 2016				

PURPOSE	The purpose of the course is to practice popular technical approach for analyzing, designing an application, system, or business by applying the object-oriented paradigm and visual modeling throughout the development life cycles to foster better stakeholder communication and product quality.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the basics object model for System development.	j					
2.	Apply the various modeling techniques using UML approach.	b					
3.	About building high quality system for different real world issues.	c					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: INTRODUCTION	6			
1.	Complexity in Traditional Systems	1	C	1	1,3,4
2.	The Object Model	2	C	1	1,3,4
3.	Classes and Objects	2	C	1	1,3,4
4.	Classification	1	C	1	1,3,4
	UNIT II: STATIC MODELING	6			
5.	What is UML?	1	C	2	2,3,4
6.	Use Case Diagram	2	C,D	2,3	2,3,4
7.	Domain Models	1	C,D	2,3	2,3,4
8.	UML Class Diagram	2	C,D	2,3	1,3,4
	UNIT III: DYNAMIC MODELING	6			
9.	Interaction and Package Diagram	2	C,D	2,3	2,3,4
10.	Activity Diagrams and Modeling	1	C,D	2,3	1,3,4
11.	State Machine Diagram and Modeling	1	C,D	2,3	1,3,4
12.	UML Component Diagram	1	C,D	2,3	1,3,4
13.	UML Deployment Diagram	2	C,D	2,3	1,3,4
	UNIT IV: GoF DESIGN PATTERNS	6			
14.	Object Design	1	C	1	2
15.	What are Patterns?	1	C	1	2
16.	Applying GoF Design Patterns	2	C,D	2	2
17.	Design Persistence Framework	2	C	2,3	2
	UNIT V: APPLICATIONS	6			
18.	Satellite Based Navigation	1	D,I	2,3	1
19.	Traffic Management	1	D,I	2,3	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
20.	Crypt Analysis	2	D,I	2,3	1
21.	Weather Monitoring Station	1	D,I	2,3	1
22.	Vacation Tracking System	1	D,I	2,3	1
	Total Contact Hours	30			

Note: Each Student is assigned with a mini project for which implementation to be carried out

Sl.No	LEARNING RESOURCES
1.	Grady Booch, Robert A. Maksimchuk, Michael W. Engle,"Object-Oriented Analysis and Design with Applications" ,Addison-Wesley Professional; 3 edition (April 30, 2007)ISBN-13: 978-0201895513
2.	Craig Larmen, "Applying UML and Patterns", Prentice Hall; 3 edition (October 30, 2004)ISBN-13: 978- 0131489066
3.	Brett McLaughlin,"Head First Object-Oriented Analysis and Design",O'Reilly Media; 1 edition (December 7, 2006)ISBN-13: 978-0596008673
4.	Ali Bahrami , "Object Oriented Systems Development", McGraw Hill Education, Indian Edition, 2004, ISBN-13:978-0-07-026512-7

Course nature				Theory	
Assessment Method – Theory Component (Weightage 50%)					
In-semester	Assessment tool	Cycle test I	Model Exam	Tutorial Project	Total
	Weightage	10%	15%	25%	50%
End semester examination Weightage :					50%

Course Designed by		Department of Software Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	M	N
			X	X							X				
2	Category	GENERAL(G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X													
4	Staff coordinator							Mr. Joseph Reymand V							

15PD301	COMMUNICATION & REASONING SKILLS	L	T	P	C
		1	0	1	1
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NA				
<i>Course Category</i>	G GENERAL COMMUNICATION & REASONING SKILLS				
<i>Course designed by</i>	Department of Career Development Centre				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	To inculcate professional values and improve employability skills.To enrich verbal reasoning ability for succeeding in competitive exams.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, students will be able to							
1.	Gain insights on building a winning CV (digital and LinkedIn profile) in alignment with the employers' expectations and creating an impressive self-introduction video	g					
2.	To sharpen critical thinking skills by analyzing complex arguments with explicit and implicit premises to validate the author's point of view	i					
3.	Actively participate in formal discussions and manifest their professional skills such as leadership, empathy, time management and assertiveness	d	g				
4.	Build confidence to encounter the real interview process through formal one-on-one assessment sessions with constructive feedback.	i	g				
5.	To develop comprehension and interpretation skills through speed reading and mind mapping techniques	i					
6.	To assess the logical correctness of texts through application of grammatical rules	g	i				

Sl. No.	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: CURRICULUM VITAE	2			
1.	Importance of building a winning CV,Orientation to placement preparation&Do's and Don'ts of CV/Inputs on LinkedIn profiling	1	C	1	8,9
2.	Preparation of an impressive CV	1	C,D,I,O	1	8,9
	UNIT II: GROUP DISCUSSION	6			
3.	What is GD? Why GD? Types Of GD, SPELT Topics, Do's & Don'ts of GD, Skills Assessed/Parameters, Knowledge, Body Language, Communication, Team Skills, Time management, Assertiveness	1	C	3	1,2
4.	Mock GD	1	I	3	
5.	GD Assessment	4	O	3	
	UNIT III: CRITICAL REASONING-II	4			

Sl. No.	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
6.	Recap of Critical Reasoning Strategies	1	C	2	4
7.	Drawing conclusion of an Argument	1	C,I,O	2	4
8.	Inference of an Argument	1	C, I,O	2	4
9.	Summarizing and Evaluation of an Argument	1	C, I,O	2	4
	UNIT IV: VIDEO PROFILE	2			
10.	Instructions to present an appealing self introduction video – Sample video profile screening	1	C	1	10
11.	Presentation of self introduction video for assessment	1	C,D,I,O	1	10
	UNIT V: SYNTACTIC ANALYSIS	2			
12.	Determination of Correct Sentences	1	I, O	6	5
13.	Determination of Incorrect Sentences	1	I, O	6	5
	UNIT VI: COMPREHENSION SKILLS	6			
14.	Techniques of Active and Efficient Reading (Short and Long Passages)	2	C,D,I	5	6,7,8,9
15.	Analysis of Question Types	4	C,D,I	5	6,7,8,9
	UNIT VII: INTERVIEW SKILLS	8			
16.	What is a Structured Interview? Preliminary Preparation, Do's & Don'ts of an Interview, Sample Interview Video Projection	1	C	4	3
17.	Discussion of frequently asked questions in the interview	1	D,I	4	3
18.	Personal Interview Assessment with constructive feedback	6	O	4	
	Total Contact Hours	30			

Sl.No	LEARNING RESOURCES
5.	Anand Ganguly, “Group Discussion for Admissions and Jobs”, Pustak Mahal Publications.
6.	Gerald M. Phillips, Douglas J. Pedersen, “Group Discussion: A Practical Guide to Participation and Leadership”, Waveland Press
7.	Susan Hodgson, “Brilliant Answers to Tough Interview Questions”, Pearson Publications.
8.	Manhattan GMAT - Critical Reasoning GMAT Strategy Guide, 12 th Edition
9.	Manhattan GMAT Sentence Correction Guide, 5 th Edition
10.	Manhattan Prep GRE : Reading Comprehension and Essays, 5th Edition
11.	Nishit K Sinha, VARC for the CAT, 3rd Edition, Pearson Publication, 2015
12.	The Official Guide to the GRE-General Revised Test, 2 nd Edition, Mc Graw Hill Publication
13.	Sujith Kumar, Reading Comprehension and Essays, 5th Edition
14.	https://www.quintcareers.com/curriculum-vitae/
15.	http://www.hongkiat.com/blog/professional-linkedin-profile/
16.	https://www.youtube.com/video resume/

Course nature	Theory
----------------------	---------------

Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	10%	20%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Career Development Centre													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	N
					X			X		X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area(for p only)	Program ming	Networking			Data base		Web System		Human Computer Interaction			Platform Technologies		
		Not Applicable													
4	Staff coordinator														

15IT314J	PRINCIPLES OF OPERATING SYSTEMS	L	T	P	C
		3	0	2	4
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15IT212J COMPUTER ORGANIZATION AND ARCHITECTURE				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	E PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	Operating Systems is an exciting area because its design exerts a major influence on the overall function and performance of the entire computing system. The main objective of this course is to provide a complete discussion of OS principles and implementation issues. Set of laboratory exercises are designed to improve the understanding of the learners. Students work on UNIX(Linux), Windows and an educational operating system, OS161.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the basic and functions of operating systems	c					
2.	Understand the basics of process, scheduling, communication of processes	c					
3.	Understand the concepts involved in the management of memory and storage	i					
4.	Learn the operating systems functionalities with respect to Linux and Windows	i					
5.	Understand the OS161 kernel implementation and modify the kernel as per the requirements	j					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: INTRODUCTION	9			
1.	Overview of Operating Systems: Role, purpose, design issues of modern OSes.	1	C	1	1,6
2.	Assembly Level Machine Organization : Von Neumann Machine, X86 Assembly Instructions, Heap, Stack, Code	2	C	1	2
3.	Subroutine Calls, I/O and Interrupts	2	C	1	1,2
4.	Operating System Principles: Processes, Process Control, Threads, Process Control Blocks, Process States, Interrupts, Context-Switching	4	C,I	2	1,6
	UNIT II: PROCESS SCHEDULING	9			
5.	CPU scheduling, scheduling policies, deadlines, real-timeConcerns	3	C,I	2	1,6
6.	Case Study : Windows and Linux	1	C	2,4	1,6
7.	Inter-Process Communication; Process Synchronization, Critical Solution Problem and Solutions; Deadlocks	3	C,I	2	6
8.	Threads, pthreads interface	2	C,I	2	6

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	UNIT III: MEMORY MANAGEMENT	9			
9.	Introduction to Storage Technologies, Memory Hierarchy, Cache Memories	2	C	3	1,2
10.	Memory Management: Memory Partitioning, Paging, Segmentation, Combined Paging and Segmentation	3	C	3	1,3,6
11.	Working Sets and Thrashing; Latencies, Caching, Locality, Cache Consistency	2	C,I	3	1,2
12.	Dynamic Memory Management, Garbage Collection	1	C,I	3	2
13.	Case Study : Windows and Linux	1	C	3,4	1,3,6
	UNIT IV: VIRTUAL MEMORY	9			
14.	Rationale for protection and predictable performance, levels of indirection	2	C	3	1,2
15.	Methods for implementing Virtual Memory, Paging and Virtual Memory	2	C	3	1,2
16.	Virtual Machines: Virtual File Systems, Virtual Devices and I/O	3	C	3	1,6
17.	Hypervisors, Sandboxes, Emulators	2	C	3	1,6
	UNIT V: FILE SYSTEMS AND I/O SUBSYSTEMS	9			
18.	Files : metadata, operations, organization, etc. ; File Access and Security Concerns	1	C	3	1,6
19.	File Storage Management, Root File system, Disk Allocation Methods; Free Space Management Techniques.	2	C,I	3	1,6
20.	File System Partitioning; Virtual Filesystems; Memory Mapped Files, Journaling and Log Structured File Systems	2	C	3	1,6
21.	I/O Management	1	C	3	1,6
22.	I/O Scheduler, Device Handler, Terminal I/O, Disk Scheduling	3	C	3	1,6
	Total Contact Hours	45			

Sl. No.	DESCRIPTION OF EXPERIMENTS	Contact Hours	C-D-I-O	IOs	Reference
1.	Study of OS161 instructional operating system	2	C	5	1,7,8
2.	Building the OS161 kernel from source	2	I	5	7,8
3.	Modifying the OS161 kernel by adding debugging statements and system calls	4	D,I	5	7,8
4.	Providing argument handling features to OS161	2	D,I	5	7,8
5.	Study of boot process of Windows and Linux OS.	2	C	1,2	8

Sl. No.	DESCRIPTION OF EXPERIMENTS	Contact Hours	C-D-I-O	IOs	Reference
6.	Programs on process management	4	D,I	2	6,8
7.	Programs on process synchronization	2	D,I	2	6,8
8.	Programs related to memory	4	D,I	2,3	2,8
9.	Shell Programming	4	D,I	4	8
10.	Mini Project: i) implementation of command line interpreter(Shell)ii) implementation of Linux/Windows device driver	Home work; 2 hours for demo	D,I	4	1,2,3,5,8
11.	Model Examination	2			
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	William Stallings, “Operating Systems: Internals and Design Principles”, 7 th Edition, Prentice Hall, 2012, ISBN-13: 978-0-13-230998-1
2.	Bryant and O’Hallaron, “ <i>Computer Systems: A Programmer's Perspective</i> ”, 2 nd Edition, AddisonWesley. 2010, ISBN 9780136108047
3.	Pramod Chandra P.Bhatt, “An Introduction to Operating Systems Concepts and Practice”, Prentice Hall India, 3 rd Edition, 2010, ISBN: 978-8120348363
4.	Achyut S Godbole, AtulKahate,”Operating Systems”, 3 rd Edition, McGraw Hill, 2011, ISBN-13: 978-0070702035
5.	Gary J.Nutt, “Operating Systems”, 3 rd Edition, Pearson/Addison Wesley. 2004, ISBN-13: 978-0201773446
6.	Silberschatz, Peter Galvin, Greg Gagne “Operating System Principles”, 7 th Edition, Wiley India, 2006, ISBN-13: 978-0471694663
7.	Web link : http://os161.eecs.harvard.edu/as on 29/04/2016
8.	Operating Systems Lab Manual

Course nature				Theory + Practical			
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

Course Designed by		Department of Information Technology													
1	Student outcome	a	b	c	d	e	f	g	h	i	j	k	l	m	N
				X						X	X				
2	Category	GENERAL (G)	BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ARTS (E)				PROFESSIONAL SUBJECTS (P)					
3	Broad area (for ‘P’category)	Programming	Networking			Database		Web System		Human Computer Interaction		Platform Technologies			
4		Approval											X		

15IT311	SYSTEM INTEGRATION AND ARCHITECTURE	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15SE201J OBJECT ORIENTED PROGRAMMING USING C++				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	As Software development is an expensive process, proper measures are required so that the resources can be used efficiently and effectively. Thus this course is to provide the students with the concepts of development of projects in a structured and organized way. It also makes them understand the problems involved in system integration, deployment and project management. This course also shows them how a disciplined engineering approach in the development of projects makes it easier, effective and efficient.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the phases in a software project compare different process models and decide on appropriate model to choose.	j	k				
2.	Comprehend the requirements of stakeholders; analyze the same and effectively design based on requirements.	c	k				
3.	Cognize the current testing standards and maintenance strategies.	c	k				
4.	Identify the key activities in managing a software project	n					
5.	Understand the major considerations for enterprise integration and deployment	l					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: INTRODUCTION TO SOFTWARE PROCESS MODELS	6			
1.	Software Life Cycle Phases, Software Engineering, Software Process	1	C	1	1
2.	Prescriptive Process Models	2	C	1	1
3.	Specialized Process Models	1	C	1	1
4.	Unified Process	1			1
5.	Introduction to Agile Development Principles and Extreme Programming	1	C	1	1
	UNIT II: REQUIREMENTS MODELING, ANALYSIS AND DESIGN	12			
6.	Eliciting Requirements, Developing Use cases	2	C	2	1
7.	Requirements Modeling (Scenarios, Information, and Analysis Classes Flow, Behavior, Patterns, and WebApps)	4	D-I	2	1

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
8.	Design Concepts	2	D	2	1
9.	Architectural Design & User Interface Design	4	D-I	2	1
	UNIT III: MAINTENANCE, TESTING AND QUALITY ASSURANCE	9			
10.	Lehman's laws, Software Supportability	1	C	3	1,2
11.	Business Process Reengineering, Software Reengineering, Reverse Engineering	1	C	3	1,2
12.	Testing Techniques : White Box Testing and Black Box Testing Techniques	3	D-I	3	1
13.	Strategies : Unit Testing, Integration Testing, Usability, Validation Testing, System Testing., The Art of Debugging	2	C-D	3	1
14.	Quality Assurance : Quality Concepts, Software Quality Assurance	2	C	3	1
	UNIT IV: PROJECT MANAGEMENT	9			
15.	Estimation : Function Point Based, Lines of Code Based, Make/Buy Decision, Cost Constructive Model II Planning : Project Plan, Planning Process	2	C	4	1
16.	Risk Management : Identification, Projection, Risk Mitigation, Monitoring and Management Plan	2	C	4	1
17.	Scheduling and Tracking : Relationship between people and effort, Task Set and Network, Scheduling, Earned Value Analysis	2	C	4	1
18.	Process and Project Metrics.	3	C	4	1
	UNIT V: SYSTEM INTEGRATION	9			
19.	Integration Types: Presentation Integration Model, Data Integration Model, Functional Integration Model	2	C	5	3
20.	Building Blocks: The Communications Model, Methods of Integration, and Middleware Choices	2	C	5	3
21.	Object Architecture and Solutions: Distributed Architecture Framework, Object Management Architecture, Enterprise JavaBeans architecture	2	C	5	3
22.	Transaction Architecture: Transaction, Transaction processing monitors, Distributed transactions in Enterprise Application Integration	3	C	5	3
	Total Contact Hours	45			

Sl. No.	LEARNING RESOURCES
1.	Roger S. Pressman, “Software Engineering A Practitioner’s Approach”, 7 TH Edition, 2009, McGraw Hill, ISBN: 9780071267823.
2.	Ian Sommerville, “Software Engineering”, Addison Wesley, 9 th Edition, 2011, ISBN: 9780137035151.
3.	William A. Ruh, Francis X. Maginnis and William J. Brown , “Enterprise Application Integration: A Wiley Tech Brief”, John Wiley & Sons 2001, ISBN: 9780471376415

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	N
				X							X	X	X		X
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X													
4	Staff coordinator														

15IT303J	COMPUTER NETWORKS	L	T	P	C
		3	0	2	4
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	This course provides a foundation to understand computer networks using layered architectures. It also helps students to understand the various network models, addressing concept, routing protocols and design aspects of computer networks. .						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the evolution of computer networks using the layered network architecture.			b			
2.	Design computer networks using subnetting and routing concepts			c			
3.	Understand the various Medium Access Control techniques and also the characteristics of physical layer functionalities.			m			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: INTRODUCTION TO COMPUTER NETWORKS	9			
1.	Evolution of Computer Networks	1	C	1	1
2.	Classification of Computer Networks LAN, WAN, MAN	2	C	1	1
3.	Network Topology : BUS, STAR, RING, MESH -	2	C	1	1
4.	OSI Layered Architecture	2	C	1	1
5.	TCP/IP Model	2	C	1	1
	UNIT II: IPV4 ADDRESSING ARCHITECTURE	9			
6.	IPv4 Public and Private Address	2	C	2	1
7.	Subnetting	3	C	2	1
8.	VLSM-CIDR	2	C	2	1
9.	Network Devices: Router, Switch, HUB, Bridge.	2	C	2	1
	UNIT III: NETWORK LAYER PROTOCOLS	9			
10.	Static Routing	1	C	2	1
11.	Introduction to dynamic Routing Protocols	1	C	2	1
12.	RIP v1 and RIP v2, OSPF	3	C	2	1
13.	EIGRP	2	C	2	2

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
14.	BGP	2	C	2	1
	UNIT IV: DATA LINK LAYER	8			
15.	Medium Access Control Techniques	1	C	3	1
16.	Random, Round Robin, Reservation, ALOHA	1	C	3	1
17.	Pure and Slotted, CSMA/CD	1	C	3	1
18.	CSMA/CA, Ethernet, Token Ring, Token Bus,	1	C	3	1
19.	ARQ 3 Types,	1	C	3	1
20.	Error Detection Codes, Parity Check, Checksum	2	C	3	1
21.	Error Correction Codes, Hamming codes	1	C	3	1
	UNIT V: PHYSICAL LAYER CHARACTERISTICS	10			
22.	Physical Layer overview	2	C	3	1
23.	Latency, Bandwidth, Delay	1	C	3	1
24.	Wireless: 802.11	2	C	3	1
25.	Transmission Media : Twisted pair, Coaxial, Fibre	2	C	3	1
26.	802.15, 802.15.4	2	C	3	1
27.	802.16	1	C	3	1
	Total Contact Hours	45			

Sl. No.	Description of Experiments	Contact Hours	C-D-I-O	IOs	Reference
1.	IP Addressing and subnetting (VLSM)	2	D,I	1-4	1,2
2.	LAN Configuration using straight through and cross over cables	2	D,I	3	2
3.	Basic Router Configuration (Creating Passwords, Configuring Interfaces)	2	I	1	2
4.	Static and Default Routing	4	I	1	2
5.	RIPv1	4	I	2	1,2
6.	RIPv2	2	I	2	1,2
7.	EIGRP Configuration, Bandwidth, and Adjacencies	4	I	2	2
8.	EIGRP Authentication and Timers	2	I	2	2
9.	Single-Area OSPF Link Costs and Interface	2	I	2	1,2
10.	Multi-Area OSPF with Stub Areas and Authentication	2	I	2	2
11.	Redistribution Between EIGRP and OSPF	2	I	2	2
12.	Model Examination	2			
	Total Contact Hours	30			

Sl.No	LEARNING RESOURCES
-------	--------------------

1.	Behrouz A. Forouzan, “Data Communications and Networking” 5th edition, July 1, 2010, ISBN: 9780073376226
2.	Todd Lammle, “CCNA Study Guide”, Edition7, Publication Date: April 5, 2011 ISB: 10:0470901071 ISBN:13: 9780470901076
3.	William Stallings, “Data and Computer Communications”, Edition 9, 2010.

Course nature					Theory + Practical		
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	N
			X	X										X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction			Platform Technologies	
					X										
4	Staff coordinator														

15IT302J	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	2	4
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, May 2016				

PURPOSE	Designing database for different applications is an important area to focus. This course helps students to understand the limitations of file processing system and how a database management system overcomes the same. Learning various design tools and design techniques, along with a query language, makes a course on Database Management Systems complete and effective.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the fundamentals of Database Management Systems	c					
2.	Provide the proof for good database design after carefully eliminating certain problems inherent in Initial Database Design.	c					
3.	Design Logical Database Schema and Mapping it to implementation level schema through Database Language Features.	c	i				
4.	Understand the practical problems of Concurrency control and gain knowledge about failures and Recovery	c					
5.	Learn the different types of databases	c					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: INTRODUCTION	7			
1.	File Processing System, Advantages of DBMS over File Processing System	1	C	1	1
2.	Data, Database, DBMS, Data model, Data Independence, Data Catalog	1	C	1	1
3.	DBMS Architecture and Data Abstraction, DBMS Languages	2	C	1	1
4.	DBMS System Structure	1	C	1	1
5.	ER Model: Objects, Attributes and its Type, Entity and Entity Set, Relationship & Relationship Set	2	C,D	1	1
	UNIT II: DATABASE DESIGN AND QUERY PROCESSING	9			
6.	Design Issues in choosing attributes or entity set or relationship set	1	D	2	1
7.	Constraints	1	C	2	1
8.	Super Key, Candidate Keys, Primary Key	1	C	2	1

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
9.	ER Diagram Notations, Goals of ER Diagram, Weak Entity Set, ER Diagram Construction	2	C,D	2	1
10.	Tabular Representation of Various ER Schema	1	C,D	2	1,2
11.	Overview of Query Processing	1	C	2	1
12.	Relational Algebra: Fundamental operations; Views	2	C	2	1
	UNIT III : STRUCTURED QUERY LANGUAGE	11			
13.	SQL: Overview, The Form of Basic SQL Query	1	C,I	3	1
14.	UNION, INTERSECT, and EXCEPT	2	C,I	3	1
15.	Nested Queries	2	C,I	3	1
16.	Aggregate Functions, Null Values	2	C,I	3	1
17.	Complex Integrity Constraints in SQL	2	C	3	1
18.	Embedded SQL, Integrity Constraints, Object Oriented Database, Object Relational Database	2	C	3	1,3
	UNIT IV: FUNCTIONAL DEPENDENCIES AND NORMAL FORMS	9			
19.	Pitfalls in relational database, Decomposing bad schema, Need for Decomposition, Desirable Properties of Decomposition	2	C	3	1
20.	1NF, Super Key	1	C	3	1
21.	Functional dependency: Closure of Functional Dependency Set, Closure of Attribute Set, Minimal Functional Dependency Set	2	C	3	1
22.	2NF, BCNF, 3 NF, Denormalization	3	C	3	1
23.	Practical Database Design & Alternative Design techniques	1	C	3	1
24.	UNIT-V: TRANSACTION PROCESSING AND RECOVERY	9			
25.	File Structure: Overview of Physical Storage Media, Magnetic Disks	1	C	4	1
26.	RAID	2	C	4	1
27.	Transactions: Concurrency Control: LockBased Protocols,	2	C	4	1
28.	Recovery System	2	C	4	1
29.	Introduction to Parallel and Distributed Databases, Spatial and multimedia databases	2	C	5	1,3
	Total Contact Hours	45			

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
1.	Creating database, table	2	D,I	3	1,2,3,4,5
2.	Working with Data Manipulation commands	2	I	3	1,2,3,4,5
3.	Basic SELECT statements	2	I	3	1,2,3,4,5
4.	Advanced SELECT statements	2	I	3	1,2,3,4,5
5.	Integrity and Constraints	2	I	3	1,2,3,4,5
6.	Joining Tables	4	I	3	1,2,3,4,5
7.	SQL functions	2	I	3	1,2,3,4,5
8.	Sub queries	2	I	3	1,2,3,4,5
9.	Views	2	I	3	1,2,3,4,5
10.	Basics of PL/SQL	4	I	3	1,2,3,4,5
11.	Design and Develop applications	4	D,I	3	1,2,3,4,5
12.	MODEL EXAM	2			
	TOTAL CONTACT HOURS	30			

Sl. No.	LEARNING RESOURCES
1.	Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", 6 th Edition , 2010, McGraw-Hill, ISBN:0-07-352332-1
2.	Raghu Ramakrishnan, Johannes Gehrke, "Database Management System", 3 rd Edition, 2007, McGraw Hill, ISBN:978-0072465631
3.	Elmasri and Navathe, "Fundamentals of Database System", 6 th Edition, 2010, Addison-Wesley Publishing, ISBN:978-0136086208
4.	Date C.J, "An Introduction to Database", 8 th Edition , 2003, Addison-Wesley Pub Co, ISBN: 978-0321197849
5.	Peter rob, Carlos Coronel, "Database Systems – Design, Implementation, andManagement", 9 th Edition, 2009, Thomson Learning, ISBN: 978-0538469685

Course nature				Theory + Practical			
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
				X						X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
						X									
4	Staff coordinator														

15IT375L		Minor Project I			L	T	P	C
					0	0	3	2
<i>Co-requisite:</i>		NIL						
<i>Prerequisite:</i>		NIL						
<i>Data Book / Codes/Standards</i>		NIL						
<i>Course Category</i>		P	PROFESSIONAL CORE					
<i>Course designed by</i>		Department of Information Technology						
<i>Approval</i>		32 nd Academic Council Meeting , 23 rd July , 2016						
PURPOSE	To obtain hands-on experience in converting a small novel idea / technique into a working model / prototype involving multi-disciplinary skills and / or knowledge and working in at team.							
INSTRUCTIONAL OBJECTIVES					STUDENT OUTCOMES			
At the end of the course, student will be able								
6.	To conceptualize a novel idea / technique into a product				c			
7.	To think in terms of multi-disciplinary environment				d			
8.	To understand the management techniques of implementing a project						k	
9.	To take on the challenges of teamwork, prepare a presentation in a professional manner, and document all aspects of design work.						g	

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	A Multidisciplinary project to be taken up by a team of maximum of ten students. Development of prototype product, a 3D model, simulation, blueprint for a larger project and any other development work are permitted. The contribution of the individuals in the project should be clearly brought out. A combined report is to be submitted. A presentation is to be made for the reviewers on the work done by the candidate.		C,D,I	1,2,3,4	
	Total contact hours				

Course nature		Project – 100% internal continuous assessment	
Assessment Method (Weightage 100%)			
In-semester	Assessment tool	Refer the table	Total
	Weightage	Refer the table below	100%
End semester examination Weightage :			0%

Assessment components

Assessment component	Expected outcome	Evaluators	Criteria or basis	Marks
Project proposal (Review – I)	A short presentation to be delivered on: <ul style="list-style-type: none"> A brief, descriptive project title (2-4 words). The 3 nearest competitors (existing solutions) and price. Team members name, phone number, email, department/degree program, and year. A description of the product opportunity that has been identified. To include: Documentation of the market need, shortcomings of existing competitive products, and definition of the target market and its size. Proposed supervisor / guide 	Panel of reviewers	Viability / feasibility of the project Extent of preliminary work done.	0

Review II	<ul style="list-style-type: none"> • Mission Statement / Techniques • Concept Sketches, Design Specifications / Modules & Techniques along with System architecture • Coding 	Panel of reviewers	Originality, Multi-disciplinary component, clarity of idea and presentation, team work, handling Q&A.	20
Review III	<ul style="list-style-type: none"> • Final Concept and Model / Algorithm/ Technique • Drawings, Plans / programme output • Financial Model / costing • Prototype / Coding • Final Presentation and Demonstration 	Panel of reviewers	Originality, Multi-disciplinary component, clarity of idea and presentation, team work, handling Q&A.	50
Final technical Report	A good technical report	Supervisor / Guide	Regularity, systematic progress, extent of work and quality of work	30
			Total	100

15IT380L	Seminar I		L	T	P	C
			0	0	3	2
Co-requisite:	NIL					
Prerequisite:	NIL					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL CORE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting , 23 rd July , 2016					

PURPOSE	To inculcate the research culture among the students through literature reading, modelling a problem, analyzing and presenting.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able							
10.	To understand the research methodology adopted by various researchers			h	i	j	
11.	To mathematically model a problem, critically analyze it and adopt strategies to solve			b	c	e	
12.	To understand and present a well documented research			e	g		

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	Guidelines for conducting 15IT380L and 15IT381L Seminar for B.Tech 1. Upon registering for the course the student must identify a sub-domain of the degree specialization that is of interest to the student and start collecting research papers as many as possible. 2. After collecting sufficient number of research papers the student must peruse all the papers, meet the course faculty and discuss on the salient aspects of each and every paper. 3. The course faculty, after discussion with the student will approve TWO research papers that is appropriate for presentation. 4. The student must collect additional relevant reference materials to supplement and compliment the two research papers and start preparing the presentation. 5. Each student must present a 15-minute presentation on each of the approved research paper to the panel of evaluators. 6. The presenter must present one research paper within the first half of the semester (6 weeks) and another research paper in the next half of the semester (6 weeks) as per the schedule. 7. All other students registered for the course will form the audience. 8. The audience as well as the evaluators will probe the student with appropriate questions and solicit response from the presenter. 9. The presentation will be evaluated against 7 to 8 assessment criteria by 4 to 5 evaluators. 10. The score obtained through the presentations of TWO research papers will be converted to appropriate percentage of marks. This course is 100% internal continuous assessment.		C,D	1,2,3,4	
	Total contact hours	30			

Course nature			100% internal continuous assessment.	
Assessment Method (Weightage 100%)				
In-semester	Assessment tool	Presentation 1	Presentation 2	Total
	Weightage	50%	50%	100%
End semester examination Weightage :				0%

Department of Information Technology
EVALUATION OF SEMINAR PRESENTATIONS

Name of the Student:

Register Number:

Topic:

Date:

Degree and Branch:

Sl. No.	Criteria for Assessment	Evaluator 1	Evaluator 2	Evaluator 3	Evaluator 4	Evaluator 5
1	Understanding of the subject					
2	Clarity of presentation					
3	Appropriate use of Audio visual aids					
4	Whether cross references have been consulted					
5	Ability to respond to questions on the subject					
6	Time scheduling					
7	Completeness of preparation					

Poor	1	Below Average	2	Average	3	Good	4	Very Good	5
------	---	---------------	---	---------	---	------	---	-----------	---

Overall Grades:

Remarks:

Signature of Course Coordinator

15IT385L	Massive Open Online Courses I		L	T	P	C
			0	0	3	2
Co-requisite:	NIL					
Prerequisite:	NIL					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL CORE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting, July, 2016					

PURPOSE	To offer students the opportunity to study with the world's best universities by integrating select MOOCs in a regular degree programme and providing students full credit transfer, as per university regulations, if they earn a "Verified / Completion Certificate" and take a proctored examination through a secure, physical testing center.					
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES		
At the end of the course, student will be able						
1.	To apply the concepts, theories, laws, technologies learnt herein to provide engineering solutions.			f	h	i j

Course nature				Online - 100% internal continuous assessment.		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Quiz	Assignment	Non-proctored / Unsupervised Tests	Proctored / Supervised Test	Total
	Weightage	25%	25%	10%	40%	100%
End semester examination Weightage :						0%

Registration process, Assessment and Credit Transfer:

- Students can register for courses offered by approved global MOOCs platforms like edX, Coursera or Universities with which SRM partners specifically for MOOCs.
- Annually, each department must officially announce, to the students as well as to the Controller of Examinations, the list of courses that will be recognized and accepted for credit transfer.
- The department must also officially announce / appoint one or more faculty coordinator(s) for advising the students attached to them, monitoring their progress and assist the department in proctoring the tests, uploading the marks / grades, and collecting and submitting the graded certificate(s) to the CoE, within the stipulated timeframe.
- Student who desires to pursue a course, from the above department-approved list, through MOOCs must register for that course during the course registration process of the Faculty of Engineering and Technology, SRM University.
- The maximum credit limits for course registration at SRM will include the MOOCs course registered.
- The student must periodically submit the marks / grades obtained in various quizzes, assignments, tests etc immediately to the Faculty Advisor or the Course Coordinator for uploading in the university's academic module.
- The student must take the final test as a Proctored / Supervised test in the university campus.
- The student must submit the "Certificate of Completion" as well as the final overall Marks and / or Grade within the stipulated time for effecting the grade conversion and credit transfer, as per the regulations. It is solely the responsibility of the individual student to fulfill the above conditions to earn the credits.
- The attendance for this course, for the purpose of awarding attendance grade, will be considered 100% , if the credits are transferred, after satisfying the above (1) to (7) norms; else if the credits are not transferred or transferable, the attendance will be considered as ZERO.

15IT490L	Industrial Module I		L	T	P	C
			0	0	3	2
Co-requisite:	NIL					
Prerequisite:	NIL					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL CORE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting , 23 rd July, 2016					

PURPOSE	To offer students the opportunity to interact with industries and learn the best practices adopted by them.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able							
2.	To obtain an insight into the current industrial trends and practices			h			
3.	To obtain an insight into the technologies adopted by industries			k			
4.	To obtain an insight into the technical problems encountered by the industries and the scope for providing solutions.			e			
5.	To network with industry			h			

Description of Topic	Contact hours	C-D-I-O	IOs	Reference
1. The department will identify and shortlist few emerging topics that are trending in industry. 2. The department will identify experts from industry who are willing to deliver modules on the shortlisted topics. 3. The identified expert will assist the department in formulating the course content to be delivered as a 30-hour module, prepare lectures notes, ppt, handouts and other learning materials. 4. The department will arrange to get the necessary approvals for offering the course, from the university's statutory academic bodies well before the actual offering. 5. The department must officially announce, to the students as well as to the Controller of Examinations, the list of courses that will be offered as industry module. 6. The department must also officially announce / appoint one or more faculty coordinator(s) for advising the students attached to them, monitoring their progress and assist the department in proctoring/supervising/assessment the quizzes, assignments, tests etc, uploading the marks, attendance etc, within the stipulated timeframe. 7. The Student who desires to pursue a course, from the above department-approved list, must register for that course during the course registration process of the Faculty of Engineering and Technology, SRM University. 8. The maximum credit limits for course registration at SRM will include the Industry Module also. 9. All academic requirements of a professional course like minimum attendance, assessment methods, discipline etc will be applicable for this Industry Module. 10. The course will be conducted on weekends or beyond the college regular working hours.				
Total contact hours	30			

Course nature				100% internal continuous assessment.			
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage							50%

15IT390L	Industrial Training ((To be done after IV semester)			L	T	P	C
				0	0	3	2
Co-requisite:	NIL						
Prerequisite:	NIL						
Data Book / Codes/Standards	NIL						
Course Category	P	PROFESSIONAL CORE					
Course designed by	Department of Information Technology						
Approval	32 nd Academic Council Meeting , 23 rd July , 2016						

PURPOSE	To provide short-term work experience in an Industry/ Company/ Organisation						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able							
6.	To get an inside view of an industry and organization/company				j		
7.	To gain valuable skills and knowledge				j		
8.	To make professional connections and enhance networking			f	g		
9.	To get experience in a field to allow the student to make a career transition				i		

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	1. It is mandatory for every student to undergo this course. 2. Every student is expected to spend a minimum of 15-days in an Industry/ Company/ Organization, during the summer vacation. 3. The type of industry must be NOT below the Medium Scale category in his / her domain of the degree programme. 4. The student must submit the “Training Completion Certificate” issued by the industry / company / Organisation as well as a technical report not exceeding 15 pages, within the stipulated time to be eligible for making a presentation before the committee constituted by the department. 5. The committee will then assess the student based on the report submitted and the presentation made. 6. Marks will be awarded out of maximum 100. 7. Appropriate grades will be assigned as per the regulations. 8. Only if a student gets a minimum of pass grade, appropriate credit will be transferred towards the degree requirements, as per the regulations. 9. It is solely the responsibility of the individual student to fulfill the above conditions to earn the credits. 10. The attendance for this course, for the purpose of awarding attendance grade, will be considered 100%, if the credits are transferred, after satisfying the above (1) to (8) norms; else if the credits are not transferred or transferable, the attendance will be considered as ZERO. 11. The committee must recommend redoing the course, if it collectively concludes, based on the assessment made from the report and presentations submitted by the student, that either the level of training received or the skill and / or knowledge gained is NOT satisfactory.		D, I, O	1,2,3,4	
Total contact hours					

Course nature			Training – 100% internal continuous assessment	
Assessment Method (Weightage 100%)				
In-semester	Assessment tool	Presentation	Report	Total
	Weightage	80%	20%	100%

End semester examination Weightage :	0%
---	-----------

15PD302	QUANTITATIVE APTITUDE AND LOGICAL REASONING II	L	T	P	C
		1	0	1	1
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	G GENERAL				
<i>Course designed by</i>	Career Development Centre				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	To give the right knowledge, skill and aptitude to face any competitive examination.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	build a strong base in the fundamental mathematical concepts	a					
2.	grasp the approaches and strategies to solve problems with speed and accuracy	e					
3.	gain appropriate skills to succeed in preliminary selection process for recruitment	i					
4.	collectively solve problems in teams & group.	d					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: PURE ARITHMETIC II	4			
1.	Arithmetic Progression	1	C-I-O	1-4	1-5,9-12
2	Geometric Progression, Harmonic progression	1	C-I-O	1-4	1-5,9-12
3	Sets	1	C-I-O	1-4	1-5,9-12
4	Functions	1	C-I-O	1-4	1-5,9-12
	UNIT II: COMMERCIAL ARITHMETIC II	8			
5	Clocks	1	C-I-O	1-4	1-5,9-12
6	Calendar	1	C-I-O	1-4	1-5,9-12
7	Ratio Proportion	1	C-I-O	1-4	1-5,9-12
8	Ratio Proportion	1	C-I-O	1-4	1-5,9-12
9	Mixtures & Solutions	1	C-I-O	1-4	1-5,9-12
10	Mixtures & Solutions	1	C-I-O	1-4	1-5,9-12
11	Average	1	C-I-O	1-4	1-5,9-12
12	Surprise Test-I	1			
	UNIT III: COMMERCIAL ARITHMETIC III UNIT III: ALGEBRA I	6			
13	Time, Speed, Distance	1	C-I-O	1-4	1-5,9-12
14	Time, Speed, Distance-Races	1	C-I-O	1-4	1-5,9-12
15	Problems on Trains	1	C-I-O	1-4	1-5,9-12
16	Boats & Streams	1	C-I-O	1-4	1-5,9-12
17	Time and work	1	C-I-O	1-4	1-5,9-12
18	Pipes and Cisterns	1	C-I-O	1-4	1-5,9-12
	UNIT IV: GEOMETRY	6			
19	Geometry I	1	C-I-O	1-4	1-5,9-12
20	Geometry II	1	C-I-O	1-4	1-5,9-12

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
21	Mensuration I	1	C-I-O	1-4	1-5,9-12
22	Mensuration II	1	C-I-O	1-4	1-5,9-12
23	Trigonometry I	1	C-I-O	1-4	1-5,9-12
24	Trigonometry II	1	C-I-O	1-4	1-5,9-12
	UNIT V: MODERN MATHEMATICS	6			
25	Data sufficiency I	1	C-I-O	1-4	1-12
26	Data sufficiency II	1	C-I-O	1-4	1-12
27	Data Interpretation I	1	C-I-O	1-4	7-12
28	Data Interpretation II	1	C-I-O	1-4	7-12
29	Data Interpretation III	1	C-I-O	1-4	7-12
30	Surprise Test II	1			
	Total Contact Hours		30		

Sl. No.	LEARNING RESOURCES
1	Dinesh Khattar-The Pearson Guide to QUANTITATIVE APTITUDE for competitive examinations.
2	The Pearson Guide to Quantitative Aptitude and Data Interpretation for the CAT, by Nishit K Sinha
3	Dr. Agarwal.R.S – <i>Quantitative Aptitude for Competitive Examinations</i> , S.Chand &Company Limited 2011
4	Abhijit Guha, <i>Quantitative Aptitude for Competitive Examinations</i> , Tata McGraw Hill, 3 rd Edition, 2011
5	Arun Sharma-Quantitative aptitude for CAT, Tata McGraw Hill
6	Edgar Thrope, <i>Test Of Reasoning for Competitive Examinations</i> , Tata McGraw Hill, 4 th Edition, 2012
7	The Pearson Guide to Data Interpretation and Logical Reasoning for the CAT (With CD) by Nishit K. Sinha Publisher: Pearson
8	How to Prepare for Data Interpretation for the CAT Common Admission Test by Arun Sharma Publisher: Tata McGraw-Hill
9	www.indiabix.com
10	www.lofoya.com
11	www.careerbless.com
12	www.achieversforce.com

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	10%	20%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Career Development Centre													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X			X	X				X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
		X													
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator														

15MA305	STATISTICS FOR INFORMATION TECHNOLOGY		L	T	P	C
			4	0	0	4
<i>Co-requisite:</i>	NA					
<i>Prerequisite:</i>	15 MA102 (or) 15MA205B					
<i>Data Book / Codes/Standards</i>	Statistical Tables and control chart constant values to be provided.					
<i>Course Category</i>	B	CORE	MATHEMATICS			
<i>Course designed by</i>	DEPARTMENT OF MATHEMATICS					
<i>Approval</i>	-- Academic Council Meeting -- 2016					

PURPOSE	The purpose of this course is to make the students learn about the applications of statistical tools and techniques in different field.		
INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES	
At the end of the course, student will be able			
1.	To gain knowledge in measures of central tendency and dispersion	a	e
2.	To learn about methods of studying correlation and regression.	a	e
3.	To have knowledge about analysis of time series	a	e
4.	To gain knowledge about ANOVA	a	e
5.	To understand the fundamentals of quality control and the methods used to control systems and processes	a	e

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	UNIT I: INTRODUCTION TO STATISTICS (numerical problems only)	12			
1.	Introduction to uni-variate data	1	C, I	1	1-7
2.	Measures of central tendency: Arithmetic mean, Median, Definition, Problems Median: Definition, Problems	2	C, I	1	1-7
3.	Mode, Geometric Mean and Harmonic Mean: Definition, Problems	2	C, I	1	1-7
4.	Measures of dispersion: Range, Quartile deviation, Mean deviation, Definition, Problems	2	C, I	1	1-7
5.	Standard deviation and Co-efficient of variation: Definition, Problems	2	C, I	1	1-7
6.	Skewness, Definition, Problems	1	C, I	1	1-7
7.	Kurtosis and Moments, Definition, Problems	2	C, I	1	1-7
	UNIT II: CORRELATION AND REGRESSION ANALYSIS	11			
8.	Introduction to Correlation analysis, Types of correlation	1	C, I	2	1-7
9.	Methods of studying correlation - Karl Pearson's coefficient of correlation	2	C, I	2	1-7

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
10.	Rank correlation method	2	C,I	2	1-7
11.	Partial and Multiple Correlation	2	C,I	2	1-7
12.	Introduction to Regression analysis – Regression lines	1	C,I	2	1-7
13.	Properties of Regression coefficients, Problems	2	C,I	2	1-7
14.	Angle between two regression lines.	1	C,I	2	1-7
	UNIT III: ANALYSIS OF TIME SERIES	12			
15.	Components of time series – Problems of classifications – Methods of measuring trends	1	C,I	3	1,3,4
16.	Freehand graphing method, semi average method	2	C,I	3	1,3,4
17.	moving average method	2	C,I	3	1,3,4
18.	method of least squares	2	C,I	3	1,3,4
19.	Introduction to Measurement of seasonal variation	1	C,I	3	1,3,4
20.	Method of simple averages (weekly, monthly and quarterly)	2	C,I	3	1,3,4
21.	Ratio to trend method	2	C,I	3	1,3,4
	UNIT IV: ANALYSIS OF VARIANCE	13			
22.	Introduction to Small sample tests based on t and F distribution	1	C,I	4	1-4
23.	Test for single mean, difference between means,	2	C,I	4	1-4
24.	Paired t-test, Test for equality of variances,	2	C,I	4	1-4
25.	ANOVA- one -way classification	2	C,I	4	1-4
26.	Two-way classification.	2	C,I	4	1-4
27.	Non-Parametric Test: The Mann Whitney test,	2	C,I	4	1,3,6
28.	The Kruskal-Wallis single-factor analysis of variance by ranks, Procedure and problems	2	C,I	4	1,3,6
	UNIT V: STATISTICAL QUALITY CONTROL	12			
29.	Introduction - Process control	1	C,I	5	1,3,4
30.	control charts for variables - Mean and Range chart (X Bar and R)	2	C,I	5	1,3,4
31.	control charts for variables - Mean and Standard deviation chart (X Bar and s)	2	C,I	5	1,3,4
32.	Introduction to Attributes Control charts	1	C,I	5	1,3,4
33.	Control chart for the number of defectives (np-chart)	2	C,I	5	1,3,4

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
34.	Control chart for the fraction of defectives (p-chart)	2	C,I	5	1,3,4
35.	Control chart for the number of defects (c-chart)	2	C,I	5	1,3,4
	Total contact hours	60			

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS
1.	C.Chatfield, “Statistics for Technology- A course in Applied Statistics”, Chapman and Hall, 2010.
REFERENCE BOOKS/OTHER READING MATERIAL	
2.	S.C.Gupta and V.K.Kapoor, “Fundamentals of Mathematical Statistics”, Sultan Chand and Sons, New Delhi, 11 th edition, 2007.
3.	S.P.Gupta, “Elements of business Statistics”, Sultan Chand and Sons, New Delhi, 1993.
4.	S.C.Gupta and V.K.Kapoor, “Fundamentals of Applied Statistics”, Sultan Chand and Sons, New Delhi, 2003.
5.	R.S.N.Pillai, & V.Bagavathi, “Statistics – Theory and Practice”, Sultan Chand & Sons, 2009.
6.	John E. Freund’s: Mathematical statistics with Application, Miller and Miller, Pearson Education, 2012.
7.	V.K.Kapoor, “Statistic – Problems and Solutions”, 5 th edition, Sultan Chand & Sons, 2007.

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage							50%

Course Designed by		DEPARTMENT OF MATHEMATICS													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X				X									
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
					X										
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		Not Applicable													
4	Staff coordinator														

15IT304J	WEB PROGRAMMING	L	T	P	C
		3	0	2	4
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15SE205J PROGRAMMING IN JAVA				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	Web has become ubiquitous in nature. Organizations have integrated the Internet “seamlessly” into their information systems and the Web offers endless opportunity to do so. This course provides the basic concepts and techniques used to design, develop, and deploy web applications satisfying the requirements in terms of flexibility, availability and scalability.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1	Understand different internet Technologies, web 2.0 and create a basic website using HTML and Cascading Style Sheets	m	i				
2	Design a dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms	j					
3	Design a server side program using Servlets and JSP	k	l				
4	Design a simple web page in PHP, and to present data in XML format.	k	l				
5	Get overviews of java specific web services architecture and to enable rich client presentation using AJAX.	j					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: WEBSITES BASICS, HTML 5, CSS 3, WEB 2.0	9		1	1,2
1.	Understanding Internet , Difference between websites and web server, Internet technologies Overview	1	C	1	1,2
2.	Understanding websites and web servers: Understanding the difference between internet and intranet	1	C	1	1,2
3.	Web 2.0: Basics, RIA Rich Internet Applications , collaborations tools	1	C	1	1,2
4.	HTML and CSS: HTML 5.0	3	D,I	1	1,2
5.	XHTML, CSS 3	3	D,I	1	1,2
	UNIT II : JAVASCRIPT	9			
6.	An introduction to JavaScript, JavaScript DOM Model	2	C	2	1,5
7.	Built-in objects, Date and Objects	3	D,I	2	1,5

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
8.	Regular Expressions , Exception Handling, Validation	2	I	2	1,5
9.	Event Handling , DHTML with JavaScript	2	D,I	2	1,5
	UNIT III : SERVER SIDE PROGRAMMING	9			
10.	Java Servlet Architecture, Servlet Life Cycle , Form GET and POST actions, Session Handling , Understanding Cookies, Installing and Configuring Apache Tomcat Web Server	3	C,D,I	3	1
11.	Understanding Java Server Pages, JSP Standard Tag Library(JSTL)	3	C	3	1
12.	Creating HTML forms by embedding JSP code	3	D,I	3	1
	UNIT IV : PHP and XML	9			
13.	An introduction to PHP, Using PHP, Variables, Program control	1	C	4	1,3,5
14.	Built-in functions, Connecting to Database , Using Cookies, Regular Expressions	2	D,I	4	1,3,5
15.	Basic XML, Document Type Definition, XML Schema	3	C	4	1,3,5
16.	DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM)	3	I	4	1,3,5
	UNIT V : INTRODUCTION TO AJAX and WEB SERVICES	9			
17.	Introduction to Ajax , Ajax Client Server Architecture, XMLHttpRequest Object , Call Back Methods	3	C,D,I	5	1
18.	Introduction to Web Services, Java web services Basics, SOAP	2	C	5	1
19.	Creating, Publishing ,Testing and Describing a Web services(WSDL) , Consuming a web service	2	I	5	1
20.	Database Driven web service from an application	2	D,I	5	1
	Total Contact Hours	45			

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
1.	Create a simple webpage using HTML5 Semantic and Structural Elements	4	D,I	1	1,3,5
2.	Create a webpage using HTML5 Media Elements	2	D,I	1	1,3,5
3.	Add a Cascading Style sheet for designing the web page	2	D,I	1	1,3,5,
4.	Design a dynamic web page with validation using JavaScript	4	D,I	2	1,5
5.	Simple applications to demonstrate Servlets	2	D,I	3	1

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
6.	Simple applications using JSP and AJAX	4	D,I	3,5	1
7.	Design a simple online test web page in PHP	4	D,I	4	1,2,4
8.	Design simple application for accessing the data using XML	2	D,I	4	1,2,4
9.	Application for web services	4	D,I	5	1
10.	Model Exam	2			
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Deitel, Deitel and Nieto, Internet and World Wide Web : How to Program, 5 th Edition, 2012, Prentice Hall,. ISBN-13: 978-0-13-215100-9
2.	Stephen Wynkoop, Running a perfect website, QUE, 2 nd Edition, 2001. ISBN 13: 9780789709448
3.	Chris Bates, Web Programming : Building Intranet applications, 3 rd Edition, 2009, Wiley Publications,. ISBN 13: 9780470017753
4.	Jeffrey C. Jackson, “Web Technologies A computer Science Perspective”, 2011, Pearson, ISBN 9780133001976.
5.	www.W3Schools.com as on date: 18/04/2016

Course nature					Theory + Practical		
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X	X	X	X	X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
								X							
4	Staff coordinator														

15IT313J	NETWORK PROTOCOLS AND PROGRAMMING	L	T	P	C
		3	0	2	4
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15IT303J COMPUTER NETWORKS				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P	PROFESSIONAL CORE			
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	The Purpose of learning this course is to understand the various network layer, transport layer and application layer protocols and it also helps to design and implement the protocols using socket programming.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1	Describe the importance of various Internet protocols like ARP, RARP, ICMP, etc	j					
2	Understand the transport layer protocols, application layer protocol and its characteristics	m					
3	Learn and Understand IPV6 and wide area network technologies.	m					
4	Work with client server sockets and develop related applications to communicate with each other.	j					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: NETWORK AND TRANSPORT LAYER PROTOCOLS	9			
1.	IP Header	1	C	1	1
2.	IP Fragmentation	1	C	1	1
3.	ARP, RARP	1	C	1	1
4.	ICMP	1	C	1	1
5.	UDP Datagram and its characteristics	1	C	2	1
6.	TCP Header & Connection Establishment Process	2	C	2	1
7.	TCP Error Control, Congestion Control and Flow control	2	C	2	1
	UNIT II: SOCKET PROGRAMMING	9			
8.	Byte Ordering Conversion Functions	1	C	4	2
9.	System Calls used with sockets	2	C	4	2
10.	Iterative and Concurrent Server	2	C	4	3
11.	Socket Interface	1	C	4	2
12.	Remote Procedure Call	1	C	4	2
13.	TCP Client Server Program	1	D,I	4	2
14.	UDP Client Server Program	1	D,I	4	2
	UNIT III: APPLICATION LAYER PROTOCOLS	9			
15.	DNS	1	C	2	1
16.	TELNET	1	C	2	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
17.	FTP	2	C	2	1
18.	HTTP	1	C	2	1
19.	WWW	1	C	2	1
20.	DHCP	1	C	2	1
21.	SMTP, POP3	2	C	2	1
	UNIT IV: IPV6 PROTOCOL	9			
22.	IPV6 Features	1	C	3	1
23.	IPv6 Header	2	C	3	1
24.	IPv6 Address Types	2	C,D	3	1
25.	IPv6 Routing Protocols	2	C	3	4
26.	IPv4 to IPv6 Tunneling and Translation Techniques	2	C	3	1
	UNIT V: WAN PROTOCOLS	9			
27.	DSL and Cable technology	2	C	3	1
28.	Frame Relay	1	C	3	1
29.	ATM	1	C	3	1
30.	PPP	1	C	3	1
31.	HDLC	2	C	3	1
32.	MPLS	2	C	3	1
	Total Contact Hours	45			

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
1.	Study of necessary header files with respect to socket programming.	3	C	4	1,2
2.	Study of Basic Functions of Socket Programming	2	C	4	2
3.	Simple TCP/IP Client Server Communication	3	I	2	2
4.	UDP Echo Client Server Communication	3	I	1	2
5.	Concurrent TCP/IP Day-Time Server	3	I	4	1,2
6.	Half Duplex Chat Using TCP/IP	3	I	2	1,2
7.	Full Duplex Chat Using TCP/IP	3	I	2	2
8.	Implementation of File Transfer Protocol	3	I	2	2
9.	Remote Command Execution Using UDP	3	I	4	1,2
10.	ARP Implementation Using UDP	3	I	4	2
11.	MODEL EXAMINATION	1			
	TOTAL CONTACT HOURS	30			

LEARNING RESOURCES	
1.	Behrouz A. Forouzan, "TCP IP Protocol Suite " 4th edition, 2010, McGraw-Hill ISBN: 0073376043
2.	Douglas E. Comer, Internetworking with TCP/IP, Principles, protocols, and architecture, Vol 1 5th Edition, Publication Date: July 10, 2005 ISBN: 0131876716, ISBN: 978-0131876712
3.	Richard Stevens, Unix Network Programming, vol.1, 3 rd edition, 2003, McGraw-Hill ISBN 0-07-246060-1

LEARNING RESOURCES

4.	Wendell Odom, Official Certification Guide, CCNP Route 642-902, CCIE, Pearson publication
----	---

Course nature					Theory + Practical		
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
											X			X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X		X											
4	Staff coordinator														

15IT321	HUMAN COMPUTER INTERACTION	L	T	P	C
		2	0	0	2
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	As an IT professional one may be involved in the design of graphical user interfaces. This course deals with the cognitive principles involved in conceiving a good user interface and the design principles to be followed in realizing one such interface.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the basic HCI concepts and various design process, standards and guidelines	c	m				
2.	Perform implementation support and evaluation of their design	c					
3.	Learn various models and task analysis	l					
4.	Learn various dialogue notations and importance of groupware	l					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: FOUNDATIONS	6			
1.	Cognitive Principles : Human Vision, Hearing, Touch, Movement-Output channels- Human memory-STM and LTM	2	C	1	1,5
2.	Thinking-Reasoning and problem solving, Emotions, Individual difference(sex, physical age), psychology	1	C	1	1
3.	Text entry devices, display devices: 3D interaction, paper, memory, processing and networks, Ergonomics, Interaction styles	2	C	1	1,2
4.	WIMP: Interactivity, Design issues : Context and experience	1	D	1	1,2
	UNIT II: DESIGN PROCESS	6			
5.	Navigation- Screen- Screen design- Iteration and prototyping, Software life cycle- Usability	2	D	1	1
6.	Support Usability- Standards	2	D	1	1,5
7.	Guidelines- Golden rules	2	D	1	1,2
	UNIT III: IMPLEMENTATION AND EVALUATION	6			
8.	Elements of Windowing: programming application	1	C	2	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
9.	Toolkits, UI management systems , Goals, Expert analysis-user participation	2	I	2	1
10.	Evaluation methods	1	I	2	1,3,4
11.	Universal Design , User support	2	C,D	1	1,2,5
	UNIT IV: MODELS AND TASK ANALYSIS	6			
12.	Cognitive Models, GOMS, linguistic, physical and device models	1	D	3	1,5
13.	Socio-organizational issues :power and organizational structure, free rider problem , Critical mass, invisible workers, stakeholder requirements	2	C	3	1
14.	Communication and collaboration models	1	C	3	1
15.	Ethnography, face to face communication, gesture, body language-back channels- Conversations	1	C	3	1
16.	Task analysis, task decomposition, knowledge based technique	1	D	3	1
	UNIT V: THEORIES AND GROUPWARE	6			
17.	Dialogue notations: STN, H-STN, JSD, Petri net, state charts, flow charts , Concurrent dialogues : Modelling rich interaction-status event analysis-rich set behavior- properties of events	2	D	4	1,3,4
18.	Groupware : definition, time/space matrix, computer mediated communication (email, BB, structured text message, video, virtual environment)	1	C	4	1,3,4
19.	Meeting and Decision support systems (argumentation tools, meeting rooms, shared work surfaces)	2	C	4	1
20.	Shared application (shared PCs and windows, shared editors, co-authoring tools, shared diaries)	1	C	4	1
	Total Contact Hours	30			

Sl No	LEARNING RESOURCES
1.	Alan Dix, Janet Finlay, Gregory D. Abowd and Russel Beale, " <i>Human Computer Interaction</i> ", 3 rd Edition, 2004, Pearson Education, ISBN: 978-0130461094
2.	K.Meena and R.Sivakumar, "Human-Computer Interaction", 2015, Prentice Hall India, ISBN: 978-8120350502
3.	Ben Shneiderman and Catherine Plaisant, " <i>Designing the User Interface: Strategies for Effective Human-Computer Interaction</i> ", 5 th Edition, , 2009, Pearson Addison-Wesley, ISBN: 978-0-32153735-5

Sl No	LEARNING RESOURCES
4.	Yvonne Rogers, Heken Sharp and Jenny Preece, " <i>Interaction Design: Beyond Human-Computer Interaction</i> ", 3 rd Edition, 2011, John Wiley & Sons, Inc, ISBN: 0470665769, ISBN: 978-0470665763
5.	John M. Carroll, " <i>Human - Computer Interaction in the Millennium</i> ", 2008, 3 rd Edition, Pearson Education, Second Impression, ,ISBN: 978-0-201-70447-1

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
				X									X	X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)		ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
										X					
4	Staff coordinator														

15IT376L	Minor Project II			L	T	P	C
				0	0	3	2
Co-requisite:	NIL						
Prerequisite:	NIL						
Data Book / Codes/Standards	NIL						
Course Category	P	PROFESSIONAL CORE					
Course designed by	Department of Information Technology						
Approval	32 nd Academic Council Meeting , 23 rd July , 2016						

PURPOSE	To obtain hands-on experience in converting a small novel idea / technique into a working model / prototype involving multi-disciplinary skills and / or knowledge and working in at team.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able							
10.	To conceptualize a novel idea / technique into a product			c			
11.	To think in terms of multi-disciplinary environment			d			
12.	To understand the management techniques of implementing a project					k	
13.	To take on the challenges of teamwork, prepare a presentation in a professional manner, and document all aspects of design work.				g		

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	A Multidisciplinary project to be taken up by a team of maximum of ten students. Development of prototype product, a 3D model, simulation, blueprint for a larger project and any other development work are permitted. The contribution of the individuals in the project should be clearly brought out. A combined report is to be submitted. A presentation is to be made for the reviewers on the work done by the candidate.		C,D,I	1,2,3,4	
	Total contact hours				

Course nature		Project – 100% internal continuous assessment	
Assessment Method (Weightage 100%)			
In-semester	Assessment tool	Refer the table	Total
	Weightage	Refer the table below	100%
End semester examination Weightage :			0%

Assessment component	Expected outcome	Evaluators	Criteria or basis	Marks
Project proposal (Review – I)	A short presentation to be delivered on: <ul style="list-style-type: none"> • A brief, descriptive project title (2-4 words). • The 3 nearest competitors (existing solutions) and price. • Team members name, phone number, email, department/degree program, and year. • A description of the product opportunity that has been identified. To include: Documentation of the market need, shortcomings of existing competitive products, and definition of the target market and its size. • Proposed supervisor / guide 	Panel of reviewers	Viability / feasibility of the project Extent of preliminary work done.	0
Review II	<ul style="list-style-type: none"> • Mission Statement / Techniques • Concept Sketches, Design Specifications / Modules & Techniques along with System architecture • Coding 	Panel of reviewers	Originality, Multi-disciplinary component, clarity of idea and presentation, team work, handling Q&A.	20
Review III	<ul style="list-style-type: none"> • Final Concept and Model / Algorithm/ Technique • Drawings, Plans / programme output • Financial Model / costing • Prototype / Coding • Final Presentation and Demonstration 	Panel of reviewers	Originality, Multi-disciplinary component, clarity of idea and presentation, team work, handling Q&A.	50
Final technical Report	A good technical report	Supervisor / Guide	Regularity, systematic progress, extent of work and quality of work	30
			Total	100

Assessment components

15IT381L	Seminar II		L	T	P	C
			0	0	3	2
Co-requisite:	NIL					
Prerequisite:	NIL					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL CORE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting , 23 rd July , 2016					

PURPOSE	To inculcate the research culture among the students through literature reading, modelling a problem, analyzing and presenting.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able							
14.	To understand the research methodology adopted by various researchers			h	i	j	
15.	To mathematically model a problem, critically analyze it and adopt strategies to solve			b	c	e	
16.	To understand and present a well documented research			e	g		

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	Guidelines for conducting 15IT380L and 15IT381L Seminar for B.Tech 11. Upon registering for the course the student must identify a sub-domain of the degree specialization that is of interest to the student and start collecting research papers as many as possible. 12. After collecting sufficient number of research papers the student must peruse all the papers, meet the course faculty and discuss on the salient aspects of each and every paper. 13. The course faculty, after discussion with the student will approve TWO research papers that is appropriate for presentation. 14. The student must collect additional relevant reference materials to supplement and compliment the two research papers and start preparing the presentation. 15. Each student must present a 15-minute presentation on each of the approved research paper to the panel of evaluators. 16. The presenter must present one research paper within the first half of the semester (6 weeks) and another research paper in the next half of the semester (6 weeks) as per the schedule. 17. All other students registered for the course will form the audience. 18. The audience as well as the evaluators will probe the student with appropriate questions and solicit response from the presenter. 19. The presentation will be evaluated against 7 to 8 assessment criteria by 4 to 5 evaluators. 20. The score obtained through the presentations of TWO research papers will be converted to appropriate percentage of marks. This course is 100% internal continuous assessment.		C,D	1,2,3,4	
	Total contact hours	30			

Course nature			100% internal continuous assessment.	
Assessment Method (Weightage 100%)				
In-semester	Assessment tool	Presentation 1	Presentation 2	Total
	Weightage	50%	50%	100%
End semester examination Weightage :				0%

Department of Information Technology
EVALUATION OF SEMINAR PRESENTATIONS

Name of the Student:

Date:

Register Number:

Degree and Branch:

Topic:

Sl. No.	Criteria for Assessment	Evaluator 1	Evaluator 2	Evaluator 3	Evaluator 4	Evaluator 5
1	Understanding of the subject					
2	Clarity of presentation					
3	Appropriate use of Audio visual aids					
4	Whether cross references have been consulted					
5	Ability to respond to questions on the subject					
6	Time scheduling					
7	Completeness of preparation					

Poor	1	Below Average	2	Average	3	Good	4	Very Good	5
------	---	---------------	---	---------	---	------	---	-----------	---

Overall Grades:

Remarks:

Signature of Course Coordinator

15IT386L	Massive Open Online Courses II		L	T	P	C
			0	0	3	2
Co-requisite:	NIL					
Prerequisite:	NIL					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL CORE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting, July, 2016					

PURPOSE	To offer students the opportunity to study with the world's best universities by integrating select MOOCs in a regular degree programme and providing students full credit transfer, as per university regulations, if they earn a "Verified / Completion Certificate" and take a proctored examination through a secure, physical testing center.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able						
1.	To apply the concepts, theories, laws, technologies learnt herein to provide engineering solutions.		f	h	i	j

Course nature				Online - 100% internal continuous assessment.		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Quiz	Assignment	Non-proctored / Unsupervised Tests	Proctored / Supervised Test	Total
	Weightage	25%	25%	10%	40%	100%
End semester examination Weightage :						0%

Registration process, Assessment and Credit Transfer:

- Students can register for courses offered by approved global MOOCs platforms like edX, Coursera or Universities with which SRM partners specifically for MOOCs.
- Annually, each department must officially announce, to the students as well as to the Controller of Examinations, the list of courses that will be recognized and accepted for credit transfer.
- The department must also officially announce / appoint one or more faculty coordinator(s) for advising the students attached to them, monitoring their progress and assist the department in proctoring the tests, uploading the marks / grades, and collecting and submitting the graded certificate(s) to the CoE, within the stipulated timeframe.
- Student who desires to pursue a course, from the above department-approved list, through MOOCs must register for that course during the course registration process of the Faculty of Engineering and Technology, SRM University.
- The maximum credit limits for course registration at SRM will include the MOOCs course registered.
- The student must periodically submit the marks / grades obtained in various quizzes, assignments, tests etc immediately to the Faculty Advisor or the Course Coordinator for uploading in the university's academic module.
- The student must take the final test as a Proctored / Supervised test in the university campus.
- The student must submit the "Certificate of Completion" as well as the final overall Marks and / or Grade within the stipulated time for effecting the grade conversion and credit transfer, as per the regulations. It is solely the responsibility of the individual student to fulfill the above conditions to earn the credits.
- The attendance for this course, for the purpose of awarding attendance grade, will be considered 100% , if the credits are transferred, after satisfying the above (1) to (7) norms; else if the credits are not transferred or transferable, the attendance will be considered as ZERO.

15IT491L	Industrial Module II		L	T	P	C
			0	0	3	2
Co-requisite:	NIL					
Prerequisite:	NIL					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL CORE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting , 23 rd July, 2016					

PURPOSE	To offer students the opportunity to interact with industries and learn the best practices adopted by them.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able							
2.	To obtain an insight into the current industrial trends and practices			h			
3.	To obtain an insight into the technologies adopted by industries			k			
4.	To obtain an insight into the technical problems encountered by the industries and the scope for providing solutions.			e			
5.	To network with industry			h			

Description of Topic	Contact hours	C-D-I-O	IOs	Reference
1. The department will identify and shortlist few emerging topics that are trending in industry. 2. The department will identify experts from industry who are willing to deliver modules on the shortlisted topics. 3. The identified expert will assist the department in formulating the course content to be delivered as a 30-hour module, prepare lectures notes, ppt, handouts and other learning materials. 4. The department will arrange to get the necessary approvals for offering the course, from the university's statutory academic bodies well before the actual offering. 5. The department must officially announce, to the students as well as to the Controller of Examinations, the list of courses that will be offered as industry module. 6. The department must also officially announce / appoint one or more faculty coordinator(s) for advising the students attached to them, monitoring their progress and assist the department in proctoring/supervising/assessment the quizzes, assignments, tests etc, uploading the marks, attendance etc, within the stipulated timeframe. 7. The Student who desires to pursue a course, from the above department-approved list, must register for that course during the course registration process of the Faculty of Engineering and Technology, SRM University. 8. The maximum credit limits for course registration at SRM will include the Industry Module also. 9. All academic requirements of a professional course like minimum attendance, assessment methods, discipline etc will be applicable for this Industry Module. 10. The course will be conducted on weekends or beyond the college regular working hours.				
Total contact hours	30			

Course nature				100% internal continuous assessment.			
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage							50%

15IT411J	INTEGRATIVE PROGRAMMING AND TECHNOLOGY	L	T	P	C
		3	0	2	4
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15IT304J WEB PROGRAMMING				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	The purpose of this course is to make students to apply the concepts of integrative programming techniques. This also helps them to develop components in different programming languages and integrate them using web architectures.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the benefits of Integration of languages, especially the issues related with the integration of java with other languages like Assembly, C, C++ using JNI.	i					
2.	Explore core object-oriented design patterns of J2EE and their applications	i					
3.	Understand and create components in JMS	j					
4.	Developing scripting techniques using Jython	m					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: LANGUAGE INTEROPERABILITY IN JAVA	9			
1.	Using non-Java code: The Java Native Interface Calling a native method	2	D-I	1	6
2.	Name mangling and function signatures Implementing your DLL ,The JNI Env argument	2	I	1	6
3.	Accessing Java Strings, Passing and using Java objects JNI and Java exceptions, JNI and threading	2	I	1	6
4.	Steps for executing JNI using NetBeans 7.0 IDE, About Cgywin JNI program using String, Array, Exception, Object, Multithreading	3	C,D,I	1	6
	UNIT II: ENTERPRISE JAVA BEANS	9			
5.	Introduction to J2EE, Need for J2EE , Overview on J2EE, EJB3 and Difference	2	C,D	2	1
6.	Architecture of J2EE, Key Standards, The EJB Model	2	C	2	1
7.	Key Services of the Application Server	2	C,I	2	1
8.	Developing Session Beans : Stateless Session Beans and Stateful Session Beans	2	I	2	1

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
9.	Packaging , Deployment and Running application	1	C,D,I	2	1
	UNIT III: JMS-ENTERPRISE JMS PROGRAMMING	9			
10.	Overview and history of the Java Message Service (JMS)	1	C	3	2,3,9
11.	Guidelines for choosing JMS	1	C	3	2,3,9
12.	Types of messages	2	C	3	2,3,9
13.	Constructing and sending messages , receiving messages , Synchronously and Asynchronously: publish/subscribe and point-to-point messaging	2	C,I	3	2,3,9
14.	Message driven beans in Enterprise JavaBeans 2.0: understanding and using JMS transactions	2	C,I	3	2,3,9
15.	Security concepts in JMS	1	C	3	2,3,9
	UNIT IV: SCRIPTING TECHNIQUES	9			
16.	Python for the Java Platform: Basics	1	C	4	4,8
17.	Introduction to Jython, Scripting with Jython	2	C,I	4	4,8
18.	Jython and Java Integration	1	I	4	4,8
19.	Databases and Jython: Object Relational Mapping and Using JDBC	2	C,I	4	4,8
20.	Developing Applications with Jython: Web Applications With Django	1	D,I	4	4,8
21.	Developing Applications with Jython: GUI Applications, Testing and Continuous Integration in Jython.	2	D,I	4	4,8
	UNIT V: DESIGN PATTERNS	9			
22.	Introducing a Design Pattern, Role of Design Patterns	1	C,I	2	1,5
23.	Types of Patterns: FrontController, Composite View	2	C	2	1,5
24.	Composite Entity, Intercepting Filter,	2	C	2	1,5
25.	Session Facade, Service Locator	2	C	2	1,5
26.	Data Access Object, View Helper, DispatcherView, Service To Worker.	2	C	2	1,5
	Total Contact Hours	45			

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
1.	JNI : Object Passing	2	I	1	6
2.	JNI Sorting Array	2	I	1	6
3.	JNI : Different Data Types and Exception Handling	4	I	1	6
4.	Java Beans : Account Details Using Non-Visual Bean	2	I	2	1

Sl. No.	Description of experiments	Contact Hours	C-D-I-O	IOs	Reference
5.	Java Beans : Color Bean Using Visual Bean	4	I	2	1
6.	EJB : Session Bean	2	I	2	1
7.	EJB : Entity Bean	4	I	2	1
8.	Developing JMS Applications	2	I	3	2,3,9
9.	Simple Swing application in Java using Jython	2	I	4	4,8
10.	Web Applications With Django using Jython	4	I	4	4,8
11.	Model Exam	2			
	Total Contact Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Java server Programming (J2EE 1.6) Black Book, Kogent Learning Solution Inc. Dream Tech Press 2009, ISBN 13 : 9788177229363
2.	Mark Richards, Richard Monson-Haefel, David A Chappell, Java Message Service, 2 nd Edition 2009 O'Reilly Media ISBN 13: 9780596522049
3.	Shaun TerryEnterprise JMS Programming, 1 st Edition, M&T Books, ISBN-13: 978-0764548970
4.	Josh Juneau , Jim Baker , Donna L. Baker , Frank Wierzbicki , Leo Soto Muoz , Victor Ng , The Definitive Guide to JythonPython for the Java Platform , 2010, Apress Publication. ISBN13: 978-1-4302-2527-0
5.	http://www.tutorialspoint.com/design_pattern/as on date: 18/04/2016
6.	https://www3.ntu.edu.sg/home/ehchua/programming/java/JavaNativeInterface.html as on date: 18/04/2016
7.	http://www.javatpoint.com/java-beanas on date: 18/04/2016
8.	http://www.jython.org/jythonbook/en/1.0/as on date: 18/04/2016
9.	https://blogs.oracle.com/soaproactive/entry/how_to_create_a_simple as on date: 18/04/2016

Course nature				Theory + Practical			
Assessment Method – Theory Component (Weightage 50%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%
Assessment Method – Practical Component (Weightage 50%)							
In-semester	Assessment tool	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination	Total	
	Weightage	40%	5%	5%	10%	60%	
End semester examination Weightage :							40%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X	X			X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X													
4	Staff coordinator														

15IT413	IT INFRASTRUCTURE MANAGEMENT	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting ,May 2016				

PURPOSE	IT Infrastructure has become pervasive in every organization to handle everyday tasks and complex situations. The course on IT Infrastructure Management has found an inevitable place in modern day degree programs in order to make the students knowledgeable not only in installing and configuring hardware, software and networks but also in business process of procurement, storage management, security management, service delivery process, IT audit etc					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Understand the design factors and challenges in IT Infrastructure Management	b				
2.	Understand service delivery and associated processes	c				
3.	Understand storage and security management related to IT Infrastructure	l				
4.	Understand performance and tuning processes and associated case studies	c				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: IT INFRASTRUCTURE	8			
1.	Introduction, Challenges in IT Infrastructure Management	2	C	1	2
2.	Design Factors for IT Organizations and IT Infrastructures	2	C	1	2
3.	IT Systems and Service Management Process	2	C	1	2
4.	Information systems Design Process,IT Infrastructure Library	2	C	1	2
	UNIT II: SERVICE DELIVERY AND SUPPORT PROCESS	10			
5.	Service Level Management, Financial Management	3	C	2	2
6.	IT Service Continuity Management, Capacity Management	3	C	2	2
7.	Configuration Management, Availability management, Release Management	4	C	2	2
	UNIT III: STORAGE AND SECURITY MANAGEMENT	10			
8.	Backup and Storage,Disaster Recovery	3	C	3	2

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
9.	Space Management, Bare Machine Recovery (BMR)	2	C	3	2
10.	Data Retention ,Computer Security	3	C	3	2
11.	Identity Management- Access control system- Intrusion Detection	2	C	3	2
	UNIT IV: PERFORMANCE AND TUNING	10			
12.	Introduction, Difference between Performance and Tuning processes and other Infrastructure processes, Definition	4	C	4	1
13.	Preferred characteristics, Performance and tuning applied to major resource environments	4	C	4	1
14.	Assessing an Infrastructure's performance and tuning process,Measuring and streamlining the P and T process	2	C	4	1
	UNIT V: CASE STUDIES	7			
15.	Asset Network Corporation case, Radio Shack case	2	C	4	1
16.	Business Process Outsourcing (BPO) Infrastructure Planning and Management	2	C	1	3
17.	e-Commerce Business Infrastructure Planning and Management	1	C	1	3
18.	Enron case,Tycocase,Worldcom case	2	C	4	1
	Total Contact Hours	45			

Sl. No.	LEARNING RESOURCES
1.	Rich Schiesser, “ IT Systems Management”, 2 nd edition, 2010, Pearson Education, ISBN: 978-0137025060
2.	P.Gupta, “ IT Infrastructure and Its Management” 2 nd Reprint, 2010, Tata McGraw Hill, ISBN: 978-0070699793
3.	SjaakLaan , “IT Infrastructure Architecture : Infrastructure Building Blocks and Concepts”,2011 , Lulu Press Inc, ISBN 978-1-4478-8128-5.
4.	Leonard Jessup, Joseph Valacich,“Information System Today: Managing Digital World”, 3 rd Edition, 2007, Prentice Hall, ISBN: 0-13-233506-9.
5.	Hausman, Cook, “IT Architecture for Dummies”, 2011, Wiley Publishing, Hoboken, NJ www.wiley.com ISBN: 978-0-470-55423-4
6.	Richard J. Reese, “IT Architecture in Action”,2008,Xlibris Publishing ,ISBN:978-1-4363-0505-1

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
			X	X									X		
2	Category	GENERAL (G)		BASIC SCIENCES (B)		ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)					
										X					
3	Broad Area(for p only)	Programming		Networking		Data base	Web System		Human Computer Interaction			Platform Technologies			
		X				X									
4	Staff coordinator														

15IT412	INFORMATION ASSURANCE AND SECURITY	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , May 2016				

PURPOSE	This course introduces the basics of information security focusing on confidentiality, Integrity and Availability. It provides the understanding of different security mechanisms used in various areas of computing						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the different ways the information systems may be compromised	e	j				
2.	Learn to model threats and analyze software systems	b	m				
3.	Understand and apply different countermeasures and protect information	I	j				
4.	Perform vulnerability testing	b	i				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I: INTRODUCTION	9			
1.	Information Assurance Basics : The Need for Information Assurance	1	C	1	1
2.	The MSR Model of Information Assurance	1	C	1	1, 2
3.	Information Assurance in Cybersecurity	1	C	1	1
4.	Implications from Lack of Information Assurance	1	C	1	1
5.	Information Assurance Concepts : Defense in Depth	1	C	1	1
6.	CIA Balance, Nonrepudiation and Authentication	1	C	1	1
7.	Assets, Threats, Vulnerabilities, Risks, and Controls , Cryptology	2	C	1	1, 2
8.	Organizations Providing Resources for Professionals	1	C	1	1
	UNIT II: PLANNING STRATEGY	9			
9.	Information Assurance Management System	1	C	1	1
10.	Information Asset Life Cycle, Plan,Do,Check,Act Model	1	C	1	1
11.	Current Practices : Due Care and Due Diligence	2	C	1	1, 2
12.	Regulations : Specific Laws and Regulations, International Laws and Acts	2	C	1	1, 2
13.	Standards and Best Practices, Plans for Information Assurance Strategy	1	C	1	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
14.	Information Assurance Planning - Approaches to implement Information Assurance	2	C	1	1
	UNIT III: OPERATIONAL ISSUES AND POLICY	9			
15.	Information Assurance Process : Managing Information Assurance	1	C	2	1
16.	Structure of an Information Assurance	1	C	2	1
17.	Organizational Maturity, Asset Management	1	C	2	1
18.	Information Assurance Risk Management : Process , Secure design through threat modeling	2	C	2	1, 3
19.	Importance of Policy: Information Assurance Policy	1	C	2	1,2
20.	Policy Development Steps	1	C	2	1
21.	Certification, Accreditation, and Assurance	2	C	2	1
	UNIT IV: SECURE MITIGATION SERVICES	9			
22.	Benefits of Incorporating Security Considerations : System Development Life Cycle	1	C	3	1
23.	Information Assurance in System Development Life Cycle	1	C	3	1, 2
24.	Information Assurance in the Service Acquisition Life Cycle	1	C	3	1
25.	Physical and Environmental Security Controls - Handling of Media	1	C	3	1, 2
26.	Information Assurance Awareness, Training, and Education (AT and E), Purpose, Benefits	1	C	3	1
27.	AT and E : Design, Development, Assessment, Types of Learning Programs	1	C	3	1
28.	Preventive Information Assurance Tools	1	C	3	1
29.	Preventive Information Assurance controls	1	C	3	1
30.	Access control benefits, Techniques, Administration	1	C	3	1
	UNIT V: DETECTION AND RECOVERY PROCESSES	9			
31.	Information Assurance Detection and Recovery Processes	1	C	4	1
32.	Intrusion Detection Systems	1	C	4	1, 2
33.	Log Management Tools: SIEM, Honeypot/Honeynet	1	C	4	1
34.	Malware Detection, Vulnerability Scanners	1	C	4	1
35.	Penetration Test, Physical Controls	1	C	4	1
36.	Information Assurance Measurement Process, Metrics Program	1	C	4	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
37.	Incident Handling Process	1	C	4	1, 5
38.	Computer Forensics : Examiner Prerequisites, Team Establishment	2	C	4	1
	Total Contact Hours	45			

Sl. No.	LEARNING RESOURCES
1.	Steven Hernandez, Corey Schou, “Information Assurance Handbook: Effective Computer Security and Risk Management Strategies”, 1 st Edition, 2014, McGraw-Hill Osborne Media, ISBN : 0071821651, ISBN : 9780071821650
2.	Michael E. Whitman and Herbert J. Mattord, “Principles of Information Security”, 5th edition, 2015, Thomson Publications, ISBN 1111899134
3.	Corey Schou, Dan Shoemaker, “Information Assurance for the Enterprise”, Tata McGraw-Hill Edition, 2007
4.	Michael Howard and David LeBlanc, “Writing Secure Code”, 2 nd edition, 2003, Microsoft Press, ISBN: 0735617228
5.	Kevin Mandia, Chris Prosise, "Incident Response-Investigating Computer Crime", 2003, Tata McGraw Hill, ISBN : 978013609744
6.	William Stallings, “Cryptography and Network Security- Principles and Practice”, 6 th Edition, 2013, Pearson, ISBN: 9780136073734

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
			X			X				X	X			X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)		ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
										X					
3	Broad Area (For P Only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
				X											
4	Staff coordinator														

15IT415M	MULTI-DISCIPLINARY DESIGN		L	T	P	C
			3	0	0	3
Co-requisite:	NIL					
Prerequisite:	NIL					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL CORE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting, 23 rd July, 2016					

PURPOSE	Students of any specialization at an undergraduate level learn courses related to various sub-domains (Multi-disciplinary) of their specialization individually. They are not exposed to understanding how the various multi-disciplinary fields interact and integrate in real life situations. It is very common that an expert in a particular domain models and designs systems or products oblivious of the impact of other subsystems. This lack of multi-disciplinary thinking is very blatantly visible when the students take up their major project during their final year. This course aims to develop appropriate skills on systemic thinking on how to identify and formulate a problem, decompose the problem into smaller elements, conceptualize the design, evaluate the conceptual design by using scientific, engineering and managerial tools, select, analyze and interpret the data, consideration of safety, socio-politico-cultural, risks and hazards, disposal, regional and national laws, costing and financial model and undertake documentation and finally presentation.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able							
1.	To subdivide a complex system into smaller disciplinary models, manage their interfaces and reintegrate them into an overall system model	a	c	e	f	i	l
2.	To rationalize a system architecture or product design problem by selecting appropriate design variables, parameters and constraints	a	c	e	f	i	l
3.	To design for value and quantitatively assess the expected lifecycle cost of a new system or product	a	c	e	f	i	l
4.	To take on the challenges of teamwork, prepare a presentation in a professional manner, and document all aspects of design work.	a	c	e	f	i	l

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
1.	Introduction: Facilitating Multidisciplinary Projects		C,D,I,O	1,2,3,4	1,2
2.	Identifying and formulating a problem				
3.	System Modeling				
4.	Thinking perspectives: Decomposition–Composition Thinking Hierarchical Thinking, Organizational Thinking, Life-Cycle Thinking, Safety Thinking, Risk Thinking, Socio-politico-cultural thinking, Environment thinking				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
5.	Decomposing a system – Identifying the major sub-systems				
6.	Mathematical Modeling and Governing equations for each sub systems				
7.	Objectives, Constraints and Design Variables				
8.	Conceptual Design				
9.	Collaborative Design – Disciplinary teams satisfy the local constraints while trying to match the global constraints set by the project coordinator.				
10.	Tools for modeling, designing, analysis, data interpretation, decision making etc				
11.	Design Analysis, evaluation and selection				
12.	Costing and Financial model				
13.	Documentation, reviewing and presentation				
	Total contact hours	60			

LEARNING RESOURCES	
Sl. No.	References
1.	Systems Design and Engineering: Facilitating Multidisciplinary Development Projects G. Maarten Bonnema, Karel T. Veenvliet, Jan F. Broenink December 15, 2015, CRC Press ISBN 9781498751261
2.	Exploring Digital Design-Multi-Disciplinary Design Practices , Ina Wagner , Tone Bratteteig , Dagny Stuedahl, Springer-Verlag London, 2010, ISSN:1431-1496
	<i>Additional references can be included by the respective departments based on the domain and / or theme.</i>

Course nature			Predominantly Practice complimented by theory			
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Review 1	Review 2	Review 3	Review 4	Total
	Weightage	10%	25%	25%	40%	100%
End semester examination Weightage :						0%

Pedagogy:

Theme or major/broad domains will be announced by the department every semester. Multi-disciplinary designs will be made by the students in groups (group size may be decided by the course coordinator), with the topic of interest falling within the theme or major/broad domains as announced by the department, applying any combinations of the disciplines in engineering. 3D modeling and / or simulation must be used to validate the design.

In a combination of lecture and hands-on experiences, students must be exposed to understand and analyze engineering designs (or products) and systems, their realization process and project management. Analysis of the design criteria for safety, ergonomics, environment, life cycle cost and sociological impact is to be covered. Periodic oral and written status reports are required. The course culminates in a comprehensive written report and oral presentation. If required guest lecturers from industry experts from the sub-domains may be arranged to provide an outside perspective and show how the system design is being handled by the industry. The Conceive Design Implement Operate (CDIO) principles must be taught to the students.

A full-scale fabrication is not within the purview /scope of this course. Of course this design, if scalable and approved by the department, can be extended as the major project work. This course is 100% internal continuous assessment.

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
		X		X		X	X			X			X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies				
		X		X		X		X		X		X				
4	Staff coordinator															

15IT496L	MAJOR PROJECT			L	T	P	C
				0	0	24	12
<i>Co-requisite:</i>	NIL						
<i>Prerequisite:</i>	NIL						
<i>Data Book / Codes/Standards</i>	NIL						
<i>Course Category</i>	P	PROFESSIONAL CORE					
<i>Course designed by</i>	Department of Information Technology						
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July , 2016						

PURPOSE	The Major Project experience is the culminating academic endeavor of students who earn a degree in their Undergraduate Programs. The project provides students with the opportunity to explore a problem or issue of particular personal or professional interest and to address that problem or issue through focused study and applied research under the direction of a faculty member. The project demonstrates the student's ability to synthesize and apply the knowledge and skills acquired in his/her academic program to real-world issues and problems. This final project affirms students' ability to think critically and creatively, to solve practical problems, to make reasoned and ethical decisions, and to communicate effectively.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able							
6.	To provide students with the opportunity to apply the knowledge and skills acquired in their courses to a specific problem or issue.	a	c		e	f	i
7.	To allow students to extend their academic experience into areas of personal interest, working with new ideas, issues, organizations, and individuals.	a	c		e	f	i
8.	To encourage students to think critically and creatively about academic, professional, or social issues and to further develop their analytical and ethical leadership skills necessary to address and help solve these issues.	a	c		e	f	h i
9.	To provide students with the opportunity to refine research skills and demonstrate their proficiency in written and/or oral communication skills.	a	c		e	f	g i
10.	To take on the challenges of teamwork, prepare a presentation in a professional manner, and document all aspects of design work.			d		g	

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
---------	----------------------	---------------	---------	-----	-----------

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	<ol style="list-style-type: none"> 1. The Major project is a major component of our engineering curriculum: it is the culmination of the program of study enabling the students to showcase the knowledge and the skills they have acquired during the previous four years, design a product/service of significance, and solve an open-ended problem in engineering. 2. Each student must register to the project course related to his or her program 3. Major Project course consists of one semester and would be allowed to register only during the final year of study. 4. The Major Project may be initiated during the pre-final semester but will be assessed and credits transferred only during the last semester of study, upon completion of all other degree requirements. Generally the undergraduate major project is a team based one. 5. Each team in the major project course will consist of maximum of 5 students. 		C,D,I, O	1,2,3,4, 5	

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	<p>6. Each project will be assigned a faculty, who will act as the supervisor.</p> <p>7. The project shall be driven by realistic constraints like that related to economic, environmental, social, political, ethical, health & safety, manufacturability and sustainability.</p> <p>8. Each group must document and implement a management structure. Group leadership roles must be clearly identified including who has responsibility for monitoring project deliverables and group coordination.</p> <p>9. A group project may be interdisciplinary, with students enrolled in different engineering degrees, or in Engineering plus other faculties such as Management, Medical and Health Sciences, Science and Humanities.</p> <p>10. Each student team is expected to maintain a log book that would normally be used to serve as a record of the way in which the project progressed during the course of the session.</p> <p>11. Salient points discussed at meetings with the supervisor (i.e., suggestions for further meetings, changes to experimental procedures) should be recorded by the student in order to provide a basis for subsequent work.</p> <p>12. The logbook may be formally assessed;</p> <p>13. The contribution of each individual team member will be clearly identified and the weightage of this component will be explicitly considered while assessing the work done.</p> <p>14. A project report is to be submitted on the topic which will be evaluated during the final review.</p> <p>15. Assessment components will be as spelt out in the regulations.</p> <p>16. The department will announce a marking scheme for awarding marks for the different sections of the report.</p> <p>17. The project report must possess substantial technical depth and require the students to exercise analytical, evaluation and design skills at the appropriate level.</p>				

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	Total contact hours				

Course nature		Project – 100 % Internal continuous Assessment			
Assessment Method (Weightage 100%)					
In-semester	Assessment tool	Review 1	Review 2	Review 3	Total
	Weightage	10%	15%	20%	45%
End semester examination	Assessment Tool	Project Report	Viva Voce		
	Weightage :	25%	30%		55%

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X		X	X	X	X	X	X	X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X		X		X		X		X		X			
4	Staff coordinator														

ELECTIVE COURSES

15IT322E	PYTHON PROGRAMMING	L	T	P	C
		2	2	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15SE201J Object Oriented Programming Using C++				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P Professional Elective				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	Python has evolved into a powerful high level language that implements a deliberately clear syntax and a highly coherent programming model. Python is more preferred for its features of portability, productivity and extensive support libraries and seamless integration with components coded in any other programming language. As an information technology undergraduate student, knowledge of Python is highly required for scientific computing and efficient software development.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Appreciate the basic and advanced features of core language built ins	i				
2.	Handle and control system/OS level features	c				
3.	Communicate using sockets, write client and server side scripts	c				
4.	Design and implement basic applications with database connectivity	i				

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: CORE PYTHON : BASICS		6			
1.	Introduction to Python, Python Interpreter and its working, Syntax and Semantics	1	C	1	1
2.	Data Types, Assignments and Expressions, Control Flow Statements	2	C	1	1
3.	Sequences and Dictionaries	2	C	1	1
4.	Functions and lambda expressions	1	C	1	1
UNIT II: CORE PYTHON : ADVANCED FEATURES		6			
5.	Iterations and Comprehensions	1	C	1	1
6.	Handling text files	1	C	1	1,2
7.	Modules, Classes and OOP	2	D	1	1
8.	Exception Handling	1	D	1	1
9.	Strings and Regular Expressions	1	D	1	1,2
UNIT III: SYSTEM PROGRAMING		7			
10.	System tools : OS and Sys modules	2	C	2	2
11.	Directory Traversal tools	2	C	2	2

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
12.	Parallel System tools : threading and queue, Program Exits	3	C	2	2
UNIT IV: NETWORK AND WEB PROGRAMMING		5			
13.	Socket Programming : Handling Multiple Clients	1	C	3	2
14.	Client side scripting, urllib	1	C	3	2
15.	Server Side Scripting : CGI Scripts with User Interaction, Passing Parameters	3	C	3	2
UNIT V: GUI PROGRAMMING AND DATABASE CONNECTIVITY		6			
16.	Introduction to tkinter, Top Level Windows, Dialogs, Message and Entry	2	C	4	2
17.	Event Handling, Menus, Listboxes and Scrollbars, Text	2	C	4	2
18.	SQL Database interfaces with sqlite3 : Basic operations and table load scripts	2	C	4	2
Total contact hours		30*			
Tutorial Hours		30			

Sl. No.	LEARNING RESOURCES
1.	Mark Lutz ,”Learning Python”, O Reily, 4 th Edition, 2009, ISBN: 978-0-596-15806-4
2.	Mark Lutz ,”Programming Python “, O Reily, 4 th Edition, 2010, ISBN 9780596158118
3.	Tim Hall and J-P Stacey ,”Python 3 for Absolute Beginners” , 2009, ISBN:9781430216322
4.	Magnus Lie Hetland , “Beginning Python: From Novice to Professional”, 2 nd Edition, 2009, ISBN:9781590599822

Course nature					Theory +Tutorial	
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :					50%	

* - Excluding Assessment Hours

Course designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
				X						X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		X													
4	Staff coordinator														

15IT323E	GAME PROGRAMMING		L	T	P	C
			2	2	0	3
Co-requisite:	NIL					
Prerequisite:	15SE201J Object Oriented Programming Using C++					
Data Book / Codes/Standards	NIL					
Course Category	P		PROFESSIONAL ELECTIVE			
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting , 23 rd July 2016					

PURPOSE	The purpose of this course is to provide 2D and 3D game programming skills for students.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Understand the principles of windows programming	m				
2.	Gain knowledge on DirectX programming	m				
3.	Make use of audio and input devices	i				
4.	Develop simple games in windows environment	i				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: WINDOWS PROGRAMMING		6			
1.	Overview of windows programming	2	C	1	1
2.	Overview of DirectX, Basics of windows program	2	C	1	1
3.	Windows messaging and Event Handling, Real time Game Loop	2	C	1	1
UNIT II: DIRECTX PROGRAMMING		6			
4.	Getting started with Direct 3D	1	C	2	1
5.	Surfaces and Bitmaps	2	C	2	1
6.	Drawing Animated, Transparent and Tiled Sprite	3	C,I	2	1
UNIT III: DIRECTX AUDIO AND INPUT DEVICES		6			
7.	Using Direct Sound	2	C,I	3	1
8.	Testing Direct Sound	1	C,I	3	1
9.	Keyboard, Mouse	2	C,I	3	1
10.	Paddle Game	1	C,I	3	1
UNIT IV: 3D GRAPHICS AND 3D MODELS		6			
11.	Introducing to 3D Programming	1	C	4	1
12.	Textured cube demo	1	I	4	1
13.	Introducing Animator, Using Animator	2	C	4	1
14.	Creating car model	2	C,I	4	1
UNIT V: 3D MODEL FILES AND GAME PROJECT		6			
15.	Converting 3D files	1	C	4	1
16.	Loading and Rendering a model file	2	C	4	1
17.	Playing the Game	1	I,O	4	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
18.	Creating the models, Bitmapped Font, Simple 3D collision detection	2	I,O	4	1
	Total Contact Hours	30*			
	Tutorial Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Jonathan S. Harbour, “ <i>Beginning Game Programming</i> ”, 3 rd Edition, Course TechnologyPTR, 2009, ISBN:1-59200-585-3.
2.	David H. Eberly, “ <i>3D Game Engine Design, Second Edition: A Practical Approach to Real Time Computer Graphics</i> ”, 2 nd Edition, Morgan Kaufmann, 2006, ISBN:978-0122290633.
3.	JungHyun Han, “ <i>3D Graphics for Game Programming</i> ”, 1 st Edition, Chapman andHall/CRC, 2011, ISBN:1439827370 9781439827376.
4.	Mike McShaffrify, “ <i>Game Coding Complete</i> ”, 3 rd Edition, Charles RiverMedia, 2009, ISBN:978-1584506805
5.	Ernest Adams and Andrew Rollings, “ <i>Fundamentals of Game Design</i> ”, 1 st Edition, Prentice Hall, 2006, ISBN:978-0321643377
6.	Roger E. Pedersen, “ <i>Game Design Foundations</i> ”, 2 nd Edition, Jones and BartlettLearning, 2009, ISBN:978-1598220346

Course nature				Theory +Tutorial		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X				X	
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)		
													X		
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		X								X					
4	Staff coordinator														

15IT324E	MOBILE APPLICATION DEVELOPMENT		L	T	P	C
			2	2	0	3
<i>Co-requisite:</i>	NIL					
<i>Prerequisite:</i>	15SE205J Programming In Java					
<i>Data Book / Codes/Standards</i>	NIL					
<i>Course Category</i>	P		PROFESSIONAL ELECTIVE			
<i>Course designed by</i>	Department of Information Technology					
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016					

PURPOSE	This course imparts the knowledge and skills necessary for developing mobile applications using the Android platform.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the basics of Android devices and Platform.	i					
2.	Acquire knowledge on basic building blocks of Android programming required for App development.	k					
3.	Understand persistence Data storage mechanism in Android	j					
4.	Understand advanced application concepts like networking, Animations and Google Maps services etc.	j					
5.	Develop and publish Android applications in to Android Market	k					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: JAVA FX TECHNOLOGY FOR RICH CLIENT APPLICATIONS		4			
1.	Introduction: Introduction to mobile application development, trends, introduction to various platforms, introduction to smart phones	1	C	1	1,3,4
2.	Android platform: Android platform features and architecture, versions, comparison added features in each versions. ART(Android Runtime),ADB(Android Debug Bridge).	1	C	1	1,3,4
3.	Development environment/IDE: Android studio and its working environment, gradle build system, emulator setup	1	C	1	1,3,4
4.	Application anatomy: Application framework basics: resources layout, values, asset XML representation and generated R.Javafile ,Android manifest file. Creating a simple application.	1	C	2	1,3,4
UNIT II : ANDROID UI DESIGN		7			

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
5.	GUI for Android: Introduction to activities, activities life-cycle, Android v7 support library form API21 for lower version support	1	C,I	1	1,3,4
6.	Intent :intent object, intent filters ,adding categories, linking activities, user interface design components	2	C,I	1	1,3,4
7.	Views and View Groups: Basic views, picker views, adapter views, Menu, App Bar etc, basics of screen design; different layouts. App widgets. Lollipop Material design: new themes, new widgets, Card layouts. RecyclerView	2	C,I	1	1,3,4
8.	Fragments: Introduction to activities, activities life-cycle.	2	C,I	1	1,3,4
UNIT III: DATA PERSISTENCE		5			
9.	Different Data persistence schemes: Shared preferences, File Handling, Managing data using SQLite database	3	C,I	3	1,3,4
10.	Content providers: user content provider, Android in build content providers.	2	C,I	2	1,3,4
UNIT IV: BACK GROUND RUNNING PROCESS, NETWORKING AND TELEPHONY SERVICES		7			
11.	Services :introduction to services – local service, remote service and binding the service, the communication between service and activity, Intent Service.	1	C,I	3	1,3,4
12.	MultiThreading: Handlers ,AsyncTask	2	C,I	3	1,3,4
13.	Android network programming :URLConnection, Connecting to REST-based and SOAP based Web services	2	C,I	3	1,3,4
14.	Broad cast receivers: LocalBroadcastManager, Dynamic broadcast receiver, System Broadcast. PendingIntent, Notifications	1	C,I	3	1,3,4
15.	Telephony Manager: Sending SMS and making calls.	1	C,I	3	1,3,4
UNIT V: ADVANCED APPLICATIONS		7			
16.	Location based services: Google maps V2 services using Google API,	1	C,I	4	1,3,4
17.	Animations and Graphics: Property Animation ,View Animations, Drawable Animations	1	C,I	4	1,3,4
18.	Media and Camera API: Working with video and audio inputs, camera API	1	C,I		1,3,4

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
19.	Sensor programming: Motion sensors, Position sensors, Environmental sensors.	2	C,I	4	2
20.	Publishing Android Apps: Guide lines, policies and process of uploading Apps to Google play	2	O	5	1,3,4
Total Contact Hours		30*			
Tutorial Hours		30			

Sl. No.	LEARNING RESOURCES
1.	Dawn Griffiths, David Griffiths, “ <i>Head First: Android Development</i> ”, OReilly 2015, ISBN: 9781449362188
2.	Greg Milette, Adam Stroud, “PROFESSIONAL Android™ Sensor Programming”, John Wiley and Sons, Inc 2012, ISBN/978111265055, 9781280678943, 978111227459
3.	Paul Deitel, Harvey Deitel, Alexander Wald, “Android 6 for Programmers ,App Driven approach”, 2015, Prentice Hall ,ISBN: 9780134289366
4.	http://developer.android.com/training/index.html as on Date 21.4.2016

Course nature					Theory +Tutorial	
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X	X	X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
													X		
4	Staff coordinator														

15IT326E	CLOUD COMPUTING	L	T	P	C
		3	0	0	3
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				

Course Category	P	PROFESSIONAL ELECTIVE
Course designed by	Department of Information Technology	
Approval	32 nd Academic Council Meeting , July 2016	

PURPOSE	To introduce emerging cloud computing and its techniques, its services and security concerns that will lead to design and development of various cloud service models						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the current trend and basics of cloud computing	i	j				
2.	Learn cloud enabling technologies and its applications	i	j				
3.	Explore different cloud mechanisms and get exposure to advanced clouds	j	l				
4.	Analyze the cost metrics, handle the security threats and construct different cloud delivery design models	k					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : CLOUD COMPUTING FUNDAMENTALS AND MODELS		8			
1.	Introduction to Networking, Data communication, Cloud Computing, Origin of Cloud Computing, Basic Concepts and Terminology	3	C	1	1,2
2.	Goals and Benefits, Risks and Challenges, Roles and Boundaries, Cloud Characteristics	3	C	1,2	1,2
3.	Cloud Delivery Models, Cloud Deployment Models	2	C	1,2	1,2
UNIT II : CLOUD:ENABLING TECHNOLOGY AND APPLICATIONS		7			
4.	Broadband Networks and Internet Architecture, Data Center Technology, Virtualization Technology	2	C	2	1
5.	Web Technology, Multitenant Technology, Service Technology	2	C	2	1
6.	Applications, Cloud computing for Healthcare, Energy Systems, Transportation Systems, Manufacturing Industry, Government, Education and Mobile Communication	3	C	2	1,2
UNIT III : CLOUD COMPUTING MECHANISMS		8			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
7.	Cloud Infrastructure Mechanisms: Logical Network Perimeter, Virtual Server: Cloud Storage Device, Cloud Usage Monitor, Resource Replication, Ready-Made Environment	3	C	2,3	1
8.	Specialized Cloud Mechanisms: Automated Scaling Listener, Load Balancer, SLA Monitor, Pay Per Use Monitor: Audit Monitor, Failover System, Hypervisor, Resource Cluster, Multi:Device Broker	3	C	2,3	1
9.	Cloud Management Mechanisms: Remote Administration System, Resource Management System, SLA Management System, Billing Management System	2	C	2,3	1
UNIT IV: COST METRICS AND CLOUD COMPUTING ARCHITECTURAL MODEL		12			
10.	Cost Metrics and Pricing Models: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations	2	C	4	1,2
11.	Service Quality Metrics and SLAs: Service Quality Metrics, SLA Guidelines	2	C	4	1,2
12.	Fundamental Cloud Architectures: Illustration with Case Study	2	C	1,2,3,4	1,2
13.	Design approaches with Case Study, Design methodology for IaaS Service Model, Google API	3	C,D,I	1,2,3,4	2,4
14.	Design methodology for PaaS Service Model, Study of SaaS Service Model	3	C,D,I	1,2,3,4	2,4
UNIT V: CLOUD SECURITY AND ADVANCED CLOUD CONCEPTS		10			
15.	Fundamental Cloud Security: Basic Terms and Concepts, Threat Agents, Cloud Security Threats	2	C	4	1,2
16.	Cloud Security Mechanisms: Encryption, Hashing: Digital Signature, Public Key Infrastructure, Identity and Access Management	3	C,I	2,3,4	1,2
17.	Single Sign-On: Kerberos authentication, One-time password, Basic cloud data security mechanisms	3	C,I	2,3,4	1,2
18.	Advanced Clouds, Mobile Cloud, Media Cloud, Green Cloud	2	C	3	1,2
TOTAL CONTACT HOURS		45*			

Sl. No.	LEARNING RESOURCES
1.	Thomas Erl, Zaigham Mahmood, Richardo Puttini, "Cloud Computing: Concepts, Technology and Architecture", Fourth Printing, 2014, Prentice Hall/Pearson PTR, ISBN: 9780133387520.
2.	Arshdeep Bahga, Vijay Madisetti, "Cloud Computing: A Hands-On Approach", 2016, University Press, ISBN: 9780996025508.
3.	K. Chandrasekaran, "Essentials of Cloud Computing", 2014, Chapman and Hall/CRC Press, ISBN 9781482205435.
4.	Thomas Erl, Robert Cope, Amin Naserpour, "Cloud Computing Design Patterns", 2015, Prentice Hall/Service Tech Press, Pearson, ISBN: 978-0133858563.

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X	X	X	X		
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
													X		
4	Staff coordinator														

15IT327E	CRYPTOGRAPHY		L	T	P	C
			3	0	0	3
Co-requisite:	NIL					
Prerequisite:	NIL					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL ELECTIVE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting , 23 rd July 2016					

PURPOSE	Providing secure communication and ensuring confidentiality and integrity of information are a major concern in the field of information technology. This course deals with the techniques and mathematics used to provide information security.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Understand OSI security architecture and classical encryption techniques.	j				
2.	Acquire fundamental knowledge on the concepts of finite fields and number theory.	a				
3.	Understand various block cipher and stream cipher models.	j				
4.	Describe the principles of public key cryptosystems, hash functions and digital signature.	j				
5.	Gain a first-hand experience on encryption algorithms, encryption modes.	i				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: CLASSICAL CRYPTOGRAPHY		7			
1.	Introduction to Security attacks	1	C	1	1,2
2.	Symmetric cipher model, Security mechanisms	1	C	1	1,2
3.	Substitution techniques: Caesar cipher, Monoalphabetic cipher	2	C,I	1	1
4.	Polyalphabetic ciphers, Onetime pad	2	C,I	1	1
5.	Transposition techniques, Steganography	1	C	1	1
UNIT II: FINITE FIELDS AND NUMBER THEORY		10			
6.	Groups, Rings, Fields	1	C	2	1
7.	Euclid's Algorithm	2	C,I	2	1
8.	Modular arithmetic	1	C	2	1
9.	Finite Fields, Polynomial Arithmetic	2	C	2	1
10.	Prime Numbers, Testing for Primality	1	C,I	2	1
11.	Fermat's and Euler's Theorem	1	C,I	2	1
12.	The Chinese remainder theorem	1	C,I	2	1
13.	Discrete Logarithms	1	C	2	1
UNIT III: BLOCK CIPHERS		9			
14.	Block cipher principles	1	C	3	1
15.	Data Encryption Standard	2	C,I	3	1
16.	Block cipher Modes of operation	2	C	3	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
17.	Advanced Encryption Standard	2	C,I	3	1
18.	Blowfish, RC5 algorithm	2	C	3	1,2
UNIT IV: PUBLIC-KEY CRYPTOGRAPHY		9			
19.	Principles of Public-key Cryptosystems	2	C	4	1
20.	The RSA algorithm	2	C,I	4	1
21.	Key management	1	C	4	1
22.	Diffie,Hellman key exchange	2	C,I	4	1
23.	Elliptic curve: Arithmetic, Elliptic Curve Cryptography	2	C,I	4	1
UNIT V: HASH FUNCTIONS AND CRYPTOGRAPHIC APPLICATIONS		10			
24.	MAC	1	C	4	1
25.	Hash Algorithms (MD5, SHA)	2	C,I	4	1
26.	Digital Signature Standard	2	C,I	4	1
27.	Applications pertaining to Encryption using different ciphers and modes,	3	I	5	3
28.	One-way hash algorithms.	2	I	5	3
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	William Stallings, "Cryptography and Network Security", 6th Edition, 2014, Pearson Education, ISBN: 9789332518773.
2.	AtulKahate , "Cryptography and Network Security", 2 nd Edition, 2009, McGraw Hill Education India Pvt Ltd, ISBN:100070151458.
3.	WebTutorial: http://www.cis.syr.edu/~wedu/seed/cryptography.html as on 14/04/2016

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
		X								X	X					
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
													X			
3	Broad area(for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
					X											
4	Staff coordinator															

15IT328E	PARALLEL PROGRAMMING USING OPENCL		L	T	P	C
			3	0	0	3
<i>Co,requisite:</i>	NIL					
<i>Prerequisite:</i>	15IT212J -Computer Organization and Architecture/15CS203 -Computer System Architecture					
<i>Data Book / Codes/Standards</i>	NIL					
<i>Course Category</i>	P	PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology					
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016					

PURPOSE	The main objective of this course is to explore the basic concepts of parallelism and to introduce OpenCL as a tool for writing parallel programming.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, students will be able to:							
1.	Identify parallelism in problems	a	c				
2.	Understand graphical processor unit's(GPU) architecture	i	j				
3.	Work with OpenCL SDK kit.	i	l				
4.	Learn how to optimize web based applications.	a					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION		9			
1.	Instruction Level Parallelism, Data Level Parallelism, Task Level Parallelism.	2	C	1	1,4
2.	Synchronization , Thinking Parallel	2	C	1	1,2
3.	Concurrency and Parallel Programming	1	C	1,3	1,2
4.	Introduction to OpenCL, Platform and Devices	2	C,I	1,2	1,2,3
5.	Execution environment , Memory Model and Writing Kernel	2	C,I	1,2	1,2,3
UNIT II: OpenCL DEVICE ARCHITECTURE		9			
6.	Super Scalar Execution ,SIMD and Vector Processing	2	C	2	1,2
7.	Multicore CPU	2	C	2	1,2
8.	GPU Architecture	3	C	2	1,2
9.	APU	2	C	2	1,2
UNIT III: OpenCL CONCURRENCY		9			
10.	Creating workgroups	2	C	2	1,2
11.	Queuing synchronization	2	C	2	1,2
12.	Global Synchronization	2	C	2	1,2
13.	Host side Memory model, Device side memory model.	3	C	2	1,2
UNIT IV: EXAMPLES		9			
14.	Simple Examples, Histogram	2	I	3	1,2
15.	Image Rotation, Convolution	3	I	3	1
16.	Producer, Consumer Problem	2	I	3	1
17.	Utility Functions	2	I	3	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT V: OpenCL ACCELERATION OF WEB APPLICATIONS		9			
18.	Programming and Synchronization with WebCL.	2	I	4	1
19.	Interoperability	1	C	4	1
20.	Example Application	2	C	3,4	1
21.	Security Enhancement	2	C	4	1
22.	WebCL on Servers	2	C	4	1
Total contact hours		45*			

Sl. No.	LEARNING RESOURCES
1.	David R. Kaeli, “Heterogeneous Computing with OpenCL2.0 “, 1 st Edition, 2015, Morgan Kaufman Publishers, ISBN: 13: 978,128014141.
2.	Benedict R. Gaster, Lee, Howes, “Heterogeneous computing with OpenCL”, 2011, Morgan Kaufman Publishers, ISBN,13: 9780123877666.
3.	Introduction to OpenCL Programming, Training Guide. http://developer.amd.com/tools-and-sdks/openc1-zone/openc1-resources/openc1-course-introduction-to-openc1-programming/ as on date 22/04/16, ISBN,13:978 - 0321749642
4.	David A. Patterson and John L. Hennessy, “Computer Organization and Design: The hardware/Software Interface”, 3 rd Edition, 2007, Morgan Kaufman Publishers, ISBN,13: 978,0124077263.

Course nature				Theory		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X		X						X	X		X		
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
													X		
4	Staff coordinator														

15IT329E	DATABASE ADMINISTRATION		L	T	P	C
			2	2	0	3
Co-requisite:	NIL					
Prerequisite:	15IT302J Database Management Systems					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL ELECTIVE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting , 23 rd July 2016					

PURPOSE	Database administration is a function of managing and maintaining database management systems software. This course includes the concepts that are used to improve the skills in managing the database and to make strong career as Database Administrator for challenging and critical environment.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the architecture of database			b			
2.	Install, create and maintain database.			c	i		
3.	Understand the backup and recovery concepts.			b			

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: OVERVIEW OF ORACLE AND PHYSICAL STRUCTURE		5			
1.	Oracle Database Architecture: Overview, Oracle Database Instance Configurations	1	C,I	1	1
2.	Connecting to the Oracle Database Instance Oracle Database Memory Structures	1	C,I	1	1
3.	Process Architecture	1	C	1	1
4.	Process Structures	1	C	1	1
5.	Process Startup Sequence, Database Storage Architecture	1	C	1	1
UNIT II:MANAGING THE DATABASE INSTANCE		5			
6.	Introducing Oracle Database Management Tools, Understanding the Enterprise Manager Management Framework, Logging in to Oracle Enterprise Manager Database Express	1	C,I	2	1
7.	Using Enterprise Manager Cloud Control, Using SQL*Plus, Using SQL Developer Initialization Parameter Files	1	C,I	2	1
8.	Configuring the Oracle Network Environment: Oracle Net Services Overview, Oracle Net Listener Overview, Establishing Oracle Network Connections	1	C,I	2	1

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
9.	Using the Listener Control Utility, Using Oracle Net Configuration Assistant, Using Oracle Net Manager, Using Enterprise Manager Cloud Control	2	C,I	2	1
UNIT III : ADMINISTERING USER SECURITY AND DATA CONCURRENCY		6			1
10.	Database User Accounts, Predefined Administrative Accounts, Creating a User, Authentication	1	C,I	2	1
11.	Unlocking a User Account and Resetting the Password, Privileges, Roles, Profiles	1	C,I	2	1
12.	Managing Data Concurrency: Overview of Locks	1	C,I	2	1
13.	Locking Mechanism	1	C,I	2	1
14.	Data Concurrency, DML Locks	1	C,I	2	1
15.	Enqueue Mechanism, Lock Conflicts	1	C,I	2	1
UNIT IV: MANAGING UNDO DATA		8			
16.	Undo Data Overview, Transactions and Undo Data	1	C,I	2	1
17.	Storing Undo Information, Comparing Undo Data and Redo Data	1	C,I	2	1
18.	Managing Undo, Configuring Undo Retention, Guaranteeing Undo Retention, Changing an Undo Tablespace to a Fixed Size	2	C,I	2	1
19.	Database Maintenance: Viewing the Alert History, Automatic Workload Repository (AWR)	1	C,I	2	1
20.	Statistic Levels	1	C	2	1
21.	Automatic Database Diagnostic Monitor (ADDM)	1	C	2	1
22.	Advisory Framework, Enterprise Manager and Advisors	1	C	2	1
UNIT V: BACKUP AND RECOVERY CONCEPTS		6			
23.	Categories of Failures, Flashback Technology	1	C	3	1
24.	Understanding Instance Recovery, Phases of Instance Recovery	2	C,I	3	1
25.	Using the MTTR Advisor	1	C	3	1
26.	Media Failure	1	C,I	3	1
27.	Configuring for Recoverability	1	C,I	3	1
Total Contact Hours		30*			
Tutorial Hours		30			

Sl.NO	LEARNING RESOURCES
1.	Biju Thomas, “Oracle Database 12c Administrator Certified Associate Study Guide”, Sybex, 1 st Edition, 2014, ISBN-13: 978–1118643952.
2.	Ian Abramson, Michael S. Abbey, Michael Corey, “Oracle Database 12C: Install, Configure and Maintain Like a Professional”, 1 st Edition, 2013, McGraw Hill Education (India) Private Limited, ISBN 978-9351343134.
3.	Darl Kuhn, “Pro Oracle Database 12c Administration”, 2 nd Edition, 2013, Apress, ISBN: 978-1-4302-5728-8.

Course nature					Theory +Tutorial	
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
			X	X						X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
						X									
4	Staff coordinator														

15IT330E	TEXT MINING	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15SE205J Programming in Java				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	Text mining is the analysis of data contained in natural language text. The application of text mining techniques is used to solve business problems. Text mining can help an organization derive potentially valuable business insights from text-based content such as word documents, email and postings on social media streams like Facebook, Twitter and LinkedIn. This course covers the techniques for interpreting and retrieving required information from large volume of unstructured texts.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Learn the concepts of Machine Learning	b				
2.	Know the concepts of Information Extraction	a				
3.	Understand the concepts of Information Retrieval	b				
4.	Understand and practice the concepts of Classification and Clustering	b				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : NATURAL LANGUAGE PROCESSING		9			
1.	Text Mining Overview	1	C	1	4
2.	Introduction to Natural Language Processing, Indian Languages	1	C	1	4
3.	Grammar, Syntax, Semantics, Discourse, Synthesis, Machine Translation	2	C	1	4
4.	Morphology, Stemmer	1	C,I	1	4
5.	Regular Expressions, Spell Checkers	2	C,I	1	4
6.	Text Summarization	1	C,I	1	4
7.	Question Answer System	1	C,I	1	4
UNIT II : INFORMATION EXTRACTION		9			
8.	Statistical Modeling	2	C	2	1
9.	Rule Based Extraction	1	C	2	1
10.	Hidden Markov Model, POS Tagger	2	C,I	2	1
11.	Conditional Random Field, CRF Address Parsers	2	C,I	2	1
UNIT III : INFORMATION RETRIEVAL		9			
12.	Precision and Recall	1	C	3	1
13.	Vector Space Models	1	C	3	1
14.	Feature Identification, Feature Selection, Term Document Matrix	1	C	3	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
15.	Principal Component Analysis, Dimension Reduction	2	C,I	3	1
16.	Latent Semantic Indexing, Plagiarism Detection	2	C,I	3	1
17.	Cross Language Retrieval, Query Expansion	2	C	3	1
UNIT IV : ALGORITHMIC TECHNIQUES		9			
18.	Probabilistic Models, Aspect Models	1	C	1	1
19.	Probabilistic Latent Semantic Indexing	2	C	1	1
20.	Expectation Maximization Algorithm	2	C	1	1
21.	Latent Dirichlet Allocation	2	C	1	1
22.	Document Classification	1	C,I	1	1
23.	Polysemy Keyword Retrieval	1	C,I	1	1
UNIT V : CLASSIFICATION		9			
24.	Classification:Naive Bayes Classifier, Support Vector Machines	2	C	4	1
25.	Neural Network	1	C	4	1
26.	Clustering: Agglomerative Clustering, Divisive Clustering, Distance Measures	2	C	4	1
27.	K - Means , K:-Nearest Neighbor	2	C	4	1
28.	Co-clustering, Fuzzy C-Means	1	C	4	1
29.	Taxonomy	1	I	4	1
Total Contact Hours		45*			

Si.No	LEARNING RESOURCES
1.	Charles.T.Meadow,Bert R Boyce,Donald H Karft, “Text Information Retrieval System”, 3 rd Edition, 2007, Emerald Group Publishing, ISBN: 0123694124
2.	DavidGrossman, OphirFrieder, ”Information Retrieval–Algorithms andHeuristics”, 2004, Springer, ISBN:1402030048
3.	StefanButtcher,Charles LA Clarke,Dordon. V.Cormack,”Information Retrieval, Implementing and evaluating Search Engine”, MIT Press, 2010, ISBN: 9780262026512
4.	TanveerSiddiqui, Tiwari,“Natural Language Processing and Information Retrieval”, 2008, Oxford University Press, ISBN: 0195692327
5.	Gerald Kowalski, Mary Maybury,”Information Storage and Retrieval Systems”, 2006, Springer, ISBN: 9780306470318

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a X	b X	c	d	e	f	g	h	I	j	k	l	m	n
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)		
													X		
3	BROAD AREA (FOR P ONLY)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
						X									
4	Staff coordinator														

15IT331E	COMPUTER GRAPHICS	L	T	P	C
		2	2	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , July 2016				

PURPOSE	This course is designed to provide a comprehensive knowledge to hardware and software principles of interactive raster graphics. The basic concepts of 2-D and 3-D modeling, transformations and rendering techniques are discussed.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Gain knowledge about graphics hardware devices and software used	i					
2.	Understand the two/three dimensional graphics and their transformations	i	a				
3.	Get knowledge about various object representation methods and visible surface detection methods	j					
4.	Understand clipping techniques and illumination and color models	j					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION		6			
1.	Graphics System Overview, Raster and Random scan systems	1	C	1	1,2
2.	Input, Output devices, Line drawing Algorithm-DDA	1	C	1	1,2
3.	Bresenhams Algorithms (Line), Midpoint Circle Algorithm	2	C	1	1,2
4.	Midpoint Ellipse Algorithm, Pixel addressing and Object geometry, filled area primitives	2	C	1	1,2
UNIT II : TWO DIMENSIONAL GRAPHICS		6			
5.	Geometric Transformations ,Matrix, Homogenous and Composite	1	C	2	1
6.	2D Viewing , pipeline and coordinate reference, window to viewport transformation	1	C	2	1
7.	2D Viewing function, Clipping , Point, Line-Cohen Sutherland, Liang Barsky, NLN	2	C,I	4	1,3
8.	Polygon Clipping-Sutherland Hodgeman, Weiler-Atherton, Curve, Text, Exterior Clipping	2	C,I	4	1,3
UNIT III : 3D CONCEPTS AND OBJECT REPRESENTATIONS		6			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
9.	3D Concepts & Object representation, Polygon surfaces and tables	2	C	3	1,3
10.	Plane equations and meshes, Curved line & surfaces	1	C	3	1
11.	Quadratic surfaces and Blobby objects, Spline representation	2	C	3	1
12.	Bezier and B-Spline Curves and surfaces	1	C	3	1,3
UNIT IV: 3D TRANSFORMATIONS AND VIEWING		6			
13.	3D geometric and modeling transforms, 3D Viewing, Viewing Pipeline	2	C	2	1
14.	Viewing Coordinates & Projections, 3D Clipping, Visible Surface Detection methods-Back face detection, Z-buffer method	2	C	2	1
15.	A-buffer method, Scan line method, Painter's algorithms, Area subdivision method, Octree, Ray casting method and BSP	2	C	3	1,3
UNIT V: ILLUMINATION AND COLOUR MODELS		6			
16.	Basic models of illumination	1	C	4	1
17.	Halftone and dithering techniques	1	C	4	1,2
18.	Properties of Light, RGB Color Model, YIQ, YIQ and CMY color model	2	C	4	1,3
19.	HSV and HLS color model, Color selection	2	C	4	1,3
Total Contact Hours		30*			
Tutorial Hours		30			

Sl. No.	LEARNING RESOURCES
1.	Donald Hearn & M. Pauline Baker, "Computer Graphics C Version", 2nd Edition, Pearson Education, 2010, ISBN 978-93-325-3587-9
2.	John F. Hughes, Andries Van Dam, Morgan McGuire, David F. Sklar, James D. Foley, Steven K. Feiner, Kurt Akeley, "Computer Graphics: Principles and Practice", 3rd Edition, Addison-Wesley Professional, 2013, ISBN13: 0785342399523
3.	Samit Bhattacharya, "Computer Graphics, 2015. Oxford University Press, ISBN13: 978-0-19-809619-1
4.	Peter Shirley, Michael Ashikhmin and Steve Marschner, "Fundamentals of Computer Graphics", 3rd Edition, 2009, ISBN13: 9781568814698
5.	http://www.programmingsimplified.com/c/graphics.h

Course nature					Theory +Tutorial	
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X								X	X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		X								X					
4	Staff coordinator														

15IT332E	SOFTWARE TESTING	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15IT311- System Integration and Architecture/ 15SE202-Software Engineering Principles				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	The course of software testing will help the students to develop better programming skills and test the programs efficiently. This course demonstrates an in-depth understanding of the tools and technologies for software testing. Hence the need for the course on software testing and its purpose are quite evident.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the basics of testing, debugging and errors.	a	m				
2.	Learn various methodologies of testing.	a	m				
3.	Understand and apply the concept of Graph theory.	h					
4.	Demonstrate the purpose of Test tool and automation.	l					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION		10			
1.	Purpose of testing, Dichotomies	1	C	1	2,3
2.	Model for testing, Consequences of bugs, Taxonomy of bugs	1	C	1	2,3
3.	Transactions and Flow testing: Basic concepts of path testing, predicates	1	C	2	3,4
4.	Path predicates and achievable paths	2	C	2	3,4
5.	Application of path testing	1	C,I	2	3,4
6.	Transaction flow testing techniques. Paths, path products and regular expressions	2	C	2	3,4
7.	Reduction procedure, applications, regular expressions and Flow anomaly detection	2	C	2	3,4
UNIT II : LOGIC AND DOMAIN TESTING		8			
8..	Domains and paths	1	C	1	2
9.	Nice and ugly domains, domain testing	1	C	1	2
10.	domain and interface testing	2	C	1	2,3
11.	Overview of logic based testing, decision tables	1	C	2	2,3
12.	Path expressions, kv charts	2	C,I	2	2,3
13.	Specifications	1	C,I	2	2,3
UNIT III : STATE, STATE GRAPHS AND TRANSITION TESTING		9			
14.	State graphs	1	C	3	1,2
15.	Good and bad state graphs, state testing	1	C	3	1,2

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
16.	Testability tips	1	C	3	1,2
17.	Graph matrices and application: Matrix of graph	2	C,I	3	1,2
18.	Relations, power of a matrix, node reduction algorithm	2	C,I	3	1,2
19.	Building tools, Exposure to JMeter, Winrunner	2	C,I	3	1,2
UNIT IV : BLACK BOX TESTING		9			
20.	System testing, Acceptance testing, Smoke testing	1	C	2	1,5
21.	Adhoc testing, Performance testing	1	C	2	1,5
22.	Regression testing, Test case design techniques	1	C,I	2	1,5
23.	Software test life cycle: Test plan, preparing Traceability matrix	1	C,I	2	1,5
24.	Writing test execution report, summary report	2	C,I	4	1,5
25.	Retrospect meeting, Defect tracking	2	C,I	4	1,5
26.	Preparing bug report using defect tracking tool	1	C,I	4	1,5
UNIT V : METRICS AND AUTOMATION		9			
27.	Scope of automation, Design and architecture for automation	2	C	4	1
28.	Process model, Challenges for automation	2	C,I	4	1
29.	Test metrics and measurements: Project metrics	2	C,I	4	1
30.	Progress metrics, Productivity metrics	2	C,I	4	1
31.	Test case developed per 100 hour of testing	1	C,D,I	4	1
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	Srinivisandesikan, Ramesh Gopalaswamy, “Software testing : Principles and Practices”, Pearson education , 2006, ISBN= 817758121X
2.	Borizbeizer,” Software testing techniques”, dreamtech, second edition, 2009, ISBN13: 978-0442206727
3.	William E. Perry,”Effective methods of software testing”, Second edition,. John wiley, 2000, ISBN13: 9780471354185
4.	GlenfordJ.Myers, Corey Sandler, Tom Badgett, “Art of software testing”,Johnwiley&sons, 2011, ISBN: 978-1-118-03196-4
5.	Boris Beizer, “Black-Box Testing: Techniques for Functional Testing of Software and Systems”, 1995, ISBN: 978-0-471-12094-0

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X							X				X	X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
													X		
4	Staff coordinator														

15IT340E	DATA WAREHOUSING AND DATA MINING	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	The purpose of this course on Data Warehousing and Data Mining is to make the students knowledgeable in the area of efficient information distribution , identification of unseen pattern in large volumes of data and understand various algorithms pertaining to the course of study.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Provide efficient distribution of information and easy access to data and user friendly reporting environment	i					
2.	Find the unseen pattern in large volumes of historical data that helps to manage an organization efficiently.	i	j				
3.	Understand the concepts of various data mining techniques	i	j				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : DATA WAREHOUSING		9			
1.	Data warehousing Components, Building a Data warehouse	2	C	1	1
2.	Mapping the Data Warehouse to a Multiprocessor Architecture, DBMS Schemas for Decision Support	3	C	1	1
3.	Data Extraction, Cleanup, and Transformation Tools, Metadata.	4	C,I	1	1
UNIT II : BUSINESS ANALYSIS		9			
4.	Reporting and Query tools, Applications ,Tool Categories	2	C	2	1
6.	The Need for Applications, Cognos Impromptu ,Online Analytical Processing (OLAP)	2	C,I	2	1
7.	Multidimensional Data Model , OLAP Guidelines, Multidimensional versus, Multirelational OLAP	3	C,I	2	1
8.	Categories of Tools, OLAP Tools and the Internet.	2	C,I	2	1
UNIT III : DATA MINING		9			
9.	Introduction, Data, Types of Data, Data Mining Functionalities	3	C	3	2,3
10.	Interestingness of Patterns , Classification of Data Mining Systems, Data Mining Task Primitives	2	C,I	3	2,3

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
11.	Integration of a Data Mining System with a Data Warehouse, Issues	2	C,I	3	2,3
13.	Data Preprocessing	2	C,I	3	2,3
UNIT IV : ASSOCIATION RULE MINING AND CLASSIFICATION		9			
14.	Mining Frequent Patterns, Associations and Correlations , Mining Methods, Mining various Kinds of Association Rules	2	C,I	3	2,3,4
15.	Correlation Analysis, Constraint Based Association Mining, Classification and Prediction	2	C,I	3	2,4
16.	Basic Concepts Decision Tree Induction, Bayesian Classification, Rule Based Classification, Classification by Back propagation	2	C,I	3	2,4
17.	Support Vector Machines ,Associative Classification, Lazy Learners, Other Classification Methods	2	C,I	3	2,5
18.	Prediction	1	C	3	2,4
UNIT V : CLUSTERING AND TRENDS IN DATA MINING		9			
19.	Cluster Analysis, Types of Data , Categorization of Major Clustering Methods , K-means	3	C	3	2,5,6
20.	Partitioning Methods ,Hierarchical Methods ,Density-Based Methods, Grid Based Methods	3	C,I	3	2,6
21.	Model-Based Clustering Methods , Clustering High Dimensional Data ,Constraint , Based Cluster Analysis , Outlier Analysis , Data Mining Applications. Case studies based on Data Mining Tool	3	C,I	3	2,6
Total Contact Hours		45 ^{**}			

Sl. No.	LEARNING RESOURCES
1.	Alex Berson and Stephen J. Smith, “ Data Warehousing, Data Mining & OLAP”, Thirteenth Reprint 2008, Tata McGraw – Hill Edition, ISBN: 978-0070587410
2.	Jiawei Han and MichelineKamber, “Data Mining Concepts and Techniques”, Third Edition, Elsevier, 2012, ISBN:9780123814791
3.	Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “ Introduction To Data Mining”, Person Education.2007, ISBN: 978-0321321367
4.	K.P. Soman, ShyamDiwakar and V. Ajay “, Insight into Data mining Theory and Practice”, 2006, Easter Economy Edition, Prentice Hall of India, 2006, ISBN:978-8120328976

Sl. No.	LEARNING RESOURCES
5.	G. K. Gupta, “ Introduction to Data Mining with Case Studies ”, Easter Economy Edition, Prentice Hall of India, ISBN : 9788120343269
6.	Daniel T.Larose, “Data Mining Methods and Models”, Wiley-Interscience, 2006, ISBN: 978-0471666561

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X	X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
						X									
4	Staff coordinator														

15IT341E	ENTERPRISE RESOURCE PLANNING	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	E PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	This course provides a better understanding of how ERP system used to achieve higher levels of integration and improve customer relationships and the supply chain's overall efficiency.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	To understand the components and modules of ERP System	l				
2.	To obtain Knowledge in development and significance of ERP Systems	b				
3.	To understand the business benefits of ERP System	k				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION		9			
1.	ERP systems: An Introduction	1	C	1	1
2.	Need for Enterprise Resource Planning System	1	C	1	1
3.	Evolution of ERP, Role of ERP in business	2	C	1	1
4.	Advanced ERP systems, SCM, CRM	1	C	1	1
5.	ERP and E-Commerce: A concept; ERP and e-commerce Applications	2	C	1	1
6.	ERP Architecture: Evolution of ERP Architecture	1	C	1	1
7.	Types of ERP Architecture	1	C	1	1
UNIT II : ERP IMPLEMENTATION		9			
8.	Knowledge of Software Development	1	C,D	2	1
9.	System Development Life Cycle	2	C,D	2	1
10.	Life Cycle: ERP implementation Life Cycle	2	C	2	1
11.	Vendors and Consultants	2	C	2	1
12.	Data Migration, Project Management Success and Failure Factors of an ERP Implementation	2	C	2	1
UNIT III : ERP AND BUSINESS PROCES REENGINEERING		9			
13.	Business Process Reengineering	1	C	2	1
14.	Data Collection Methods; Implementation Process and Strategies	2	C,D	2	1
15.	Related Technologies and ERP; OLAP, Data Mining Business Intelligence	2	C	2	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
16.	Integration of Related Technologies with ERP	2	C,D	2	1
17.	ERP in Action: Operation and Maintenance of the ERP System, Maximizing the ERP System	2	C,D	2	1
UNIT IV : ERP MARKET		9			
18.	Marketplace, Dynamics	1	C	3	3
19.	SAP AG, Oracle, PeopleSoft	2	C	3	3
20.	JD Edwards, QAD Inc	2	C	3	3
21.	SSA Global, Lawson Software	2	C	3	3
22.	Epicor; Intuitive	2	C	3	3
UNIT V : ERP PRESENT AND FUTURE		9			
23.	Enterprise Application Integration	1	C	3	3
24.	ERP and E-Business	2	C	3	3
25.	ERP II	2	C	3	3
26.	Total quality management : Future Directions	2	C	3	3
27.	Trends in ERP	2			
Total Contact Hours		45*			

LEARNING RESOURCES

1.	Alexis Leon, “ERP Demystified”, 2 nd Edition, Tata McGraw Hill, 2008, ISBN: 978-1259005923
2.	D P Goyal,”Enterprise Resource Planning”, Tata McGraw-Hill Education, 2011, ISBN: 978-1259026003
3.	Jim Mazzullo,”SAP R/3 for Everyone”, Pearson, 2007, ISBN:978-0131860858

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
			X									X	X		
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
								X							
3	Broad Area(for P Only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
								X							
4	Staff coordinator														

15IT342E	MANAGEMENT INFORMATION SYSTEMS	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	This course is intended to make the IT professionals to learn the intricacies of business and the role of information systems in business						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the basic functioning of organizations and the importance of information system in the management of organizations	g					
2.	Identify, Plan and Manage IT infrastructures	c					
3.	Recognize the core information system applications required for improved performance, effective decision making and business excellence	k					
4.	Acquire knowledge to build and manage projects required for a digital firm and integrate into existing environment	l					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : ORGANIZATIONS, MANAGEMENT AND NETWORKED ENTERPRISE		9			
1.	Introduction	1	C	1	1
2.	Globalization Challenges and Opportunities	1	C	1	1
3.	Emerging digital firm	1	C	1	1
4.	Perspectives of Information Systems	1	C	1	1
5.	Business processes and Information systems	1	C	1	1
6.	Types of Information systems	1	C	1	1
7.	Systems for Collaboration and Teamwork	1	C	1	1
8.	Organization: Social Issues in Information Systems	2	C	1	1
UNIT II : INFORMATION TECHNOLOGY INFRASTRUCTURE		9			
9.	IT Infrastructure; Components	1	C	2	1
11.	Hardware and Software platform trends	1	C	2	1
12.	Management Issues	2	C	2	1
13.	Foundations of business Intelligence	2	C	2	1
14.	Telecommunications, Internet and Wireless Technology	2	C	2	1
15.	Securing Information Systems	1	C	2	1
UNIT III : KEY SYSTEM APPLICATIONS FOR DIGITAL AGE		9			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
16.	Enterprise Systems	1	C	3	1
17.	Supply chain management	1	C	3	1
18.	CRM	1	C	3	1
19.	Enterprise applications	1	C	3	1
20.	E-commerce and Mobile E-commerce	1	C	3	1
21.	Managing Knowledge; Intelligent techniques	2	C	3	1
22.	Decision Making	1	C	3	1
24.	Business Intelligence in the enterprise	1	C	3	1
UNIT IV : BUILDING AND MANAGING SYSTEMS		9			
25.	Building Information Systems	1	C	4	1
26.	Overview of system development	1	C	4	1
27.	System building approaches	2	C	4	1
28.	Development for the digital firm	1	C	4	1
29.	Establishing business value of Information Systems	1	C	4	1
30.	Managing Projects and its risks	2	C	4	1
31.	Managing global systems	1	C	4	1
UNIT V : CASE STUDIES		9			
32.	IPL team strike gold with Information Technology	1	C	1	1
33.	Collaboration and Innovation at Procter and Gamble	1	C	1	1
34.	Best digital strategy followed by mobile network providers	1	C	2	1
35.	Behavioral targeting and your privacy	1	C	2	1
36.	The Terror watch list database troubles continue	2	C	3	1
37.	You're on Social Media: Watch out	1	C	3	1
38.	Are we Ready for Cyber warfare?	1	C	4	1
39.	Are Medical records a cure for healthcare?	1	C	4	1
Total Contact Hours		45*			

LEARNING RESOURCES

1.	Kenneth C. Laudon , Jane P.Laudon, “Management Information Systems- Managing the Digital Firm”,12 th Edition, Pearson, 2012; ISBN: 0136078463
2.	Alexis Leon, “Enterprise Resource Planning”, 2 nd Edition, Tata McGraw Hill Publishing , 2005, ISBN: 0070656802
3.	Raymond Meleod, JR,” Information Systems –“, 4 th Edition, MacMillan Publishing, 2012, ISBN: 978-0131889187
4.	Gerald V.Post, David L. Anderson, “Management Information System- Solving Business Problems with Information Technology” , Tata McGraw Hill Publishing, 2012, ISBN: 978-0072823752
5.	GordanB.Davis,MargretteH.Olsan, “Management Information System, Conceptual Foundations, Structure & Development “,2 nd Edition , Tata McGraw Hill, 2012, ISBN-13: 978-0070158283

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
				X				X				X	X		
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
						X									
4	Staff coordinator														

15IT343E	MULTIMEDIA TOOLS AND APPLICATIONS	L	T	P	C
		2	2	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting ,23 rd July 2016				

PURPOSE	This course provides the knowledge about the hardware and software tools in multimedia, creating graphics and animations using Flash and to make well-designed web pages using Dreamweaver.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Gain knowledge about multimedia hardware components	j				
2.	Understand the necessity of various software tools in making multimedia	j				
3.	Obtain knowledge in making 2D graphics and animation using Flash	i				
4.	Gain basic knowledge in making web pages using Dreamweaver	i				

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION		6			
1.	Introduction : Multimedia skills	1	C	1	1
2.	Multimedia hardware components: Mac and Windows systems	2	C	1	1
3.	Memory and Storage devices, Input and Output devices	2	C	1	1
4.	Communication devices	1	C	1	1
UNIT II: MULTIMEDIA TOOLS		6			
5.	Basic Software Tools: Text, Image and Sound Editing tools: Painting and Drawing tools. Animation tools: Making instant multimedia: Office suite	2	C,D,I	2	1
6.	Multimedia Authoring tools: Types, Card and Page based Authoring tools	2	C,I	2	1
7.	Icon and Time based Authoring tools	2	C,D	2	1
UNIT III : INTRODUCTION TO FLASH		6			
8.	Managing Window and Panels	1	C,I	3	2
9.	Creating objects using the primary drawing tools, choosing and applying colors	2	C	3	2
10.	Working with text	1	C	3	2
11.	Modifying graphics ,Using symbols and instances	2	C	3	2
UNIT IV: ANIMATION USING FLASH		6			
12.	Creating animation and effects and techniques, frames and layers	2	C,I	3	2

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
13.	Integrating media files with flash	2			
14.	Adding sound, importing artwork embedding video, Working with 3D Graphics.	2	C,I	3	2
UNIT V: DREAMWEAVER		6			
15.	Working with tools, working with text ,Inserting Images , Using basic HTML in Dreamweaver, Adding Text to web pages, Inserting Images to web pages	2	C,D	4	3
16.	Setting up tables using frame & forms, adding multimedia elements to Dreamweaver	2	C,D,I	4	3
17.	Building style sheets using webpage working with layers ,Working with timelines , Enhancing web site management and workflow in Dreamweaver.	2	C,D	4	3
Total Contact Hours		30*			
Tutorial Hours		30			

Sl. No.	LEARNING RESOURCES
1.	Tay Vaughan, “MULTIMEDIA : Making it Work”, 8 th Edition, TMH, 2011, ISBN: 978-0071748469
2.	Robert Reinhardt& Dowd, “Flash CS4 Professional Bible”, 1 st Edition, Wiley publication , 2009,ISBN : 978-0470379189
3.	Joseph W Lowery ,”Adobe CS5 Bible Dream weaver Bible”, 1 st Edition, Wiley publication, 2010,ISBN: 978-0-470-58586-3

Course nature					Theory +Tutorial	
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
										X	X					
2	Category	GENERAL(G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies			
		X								X						
4	Staff coordinator															
15IT344E			DIGITAL AUDIO AND COMPUTER MUSIC										L	T	P	C

		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	The main purpose of this course is to understand and analyse digital audio and speech.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Understand the basic concepts of digital audio and speech	j				
2.	Gain knowledge about speech analysis and classification	j				
3.	Understand MIDI and audio usage in web	i				
4.	Understand audio signal processing and product manufacturing	i				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION		9			
1.	Digital Audio, Audio Processing	2	C	1	2
2.	Handling audio in MATLAB	2	I	1	2
3.	Segmentation, Visualization	1	C	1	2
4.	Sound Generation	2	C	1	2
5.	Speech: Production, Characteristics of Speech, Speech Understanding	2	C	1	2
UNIT II : HEARING COMMUNICATION AND AUDIO ANALYSIS		9			
6.	Psychoacoustics, Amplitude and Frequency models	2	C	2	2
7.	Auditory Scene Analysis	2	D	2	2
8.	Speech Communication , Quantisation , Parameterisation	3	C	2	2
9.	Audio Analysis , Analysis Toolkit , Speech Analysis and Classification	2	D	2	2
UNIT III : DIGITAL AUDIO		9			
10.	Digital Audio Technology	3	C	1	1
11.	Digital Audio Workstation	3	C	1	1
12.	Groove Tools and Techniques	3	I	1	1
UNIT IV : MIDI AND AUDIO IN WEB		9			
13.	MIDI and Electronic Music Technology	2	C	3	1
14.	Multimedia and the Web	2	C	3	1
15.	Synchronization	2	C	3	1
16.	Amplifiers	3	C	3	1
UNIT V : SIGNAL PROCESSING		9			
17.	Signal processing	2	C	4	1
18.	Noise Reduction	1	C	4	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
19.	Surround Sound	2	C	4	1
20.	Product Manufacturing	2	D	4	1
21.	Studio Tips and tricks	2	I	4	1
	Total Contact Hours	45*			

Sl.No	LEARNING RESOURCES
1.	David Miles Huber and Robert E.Runstein, “Modern Recording Techniques”- 7th Edition, 2009, Focal Press, ISBN: 978-0-240-81069-0.
2.	Ian McLoughlin, “Applied Speech and Audio Processing with MATLAB”Example, 2009,Cambridge University Press, ISBN-13 : 978-0-521-13283-1.
3.	Francis Rumsey and Tim McCormick, “Sound and Recording”-6th EditionFocal Press, 2009, ISBN: 978-0-24-052163-3.
4.	Michael Talbot and Smith, “Sound Engineering Explained”, 2/e, 2001, Focal Press (Original ISBN:0-240-51667-2, Indian Reprint ISBN-13: 978-81-312-0820-5.

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
										X	X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies			
										X						
4	Staff coordinator															

15IT345E	LINUX INTERNALS	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15IT314J- PRINCIPLES OF OPERATING SYSTEMS/ 15CS201J DATA STRUCTURES				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	This course enables the student to understand the kernel- buffers and file representation, process control and scheduling and memory management policies in Unix.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the kernel structure of Unix operating system	k					
2.	Understand the concepts of buffers and file system internal structures	j					
3.	Understand the concepts of process structure and process scheduling	j					
4.	Understand the concepts of kernel memory management policies	j					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION TO UNIX KERNEL		6			
1.	History and system structure , user perspective and operating system services	2	C	1	1
2.	Kernel architecture of Unix	1	D	1	1
3.	Unix system concepts	2	D,I	1	1
4.	Kernel data structure and system administration	1	C	1	1
UNIT II : FILE REPRESENTATION INTERNALS AND SYSTEM CALLS		11			
5.	Introduction to file system algorithms and inodes	1	C	2	1
6.	Structure of a regular file: context of inode	1	C,D	2	1
7.	Directories and super blocks, path name to inode conversion	1	C	2	1
8.	Introduction to system calls and algorithms	2	C,D	2	1
9.	System calls: open and read, write and close.	3	C	2	1
10.	Mounting file systems, crossing mount point file paths, unmounting file systems and file system maintenance.	3	C	2	1
UNIT III : KERNEL BUFFER CACHE		6			
11.	Buffer headers	1	C	2	1
12.	Structure of buffer pool	1	I	2	1
13.	Buffer retrieval scenarios	1	C,D	2	1
14.	Reading and writing disk blocks	1	C	2	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
15.	Buffer cache implementations and analysis	2	C,I,O	2	1
UNIT IV: PROCESS STRUCTURE, SCHEDULING, CONTROL AND MEMORY MANAGEMENT		13			
16.	Structure of process: process states and transitions	1	C	3	1
17.	System memory layout	2	C,D,I	3	1
18.	Context of a process, introduction to process control and creation	2	C	3	1
19.	Signals	1	C,I	3	1
20.	System boot and init process, process scheduling	3	C	3	1
21.	Terminal drivers	1	C	3	1
22.	Memory management policies: swapping , memory management policies: demand paging	3	C,I	3	1
UNIT V: MULTI PROCESS AND DISTRIBUTED UNIX SYSTEM		9			
23.	Introduction to multi process systems, master and slave processors	2	C	3	1
24.	Tunis system and performance, distributed Unix system : satellite processors	3	C	3	1
25.	Newcastle connection	2	C	3	1
26.	Transparent distributed file system, distributed file system : stub process	2	C	3	1
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	Maurice J.Bach, The Design of the UNIX Operating System, Pearson Education 1990. ISBN 13: 9780132017572.
2.	UreshVahalia, UNIX Internals: The New Frontiers, Pearson Education 2003, ISBN-13: 978-0131019089
3.	Behrouz A. Forouzan, UNIX and Shell Programming, Cengage Learning 2009, ISBN-13: 978-0534391553
4.	https://www.arm.com/resources/education/education-kits
5.	http://www.cs.sfu.ca/~ggbaker/reference/unix/ as on Date 26 -04-2016
6.	http://www.tutorialspoint.com/unix/unix-getting-started.htm as on Date 26 -04-2016
7.	http://www.tutorialspoint.com/unix/unix-useful-commands.htm as on Date 26 -04-2016
8.	http://www.ee.surrey.ac.uk/Teaching/Unix/ as on Date 26 -04-2016

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Excluding Assessment Hours															
Course Designed by		Department of Information Technology													
1	Students	a	b	c	d	e	f	g	h	I	j	k	l	m	n

	Outcome									X	X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)		ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
										X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies	
													X	
4	Staff coordinator													

15IT355E	COMPUTER ANIMATION: ALGORITHMS AND TECHNIQUES	L	T	P	C
		2	2	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	The purpose of the course is to make students study the algorithms and programming techniques for 2-D and 3-D animation.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the two dimensional graphics and their transformations	i					
2.	Understand the three dimensional graphics and their transformations	i					
3.	Gain knowledge on graphics hardware devices	i					
4.	To understand 2D and 3D animation techniques	m					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION		6			
1.	Survey of computer graphics	1	C	3	2
2.	Overview of graphics systems ,Video display devices, Raster scan systems, Random scan systems, Graphics monitors and Workstations, Input devices, Hard copy Devices, Graphics Software	2	C	3	2
3.	Output primitives, points and lines, line drawing algorithms, Loading the frame buffer, line function, circle and ellipse generating algorithms	2	C	3	2
4.	Pixel addressing and object geometry, filled area primitives	1	C	3	2
UNIT II : 2D GRAPHICS AND 3D GRAPHICS		6			
5.	Two dimensional geometric transformations, Matrix representations and homogeneous coordinates.	2	C	1	2
6.	Composite transformations , Window-to-viewport coordinate transformation, Three dimensional object representations, Polygon surfaces, Polygon tables, Plane equations, Polygon meshes	2	C	1	2
7.	Curved Lines and surfaces, Quadratic surfaces, Blobby objects, Spline representations, Bezier curves and surfaces	2	C	2	2
UNIT III : FUNDAMENTALS OF ANIMATION		6			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
8.	Animation production, history of animation, Technical Background: display pipeline	2	C	4	1
9.	Homogeneous coordinates and transformation matrix, Compounding transformation, basic transformation	2	D	4	1
10.	Extracting Transformations, Description of Transformations in the Display Pipeline, Orientation Representation	2	D	4	1
UNIT IV : ANIMATION TECHNIQUES		6			
11.	Interpolation and Basic Techniques: controlling the motion along a curve, Path following, key frames	1	D	4	1
12.	Animation languages, deforming objects	2	C	4	1
13.	Morphing, 3Dshape interpolation	1	D	4	1
14.	Natural Phenomena: Plants , water, Gaseous Phenomena	2	C	4	1
UNIT V : ADVANCED ALGORITHMS		6			
15.	Kinematic Modelling, Rigid Body Simulation, Enforcing Soft and Hard Constraints	2	I	4	1
16.	Controlling Groups of Objects, Implicit Surfaces	2	D	4	1
17.	Modelling and Animating ,Articulated Figures: Reaching and Grasping, Walking, Facial Animation	1	C	4	1
18.	Overview of Virtual Human Representation, Motion Capture	1	I	4	1
	Total Contact Hours	30*			
	Tutorial Hours	30			

Sl. No.	LEARNING RESOURCES
1.	Rick Parent, “ <i>Computer Animation: Algorithms and Techniques</i> ” , MorganKaufmann Publishers, 2012, ISBN: 1-55860-579-7
2.	Donald Hearn & M. Pauline Baker ,WarrenCarithers, “ <i>Computer Graphics With OpenGL</i> ”, 4thEdition, Pearson Education, 2010, ISBN: 0-13-015390-7
3.	John F. Hughes, Andries van Dam , Morgan McGuire ,David F. Sklar , JamesD. Foley, Steven K. Feiner, Kurt Akeley,” <i>Computer Graphics: Principles andPractice</i> ” Addison-Wesley Professional, 3 rd Edition, 2013, ISBN: 978-0-321-39952-6
4.	http://www.w3schools.com/css/css3_animations.asp as on 25 th April, 2016.
5.	http://www.tutorialspoint.com/computer_graphics/computer_animation.htm as on 25 th April, 2016.

Course nature				Theory +Tutorial		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X				X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
		X								X					
4	Staff coordinator														

15IT356E	DATA COMPRESSION	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	The purpose of this course is to provide the students with the skills required to learn and create compression techniques and algorithms. Data compression techniques and technology are ever-evolving with new applications in image, speech, text, audio and video. This course also enables the students how to evaluate and choose data compression methods.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand and apply data compression techniques	a					
2.	Understand more about Huffman coding and arithmetic coding	i					
3.	Discuss about Image, video, audio and text compression methods	j					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION		7			
1.	Introduction to data compression	1	C	1	1,2
2.	Compression techniques: lossless compression, lossy compression	1	C	1	1
3.	Measures of performance: Modeling and coding	2	C	1	1,2
4.	Basic techniques-statistical methods: Shannon-Fanocoding.	3	C	1	1,2
UNIT II : HUFFMAN CODING AND ARITHMETIC CODING		9			
5.	Huffman coding algorithm: Length, extended Huffman codes, Adaptive coding	2	C	2	1,3
6.	Comparison of Huffman and Arithmetic Coding	2	C	2	1
7.	Image Compression-JPEG, DPCM	2	C	2	1,3
8.	Hilbert scan and VQ, Cell encoding	3	C	2	1,3
UNIT III : VIDEO AND AUDIO COMPRESSION		9			
9.	Digital Video and video compression	2	C	2	1
10.	MPEG, MPEG-4	3	C	2	1,2,3
11.	Digital Audio, Human auditory systems	3	C	2	1
12.	ADPCM audio compression	2	C	2	1,2
UNIT IV: QUANTIZATION AND ENCODING		11			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
13.	Scalar quantization, adaptive quantization, non uniform quantization	2	C	3	1
14.	Vector quantization, structured vector quantizers	2	C	3	1,2
15.	Differential encoding, adaptive DPCM	2	C	3	1
16.	Delta modulation, speech coding, image coding	2	C	3	1,3
17.	Preliminaries for losses compression	2	C	3	1
UNIT V: COMPRESSION METHODS		9			
18.	Symbol ranking, Sparse strings	2	C	3	1,3
19.	Word based text compression	2	C	3	1
20.	Textual, image compression	2	C	3	1,3
21.	Dynamic Markov coding	2	C	3	1
22.	FHM curve compression	1	C	3	1,3
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	David Salomon, "Data Compression, The Complete Reference", 3rd Edition, Springer International Edition, 2007, ISBN-10: 1846286026, ISBN-13: 978-1846286025
2.	Mark Nelson, "The Data Compression Book", 2nd Edition, 1995, BPB publications, ISBN-10: 1558514341, ISBN-13: 978-1558514348
3.	Khalid Sayood, "Introduction to Data Compression", 4th Edition, 2012, Academic Press, ISBN-10: 0124157963, ISBN-13: 978-0124157965

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X								X	X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
						X									
4	Staff coordinator														

15IT357E	ENGINEERING ECONOMICS AND FINANCIAL MANAGEMENT	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	The course is intended to provide basic understanding of Economics to engineering students. This course also covers primary and secondary market.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	To impart knowledge, with respect to concepts, principles and practical applications of Economics	g				
2.	To understand the various economic barriers and to develop a growth plan to the nation	g				
3.	To Understand how to invest in market	h				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION TO ECONOMICS		9			
1.	Definitions ,Nature and Scope	1	C	1	1
2.	Difference between Microeconomics and Macroeconomics	2	C	1	1
3.	Theory of Demand and Supply	2	C	1	1
4.	Laws of variable proportions and law of returns to scale Cost	2	C	1	1
5.	Break even analysis; meaning, explanation, numerical	2	C	1	1
UNIT II: BASIC ECONOMIC PROBLEMS		9			
6.	Basic economic problems	1	C	2	1
7.	Poverty meaning, absolute & relative poverty, causes, measures to reduce	2	C	2	1
8.	Unemployment: meaning, types, causes, remedies Inflation; meaning, types, causes, measures to control	1	C	2	1
9.	Economic Indicators, GDP (Gross Domestic Product)	1	C	2	1
10.	M2 (Money Supply)	1	C	2	1
11.	Consumer Price Index (CPI), Producer Price Index (PPI)	1	C	2	1
12.	Consumer Confidence Survey Current Employment Statistics (CES)	1	C	2	1
13.	CASE STUDY	1	D	2	1
UNIT III : SECURITIES MARKET IN INDIA		9			
14.	Introduction	1	C	3	2
15.	Products, Participants And Functions	2	C	3	2

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
16.	Securities Market And Financial System	2	C	3	2
17.	Derivatives Market	2	C	3	2
18.	Regulatory Framework	2	C	3	2
UNIT IV: PRIMARY AND SECONDARY MARKET		9			
19.	Primary Market Design	1	C	3	2
20.	Secondary Market Design	1	C	3	2
21.	Trading	2	C	3	2
22.	Clearing And Settlement	1	C	3	2
23.	Risk Management	2	C	3	2
24.	Market Index	2	C	3	2
UNIT V: DERIVATIVES MARKET		9			
25.	Derivatives System	1	C	3	2
26.	Futures and Options	2	C	3	2
27.	Trading System	2	C	3	2
28.	Clearing And Settlement	2	C	3	2
29.	Margining	2	C	3	2
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	R.Paneerselvam, "Engineering Economics", 2 nd Edition, PHI publication, 2013, ISBN:978-81-203-4837-0
2.	Bodie, Kane, Marcus, "Essentials of Investments" 9 th edition, , PHI publication, 2013, ISBN 9780078034695
3.	Robert J. Shiller, "Introduction: Finance, Stewardship, and Our Goals in Finance and the Good Society", Princeton University Press, 2012, ISBN: 9780691154886
4.	Frank J. Fabozzi, "The Handbook of Fixed Income Securities", 8 th Edition, 2012, McGraw-Hill Professional, ISBN-13: 978-0071768467

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
								X	X							
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area(For P Only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies				
						X										
4	Staff coordinator															

15IT358E	ADVANCED JAVA PROGRAMMING AND TECHNOLOGY	L	T	P	C
		2	2	0	3
<i>Co:requisite:</i>	NIL				
<i>Prerequisite:</i>	15SE205J Programming in Java				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	This course would inculcate the skills required to develop next generation GUI development using Java FX Technology. This course would also enable students to design and develop JEE based enterprise web applications using Servlet, JSP and JSF Technologies for developing dynamic web pages and for programming for persistent data storage.
----------------	---

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES					
At the end of the course, student will be able to							
1.	Acquaint themselves with GUI programming with JavaFX Java's next generation graphical user interface (GUI)	i					
2.	Develop database applications with Java	k					
3.	Learn server side programming with Sevlets and JSP for designing and implementing dynamic web projects	j					
4.	Apply Knowledge of Socket Programming and develop networking applications	j					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : JAVA FX TECHNOLOGY FOR RICH CLIENT APPLICATIONS		5			
1.	Java FX Architecture: JavaFX8 application structure, using pure java code ,using FXML.Application, scene and stage. Tools for development Scene Builder, Netbeans 8, Eclipse(Fx)	2	C	1	1,4
2.	FXML and Scene builder: MVC approach, FXML controller, Layout , Builtin UI controls ,applying CSS to UI controls	2	D	1	1,4
3.	Lambda expressions: Functional interfaces, Properties and Binding, Lambda to handle events	1	C	1	1,4
UNIT II : JAVA FX ADVANCED CONCEPTS		7			
4.	Animation and visual effects: Working with images	1	C,I	1	1,4
5.	Custom UI, Charts: Theme, custom controls, pie and line charts with event handling	2	D,I	1	1,4
6.	Java FX media: Media Events, Playing audio, Playing video	2	C,I	1	1,4
7.	Java FX 3D: 3D basic scenes in java FX	1	C	1	1,4

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
8.	Java FX on Web: Web Engine, Viewing HTML content in Web View, Web Events	1	I	1	1,4
UNIT III : JAVA DATABASE CONNECTIVITY TECHNOLOGY:JDBC TECHNOLOGY, JAVA PERSISTENCE API		7			
9.	Database Architecture : Components of JDBC – Exploring JDBC Drivers ,Connection Establishment, Processing SQL query with Statements and fetching results with Result set, Result set meta data, Handling SQL Exceptions	3	C,I	2	2,4
10.	Advanced JDBC concepts: PreparedStatement interface ,Callable statement interface,executing batch updates, handling BLOB and CLOB objects	2	C,I	2	2,4
11.	Java persistence API: Architecture, ORM components, Entity and its life cycle, managers, JPQL, Entity Relationship, Advanced mapping	2	C,I	2	2,4,6
UNIT IV: JAVA SERVER SIDE PROGRAMMING TECHNOLOGY IN WEB		5			
12.	Overview of JSP 2.3 and Servlet 3.1: Servlet container, creating dynamic web pages using JSP and servlets	1	C	3	2,5
13.	Servlet Basics: Servlet Lifecycle, Deploymentdescriptor, ServletConext,ServletConfig,Request dispatcher, Send redirect and Forward.	1	C	3	2,5
14.	JSP basics: Difference between JSP and servlets.JSP expressions, scriptlets,declarations,directives and action	1	C,I	3	2,5
15.	Advanced topics: Cookies and Session tracking,Servlet Filters, Java beans, Expression Language 3.0, Standard tags JSTL 1.2, custom tags,Event handling, Asynchronous Servlet	1	C,I	3	2,5
16.	Model View Controller : MVC pattern with JSP and Servlets	1	D,I	3	2,5
UNIT V: JAVA SERVER FACES TECHNOLOGY		6			
17.	JSF 2.2 Introduction: Installation and setup,Architecture,JavaServer Faces Implementation of MVC,The JSF Lifecycle, JavaServer Faces userinterface components	2	C	4	3
18.	JSF Programming: HTML5 and JSF2.2,Managed beans, JSF Expression language, Handling GUI and Events, Validating user input,JSF and AJAX integration	2	C,I	4	3
19.	Advanced Topics: CustomComponents,Facelets, Introduction to Prime Faces	2	C,I	4	3
Total Contact Hours		30*			

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
	Tutorial Hours			30	

Sl. No.	LEARNING RESOURCES
1.	Carl Dea, Mark Heckler, GerritGrunwald, José Pereda, Sean Phillips “JavaFX 8: Introduction by Example” 2nd Edition 2014, Apress, ISBN13: 978-1-4302:6460:6
2.	Kogent Learning Solutions Inc “Java Server Programming Java EE 7 (J2EE 1.7), Black Book” 2015, dreamtechpress, ISBN: 13: 9789351194170
3.	AnghelLeonard,”MasteringJavaServer Faces 2.2” , June 2014, Packt Publishing, ISBN: 9781782176466
4.	Paul Deital,HarveyDeital,”Java How to Program. “10 th Edition,2015, Pearson, ISBN:10: 0133813436 / ISBN:13: 9780133813432
5.	http://pdf.coreservlets.com/ as on date21.4.2016
6.	https://docs.oracle.com/javase/tutorial/as on date 21.4.2016

Course nature				Theory +Tutorial		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X	X	X			
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)		
													X		
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		X													
4	Staff coordinator														

15IT359E	LINUX ADMINISTRATION	L	T	P	C
		2	2	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting ,July 2016				

PURPOSE	To provide knowledge on various theoretical and technical aspects of Linux basics and server administration.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	To Learn the basics of Linux system administrative tasks			i			
2.	To perform the Linux file systems management and various server management			k			

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
UNIT I: MANAGING FILES FROM COMMAND LINE		6			
1.	Linux file system hierarchy	1	C	1	2
2.	Locating files and directories by Name	1	C	1	2
3.	Linux file system default permissions and access	1	C,I	1	2
4.	Managing Linux file system permission	2	C,I	1	2
5.	Controlling new file permission and ownership	1	C,I	1	2
UNIT II: MONITORING AND MANAGING LINUX PROCESS AND LOGS		6			
6.	Linux process	1	C	1	2
7.	Controlling Jobs	1	C,I	1	2
8.	Background Process and Foreground Process	1	C,I	1	2
9.	Monitoring Process Activity	1	C,I	1	2
10.	Killing Processes	1	C,I,O	1	2
11.	Reviewing syslog files	1	C	1	2
UNIT III: MANAGING LINUX USERS		6			
12.	User creating and management commands	1	C,I,O	2	1
13.	/etc/password	1	C,I,O	2	1
14.	/etc/shadow and /etc/group	1	C,I,O	2	1
15.	Users and access permissions	2	C,I,O	2	1
16.	Modifying user and group attributed	1	C,I,O	2	1
UNIT IV: BOOTING, FILE SYSTEMS AND CORE SYSTEM SERVICES		6			
17.	Boot Loaders and init process	1	C,I	2	1
18.	Enabling and Disabling Services, booting and shutting down	1	C,I	2	1

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
19.	Managing file systems	2	C,I	2	1
20.	Adding new disk	1	C,I	2	1
21.	Syslog Daemon and CRON	1	C,I	2	1
UNIT V: SERVERS AND INTERNET SERVICES		6			
22.	DNS: Understanding DNS and Configuring DNS	1	C,I	1,2	1
23.	Configuring DNS Client	1	C,I	1,2	1
24.	Virtualization	1	C,I	1,2	1
25.	Setting Up Web Server: Understanding and Installing HTTP	2	C,I	1,2	1
26.	Configuring Apache	1	C,I	1,2	1
Total Contact Hours		30*			
Tutorial Hours		30			

Sl. No.	LEARNING RESOURCES
1.	Steve Shah and Wale Soyinka “Linux Administration: A Beginner’s Guide”, 4 th Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, ISBN: 978-0072262599
2.	Susan Lauber, Philip Sweany, Rudolf Kastl and George Hacker, “REDHAT System Administration-1 Student Work book”, REDHAT Inc. 2014

Course nature					Theory +Tutorial	
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X		X			
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming			Networking			Data base		Web System		Human Computer Interaction		Platform Technologies	
														X	
4	Staff coordinator														

15IT360E	FUNDAMENTALS OF VIRTUALIZATION		L	T	P	C
			3	0	0	3
Co:requisite:	NIL					
Prerequisite:	15IT314J Principles of Operating Systems					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL ELECTIVE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting, 23 rd July 2016					

PURPOSE	Virtualization is changing almost every aspect of how we manage systems, storage, networks, security, operating systems, and applications. The main objective of this subject is to introduce the basic concepts of virtualization to the students.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Identify the components of a Classical Data Center			i			
2.	Understand Compute, Desktop and Application Virtualization			m			
3.	Analyze Network and Storage Virtualization			i			
4.	Migrate to and manage your new virtualized environment			m			

Session	Description of Topic	Contact Hours	C-D-I-O-	IOs	Reference
UNIT I : CLASSIC DATA CENTER		9			
1.	Introduction to CDC: Application, DBMS, Compute, Storage, Network	1	C	1	2
2.	Storage Technologies: DAS,NAS,SAN, RAID,FCoE.	2	C,I	1	2
3.	Object based Storage, Unified Storage	2	C	1	2
4.	Business Continuity, Backup, Deduplication and Recovery	2	C	1	2
5.	Key Management activities in CDC. Virtualization and Cloud.	2	C	1	2
UNIT II : VIRTUALIZED DATA CENTER : COMPUTE		10			
6.	Virtualization Types, Hypervisor Types, Hardware Options	2	C,O	2	1
7.	Compute Virtualization Overview, Benefits	2	C	2	1
8.	Virtual Machine: Files, File System, Hardware, Console	2	C,I	2	1,2
9.	Resource Management: Resource Pool, Share, Limit, Reservation. Optimization Techniques	3	C	2	1
10.	Physical to Virtual Conversion – Convertor Components and Types	2	C,D,I	4	1
UNIT III : VIRTUALIZED DATA CENTER : STORAGE		9			

Session	Description of Topic	Contact Hours	C-D-I-O-	IOs	Reference
11.	Storage Virtualization Overview and Key benefits	1	C	3	1
12.	Storage Virtualization at Compute Network and Storage Layers	2	C	3,4	1
13.	Block Level and File Level Storage Virtualization	2	C	3	1
14.	Virtual provisioning,Benefits.	2	C	3	1
15.	Thin LUN and Thin Pool, Automated Storage Tiering	2	C	3	1
UNIT IV : VIRTUALIZED DATA CENTER : NETWORK		9			
16.	Network Virtualization Overview in VDC, Benefits, Tools	2	C	3	3,6
17.	Network Components:vNIC, HBA, vSwitch:Types, Ports/Port Group	2	C,I	3,4	3,6
18.	VLAN and VSAN Trunking and Tagging	2	C,I	3	3,6
19.	Network Traffic Management: Requirements, Techniques.	2	C	3	3,6
20.	Nexus 1000v.	1	C,O	2,4	6
UNIT IV : VIRTUALIZED DATA CENTER – DESKTOP AND APPLICATION		8			
21.	Desktop Virtualization: Drivers, Benefits, Techniques.	2	C	2	1
22.	User State Virtualization	2	C	2	1
23.	Application Virtualization Overview, Benefits	1	C	2	1
24.	Application Virtualization deployment Methods	1	C	2,4	1
25.	Remote Desktop Services	1	C	2	1
26.	Tools : VMWare ThinApp, VMWare View	1	C	2	1
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	Matthew Portnoy "Virtualization Essentials" John Wiley and Sons 2nd Edition 2012, ISBN: 978-1-118-17671-9
2.	Wendell Odom ,”CCNA Data Center”, 2nd Edition 2015., Pearson Education, ISBN-13: 978-9332543478
3.	Kris Jamsa, “Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and more”, 1st Edition, 2013, Jones&Bartlett Learning Company LLC, ISBN-13: 978-1449647391
4.	Anthony T .Velte, Toby J.Velte, Robert Elsenpeter, “Cloud Computing: APractical Approach”, Fourth Reprint, 2010, Tata McGraw Hill Edition, ISBN 13: 9780070683518
5.	Sanjay K. Hooda ,Shyam Kapadia , Padmanabhan Krishnan "Using TRILL, FabricPath, and VXLAN", 1st Edition 2014, Cisco Press , ISBN-13: 978-1-58714-393-9

Sl. No.	LEARNING RESOURCES
6.	Tim Mather, SubraKumaraswamy, ShahedLatif, “Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance” 1st edition , 2009, O'Reilly Media; ISBN-13: 978-0596802769

Course nature					Theory		
Assessment Method (Weightage 100%)							
In:semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X				X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
													X		
4	Staff coordinator														

15IT361E	INTERNET SECURITY AND COMPUTER FORENSICS	L	T	P	C
		3	0	0	3
Co:requisite:	NIL				
Prerequisite:	15IT304J Web Programming				
Data Book / Codes/Standards	NIL				
Course Category	P PROFESSIONAL ELECTIVE				
Course designed by	Department of Information Technology				
Approval	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	The main purpose of this course is to learn various internet (web) based security strategies, attack vectors, and if a malicious intrusion happens how to investigate computers forensically, thus preventing and solving a crime.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Understand OSI security architecture and encryption techniques	m				
2.	Understand Email Security	i				
3.	Design and Analyze Security in Web	m				
4.	Describe the incident response methodology for all stages of an investigation	i				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION TO SECURITY		8		1	1,4
1.	OSI Security Architecture	1	C	1	1,7
2.	Classical Encryption Techniques	1	C,I	1	1,7
3.	Principles of PKI: RSA	2	C,I	1	1,7
4.	Key Exchange and Key Management: Diffie Hellman	2	C,I	1	1,7
5.	Hash Functions, Keyed Hash Functions	1	C,I	1	1,7
6.	Digital Signatures.	1	C,I	1	1,7
UNIT II : EMAIL SECURITY		9			
7.	Security Services in Email	2	C	2	4
8.	Sender Policy Framework(SPF)	1	C	2	4
9.	Domain Keys Identified Mail (DKIM)	2	C	2	4
10.	Domain Based Message Authentication, Reporting and Conformance (DMARC)	2	C	2	4
11.	S/MIME	2	C	2	4
UNIT III : WEB SECURITY		8			
12.	SSL/TLS Basic Protocol: Computing keys	1	C	3	1,2
13.	SSL Client authentication: PKI deployed by SSL	1	C	3	1,2
14.	Cookie Authentication and its Security Policy	1	C	3	1,2
15.	Same Origin Policy	1	C	3	1,2
16.	Browser Security Mechanisms and Policy	2	C	3	1,2
17.	Web 2.0 Security	1	C	3	1,2
18.	Web Application Firewall	1	C	3	1,2

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT IV : WEB BASED ATTACKS		8			
19.	Structured Query Language(SQL) Injection and its Types	1	C	3	1,2
20.	Cross-site scripting(XSS), Document Object Model(DOM) Based Attacks	2	C	3	1,2
21.	Session Hijacking, Cookie Guessing Attacks, Cookie Discovery attacks, Cookie Setting Attacks	2	C	3	1,2
22.	Phishing Attacks, Cross Site Request Forgery, denial-of-service (DoS)/Distributed DoS Attacks	2	C	3	1,2
23.	Secure Socket Layer Man In The Middle Attack	1	C	3	1,2
UNIT V : DIGITAL FORENSICS		12			
24.	Incident response Methodology	1	C	4	3
25.	Data Collection: Web Browsers, History, Index.dat, Network Traffic, Logs and other artifacts	2	C	4	3
26.	Data Handling: seizure issues, device identification, networked devices and contamination.	2	C	4	3
27.	Digital forensics examination principles: Previewing, imaging, continuity, hashing and evidence locations	2	C	4	3
28.	Data Analysis: Integrated analysis, Timeline analysis, Analysis of search history, Analysis on URL encoding, Analysis of user activity, Recovery of deleted information.	4	C	4	3
29.	Creating Forensic Report.	1	C	4	3
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	Dafydd Stuttard, "The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws 2nd Edition", 2011. Wiley, ISBN: 978-1-118-02647-2
2.	Bryan Sullivan, Vincent Liu "Web Application Security, A Beginner's Guide", 1 st Edition, 2012. McGraw: Hill, ISBN: 9780071776165
3.	Darren R. Hayes "A Practical Guide to Computer Forensics Investigations" 1st Edition, 2015. PEARSON, ISBN-13: 978-0-7897-4115-8
4.	Chris Porter, "Email Security with Cisco IronPort", 1 st Edition, 2012. Cisco Press ISBN-13: 978-1-58714-292-5
5.	Kevin Mandia, "Incident Response and Computer Forensics, 3 rd Edition": 2012. The McGraw: Hill, ISBN-13: 078-3254041295
6.	Steve Bunting, "EnCase Computer Forensics :: The Official EnCE: EnCase Certified Examiner Study Guide": 2 nd Edition 2012. John Wiley and Sons, ISBN: 978-0-470-90106-9
7.	William Stallings, "Cryptography and Network Security: Principles and Practice", 7 th Edition, 2016. Pearson Education, ISBN-13: 978-0134444284

Sl. No.	LEARNING RESOURCES
8.	Micki Krause, Harold F, Tripton, "Information Security Management Handbook", 6 th Edition 2012.Auerbach Publications, ISBN 9781439893135

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X				X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
				X											
4	Staff coordinator														

15IT362E	INFORMATION STORAGE AND MANAGEMENT	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	The main objective of this course is to demonstrate how the storage technology is evolving to meet the ever increasing demand for space from variety of information sources and the sheer volume. The course discusses the techniques available for effective management of storage and retrieval of data and also the backup and recovery techniques.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Identify the components of managing the data center and understand logical and physical components of a storage infrastructure	k					
2.	Evaluate storage architectures including storage subsystems	l					
3.	Understand the business continuity, backup and recovery methods.	k					
4.	Monitor the storage infrastructure and management activities	m					
5.	Understand the cloud computing services and models	l					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION		9			
1.	Introduction to Information Storage Management, Evolution of Storage Technology	1	C	1	1
2.	Data Centre Infrastructure, Key challenges in managing information.	2	C	1	1
3.	Data Center Environment: Application, Database Management System (DBMS) - Host : Connectivity, Storage, Disk Drive Components	2	C	1	1
4.	Intelligent Storage System: Components of an Intelligent Storage System	2	C	1	1
5.	Storage Provisioning, Types of Intelligent Storage Systems.	2	C	1	1
UNIT II : STORAGE NETWORKING TECHNOLOGIES		10			
6.	Fiber Channel: Overview ,SAN and its Evolution, Components of FC SAN, FC Connectivity	2	C	2	1,3,5

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
7.	FC Architecture, IPSAN-iSCSI components, iSCSI Topologies, iSCSI Protocol Stack,iSCSI Names	2	C	2	1,2,5
8.	NAS: General Purpose Servers versus NAS Devices ,Benefits of NAS- File Systems and Network File Sharing, Components of NAS, NAS I/O Operation	2	C	2	1,3,5
9.	NAS Implementations, NAS File Sharing Protocols	2	C	2	1,3,5
10.	Object Based Storage Devices , Content addressed Storage	2	C	2	1
UNIT III : BUSINESS CONTINUITY AND BACK UP RECOVERY		9			
11.	Business Continuity: Information Availability ,BC Terminology, BC Planning life cycle.	2	C	3	1
12.	Failure Analysis, Business Impact Analysis	2	C	3	1
13.	Backup and Archive: Backup Purpose ,Backup Considerations, Backup Granularity	2	C	3	1
14.	Recovery Considerations, Backup Methods	1	C	3	1
15.	Backup Architecture, Backup and Restore Operations	2	C	3	1
UNIT IV : STORAGE SECURITY AND MANAGEMENT		10			
16.	Storage Security Framework and Domain	3	C	4	1
17.	Monitoring the Storage Infrastructure: Monitoring Parameters , Components Monitored	2	C	4	1
18.	Monitoring examples	2	C	4	1
19.	Storage Infrastructure Management Activities	1	C	4	1
20.	Storage Management Examples: Storage Allocation to a New Server/Host , File System Space Management	2	C	4	1
UNIT V : CLOUD COMPUTING		7			
21.	Cloud Enabling Technologies : Characteristics of Cloud Computing , Benefits of Cloud Computing	2	C	5	1,6
22.	Cloud Service Models, Cloud Deployment models	3	C	5	1,6
23.	Cloud computing Infrastructure, Cloud Challenges.	2	C	5	1,6
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	‘EMC Corporation, “Information Storage and Management”,2 nd edition Wiley India, ISBN13: 978-1118094839
2.	UifTroppen Rainer Wolfgang Muller,”Storage Networks Explained”, India, Wiley, 2010, ISBN13: 978-0470741436

Sl. No.	LEARNING RESOURCES
3.	Robert Spalding, Storage Networks: The Complete Reference, Osborne, Tata McGraw Hill, 2003, ISBN-13: 978-0072224764
4.	Farley, 'Building Storage Networks', Osborne, Tata McGraw Hill, 2009, ISBN-13: 978-0072130720
5.	Meeta Gupta, Storage Area network Fundamentals, Pearson Education Limited, 2002, ISBN13: 978-1587050657
6.	Anthony T .Velte, Toby J.Velte, Robert Elsenpeter, "Cloud Computing: A Practical Approach", Fourth Reprint, Tata McGraw Hill Edition, 2010, ISBN-13: 978-0071626941

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
												X	X	X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
				X		X									
4	Staff coordinator														

15IT421E	INFORMATION AND NETWORK SECURITY		L	T	P	C
			3	0	0	3
Co-requisite:	NIL					
Prerequisite:	15IT303J Computer Networks					
Data Book / Codes/Standards	NIL					
Course Category	P	PROFESSIONAL ELECTIVE				
Course designed by	Department of Information Technology					
Approval	32 nd Academic Council Meeting , 23 rd July 2016					

PURPOSE	To introduced to the core concepts of information and network security. To understand the network defense technologies with particular emphasis given to the creation of a layered and diversified defense-in-depth architecture that begins with a security policy defining each layer.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Understand the information security need and usage	j				
2.	Understand and apply different countermeasures and protect information	m				
3.	Define the concepts of security solutions	j				
4.	Identify and explain the concepts, policies, and technologies associated with applications	m				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INFORMATION SECURITY		9			
1.	Information Security Policy, Standards, and Practices	1	C	1	1
2.	The Information Security Blue Print	2	C	1	1
3.	Information Security Framework	2	C	1	1
4.	System privileges	2	C	1	1
5.	Contingency plan and a model for contingency plan	2	C	1	1
UNIT II : SECURITY TECHNOLOGY		9			
6.	Firewalls	1	C,I	2	1
7.	Intrusion Detection Systems (IDS)	2	C,I	2	1
8.	Protecting Remote Connections	1	C	2	1
9.	Honey Pots, Honey Nets, and Padded cell systems	3	C,I	2	1
10.	Scanning and Analysis Tools	2	C,I	2	1
UNIT III : INTRODUCTION TO NETWORK SECURITY		9			
11.	Attacks , Services, and Mechanisms	1	C	3	2
12.	Amodel for Internetwork Security	2	C	3	2
13.	Kerberos	2	C	3	2
14.	X.509 Directory Authentication Service	2	C	3	2
15.	Attacks on Cryptosystems	2	C	3	2
UNIT IV: ELECTRONIC MAIL SECURITY AND IP SECURITY		9			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
16.	Pretty Good Privacy	1	C	3	2
17.	S/MIME	2	C	3	2
18.	IP Security Architecture	2	C	3	2
19.	Authentication Header	2	C	3	2
20.	Encapsulating Security Payload	1	C	3	2
21.	Combining Security Associations	1	C	3	2
UNIT V: WEB SECURITY		9			
22.	Web security requirements	1	C	4	2
23.	Socket Communication	2	C	4	2
24.	Secure Socket layer (SSL)	2	C	4	2
25.	Transport layer Security (TLS)	2	C	4	2
26.	Secure Electronic Transaction (SET)	1	C	4	2
27.	CASE STUDY	1	I	4	2
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	Michael E. Whitman, Herbert J. Mattord,” Principles of Information Security”, 2 nd Edition, 2011, Thomson, ISBN-13: 978-1111138219
2.	William Stallings, “Applications and Standards – Network Security Essentials”, 5 th Edition, 2014, Pearson Education, ISBN-13: 9780136108054
3.	Behrouz A. Forouzan, Cryptography and Network Security ,, 4 th Edition 2007, Tata McGraw-Hill, ISBN-13: 9780071263610

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
											X			X		
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
													X			
3	Broad Area(for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
					X											
4	Staff coordinator															

15IT422E	INTERNET OF THINGS	L	T	P	C
		2	2	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	We are surrounded by millions of things and devices. Internet of Things (IoT) is a technological need to interconnect all such devices, things with us anywhere, anytime. This course attempts to address the paradigm shift in technologies, standards and tools needed to achieve the interoperability and thereby develop applications						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the basics of IoT and its application sectors	a					
2.	Understand M2M and IoT	a					
3.	Understand and become proficient in IoT platforms	a	i				
4.	Understand and apply IoT protocols appropriately	a	i				
5.	Design and develop IoT based applications	c	l				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION AND CONCEPTS OF IOT		5			
1.	Introduction to IOT, definition and characteristics of IOT, Overview of the syllabus	1	C	1	1
2.	Architecture of Internet of Things, Physical and logical design of IOT, IOT enabling technologies, IOT levels and deployment templates	2	C	1	1
3.	Domain specific IOTs, home automation, cities, environment, Domain specific IOTs, Energy, retail, agriculture, industry, health and lifestyle	2	C	1	1
UNIT II : IOT AND M2M COMMUNICATION		8			
4.	M2M, difference between IOT and M2M, ETSI M2M Architecture, system architecture	2	C	2	1
5.	ETSI M2M SCL resource structure, Security in ETSI M2M framework, SDN and NFV for IOT, IOT system management, need for IOT system management	3	C	2	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
6.	SNMP, Network operator requirements, NETCONF-YANG, IOT system management with NETCONF-YANG, IoT Design methodology-case study on IOT system for Weather Monitoring	2	C,I	2	1
UNIT III : IoT PLATFORMS		6			
7.	Introduction to Hardware used for IoT: Microcontrollers, Microprocessors, SoC, Sensors	2	C,I	3	1
8.	Introduction to Arduino, Pi, Spark, Intel Galileo	3	C,I	3	1
UNIT IV: IoT TECHNICAL STANDARDS AND PROTOCOLS		5			
9.	RF Protocols: RFID, NFC; IEEE 802.15.4: ZigBee, Z-WAVE, THREAD; Bluetooth Low Energy (BLE), IPv6 for Low Power and Lossy Networks (6LoWPAN) and Routing Protocol for Low power and lossy networks (RPL)	2	C	4	1,2
10.	CoAP, XMPP, Web Socket, AMQP, MQTT, WebRTC, PuSH	2	C	4	1,2
11.	Architectural Considerations in Smart Object Networking	1	C	4	5
UNIT V: DEVELOPING INTERNET OF THINGS		6			
12.	IoT platforms design methodology, IoT Physical devices and endpoints,	2	C	5	1
13.	IoT Systems: Logical design using Python, IoT physical servers and cloud offerings (Cloud computing for IoT)	3	C,I	5	1
Total contact hours		30*			
Tutorial hours		30			

Sl. No.	LEARNING RESOURCES
1.	Arshdeep Bahga, Vijay Madisetti, "Internet of Things, A Hands-on Approach", 1 st Edition 2015, University Press, ISBN: 978-81-7371-954-7
2.	Oliver Hersent, David Boswarthick, Omar Elloumy, "The Internet of Things", 1 st Edition, 2015, ISBN: 978-81-265-5686-1
3.	Michael Miller, "The Internet of Things, How Smart TVs, Smart Cars, Smart Homes, and Smart Cities are changing the World", First edition, 2015, Pearson, ISBN: 978-93-325-5245-6
4.	https://www.arm.com/resources/education/education-kits
5.	https://tools.ietf.org/html/rfc7452 , as on date: 25/04/2016
6.	http://dret.net/lectures/iot-spring15/protocols , as on date: 25/04/2016
7.	http://iot.intersog.com/blog/overview-of-iot-development-standards-and-frameworks , as on date: 25/04/2016

Course nature					Theory +Tutorial	
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	i	j	k	l	m	n
		X		X						X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
												X			
4	Staff coordinator														

15IT423E	DATA SCIENCE AND BIG DATA ANALYTICS	L	T	P	C
		2	2	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	Today's world is data-driven world. Increasingly, the efficient operation of organizations across sectors relies on the effective use of vast amounts of data. This course provides grounding in basic and advanced analytic methods and an introduction to big data analytics technology and tools.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Learn about the basics of data Science and to understand the various supervised and unsupervised learning techniques.	a					
2.	Bring together several key technologies used for manipulating, storing, and analyzing big data from advanced analytics perspectives.	i	j				
3.	Realize the Hadoop architecture and implementation of MapReduce Application.	j	l				

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION TO DATA SCIENCE		6			
1.	Introduction of Data Science, Basic Data Analytics using R, R Graphical User Interfaces	1	C	1	1
2.	Data Import and Export, Attribute and Data Types, Descriptive Statistics, Exploratory Data Analysis, Visualization Before Analysis, Dirty Data, Visualizing a Single Variable, Examining Multiple Variables, Data Exploration Versus Presentation	3	C,D,I	1	1
3.	Statistical Methods for Evaluation, Hypothesis Testing, Difference of Means, Wilcoxon Rank-Sum Test, ANOVA	2	C	1	1
UNIT II : ADVANCED ANALYTICAL THEORY AND METHODS		6			
4.	Overview of Clustering, K-means, Use Cases, Overview of the Method, Perform a K-means Analysis using R	2	C	1,2	1,4
5.	Classification, Decision Trees, Overview of a Decision Tree, Decision Tree Algorithms, Evaluating a Decision Tree	2	C	1,2	1,4

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
6.	Decision Tree in R, Bayes' Theorem, Naïve Bayes Classifier, Smoothing, Naïve Bayes in R	2	C,D,I	1,2	1
UNIT III : ADVANCED ANALYTICS TECHNOLOGY AND TOOLS		6			
7.	Analytics for Unstructured Data, Use Cases, MapReduce, Apache Hadoop, The Hadoop Ecosystem, Pig, Hive, Hbase, Mahouth, NoSQL, SQL Essentials	3	C	1,2	1
8.	Joins, Set Operations, Grouping Extensions, In-Database Text Analysis, Advanced SQL, Window Functions, User-defined Functions and Aggregates, Ordered Aggregates, MADlib	3	C	1,2	1
UNIT IV : HADOOP DISTRIBUTED FILE SYSTEM ARCHITECTURE		6			
9.	HDFS Architecture, HDFS Concepts, Blocks	2	C	3	2,5
10.	NameNode, Secondary NameNode, DataNode, HDFS Federation, HDFS High Availability, Basic File System Operations	2	C	3	2
11.	Data Flow, Anatomy of File Read, Anatomy of File Write, Anatomy of a MapReduce Job Run	2	C	3	2
UNIT V : PROCESSING YOUR DATA WITH MAPREDUCE		6			
12.	Getting to know MapReduce, MapReduce Execution Pipeline, Runtime Coordination and Task Management	2	C	3	3,5
13.	MapReduce Application, Hadoop Word Count Implementation	2	C,D,I	3	5
14.	Installing and Running Pig, Hbase Versus RDBMS, Installing and Running ZooKeeper	2	C	3	3
Total contact hours		30*			
Tutorial hours		30			

Sl. No.	LEARNING RESOURCES
1.	David Dietrich, Barry Heller and Beibei Yang, "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", EMC Education Services, Reprint 2015, Wiley, ISBN: 9788126556533.
2.	Tom White, "Hadoop: The Definitive Guide", 4th Edition, 2015, O'Reilly, ISBN: 9789352130672.
3.	BirisLublinsky, Kevin T. Smith and Alexey Yakubovich, "Professional Hadoop Solutions", Reprint 2014, Wiley, ISBN 13:9788126551071.
4.	Stephen Marsland, "Machine Learning – An Algorithmic Perspective", , Taylor & Francis Group, Second Edition, 2015, Chapman & Hall / CRC Press , ISBN:9781466583283.
5.	Nathan Marz, James Warren, "Big Data-Principles and best practices of scalable real-time data systems", Edition 2015, DreamTech Press, ISBN: 9789351198062.

Course nature					Theory +Tutorial	
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	i	j	k	l	m	n
		X								X	X		X		
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
						X									
4	Staff coordinator														

15IT424E	BUSINESS INTELLIGENCE AND ANALYTICS	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15IT340E Data Warehousing and Data Mining				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	To provide in-depth knowledge of handling data and business analytics tools that can be used for fact-based decision making process.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
Become familiar with the processes needed to develop, report and analyze business data				i			
Apply BI enabling technologies in organizational settings				k	l		
Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization				j	k		
Learn how to use and apply selected business analytics software				l			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : OVERVIEW OF BUSINESS INTELLIGENCE, ANALYTICS, AND DECISION SUPPORT		9			
1.	Information Systems Support for Decision Making, An Early Framework for Computerized Decision Support, The Concept of Decision Support Systems, A Framework for Business Intelligence	3	C	1	1,4
2.	Business Analytics Overview, Brief Introduction to Big Data Analytics	2	C,D,I	4	1
3.	Clickstream Analysis: Metrics, Clickstream Analysis: Practical Solutions, Competitive Intelligence Analysis	4	C	4	2
UNIT II : FOUNDATIONS AND TECHNOLOGIES FOR DECISION MAKING		9			
4.	Decision Making: Introduction and Definitions, Phases of the Decision, Making Process	1	C	1,2	1
5.	The Intelligence Phase, Design Phase, Choice Phase, Implementation Phase	2	C	2	1
6.	Decision Support Systems: Capabilities, Decision Support Systems: Classification	3	C	2	1,4
7.	Decision Support Systems: Components	2	C	2	1,4

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT III : TECHNIQUES FOR PREDICTIVE MODELING AND SENTIMENT ANALYSIS		9			
8.	Basic Concepts of Neural Networks, Developing Neural Network, Based Systems	1	C	3	1,3
9.	Illuminating the Black Box of ANN with Sensitivity, Support Vector Machines	1	C,D,I	2	1,3
10.	A Process, Based Approach to the Use of SVM, Nearest Neighbor Method for Prediction, Sentiment Analysis Overview	3	C	2,3	1,3
11.	Sentiment Analysis Applications, Sentiment Analysis Process	2	C	2,3	1,3
12.	Sentiment Analysis and Speech Analytics	1	C	1,2,3	1
UNIT IV : OPTIMIZATION AND MULTI-CRITERIA DECISION MAKING SYSTEMS		9			
13.	Decision Support Systems Modeling, Structure of Mathematical Models for Decision Support, Decision Making Under Certainty, Uncertainty and Risk	2	C	3	1
14.	Decision Modeling with Spreadsheets, Mathematical Programming Optimization	3	C,I	3,4	1
15.	Decision Analysis with Decision Tables and Decision Trees	2	C,I	3,4	1
16.	Multi-Criteria Decision Making With Pairwise Comparisons	2	C	3	1
UNIT V: AUTOMATED DECISION SYSTEMS AND EXPERT SYSTEMS		9			
17.	Automated Decision Systems, The Artificial Intelligence Field	1	C	3	1,4
18.	Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, Knowledge Engineering	4	C	3	1
19.	Development of Expert Systems, Location, Based Analytics for Organizations, Cloud Computing and BI	3	C,D,I	3,4	1
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	Ramesh Sharda, DursunDelen, Efraim Turban, J. E. Aronson, Ting-Peng Liang, David King, "Business Intelligence and Analytics: System for Decision Support", 10 th Edition, Pearson Global Edition, 2013, ISBN: 9781292009209.
2.	AvinashKaushik, "Web Analytics 2.0 - The Art of Online Accountability & Science of Customer Centricity", 2010, Wiley, ISBN: 9780470529393.
3.	Stephen Marsland, "Machine Learning – An Algorithmic Perspective", 2 nd Edition, 2015, Chapman& Hall / CRC Press, Taylor& Francis Group, ISBN:9781466583283.
4.	Vicki L. Sauter, "Decision Support Systems for Business Intelligence", 2 nd Edition, 2011, Wiley, ISBN: 9780470433744.

Course nature					Theory		
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X	X	X	X		
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
						X									
4	Staff coordinator														

15IT426E	PARALLEL ARCHITECTURE AND ALGORITHMS	L	T	P	C
		3	0	0	3
<i>Co, requisite:</i>	NIL				
<i>Prerequisite:</i>	15IT212J- Computer Organization and Architecture/15CS203- Computer System Architecture				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	The main objective of the course is to provide the students with the basic concepts of the concurrency features exist in the processors of today and the technology behind. Students are also exposed how to make best use of those features by writing parallel programming.
----------------	---

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES					
At the end of the course students will be able to :							
1.	Understand parallel architecture and their features	h					
2.	Understand and apply thread concepts to exploit the architectural features	j					
3.	Learn to use standard techniques and paradigms while developing parallel algorithms	i					
4.	Develop simple parallel programs to improve performance	c					
5.	Understand the principles of distributed systems and issues in implementation	i					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION		9			
1.	Instruction Set, Measuring Performance, MIPS Architecture	1	C	1	1,2
2.	Pipelining Basics, Hazards	2	C	1	1,2
3.	Software Scheduling, Loop Unrolling, Loop Transformation	2	C	1	1,2
4.	Dynamic Scheduling, Hardware Based Speculation	2	C	1	1,2
5.	Branch Prediction	2	C	1	1,2
UNIT II : THREAD BASED IMPLEMENTATION		9			
6.	Thread Management	1	C	2	1,3
7.	Attributes of Thread with Example	2	C,I	2	1,3
8.	Mutual Exclusion and Mutex Usage	2	C,I	2	1,3
9.	Thread Implementation	2	C,I	2	1,3
10.	Event and Conditional Variable's, Java Threads.	2	C,I	2	1,3
UNIT II : PARALLELISM PARADIGMS AND PROGRAMMING		9			
11.	Data Flow Computing, Systolic Architectures	2	C	3	1
12.	Functional and Logic Paradigms	2	C	3	1
13.	Distributed Shared Memory	1	C	3	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
14.	Fortran 90, nCUBE C, OCCAM, C-LINDA and OpenMP	1	C,I	3	1
15.	Debugging Parallel Programs	2	C,I	3	1
UNIT IV: PARALLEL MACHINES		9			
16.	Synchronization and Communication	1	C	4	1,4
17.	Strategies for Parallelism	2	C	4	1,4
18.	Parallel Machines, Speedup, Complexity and Cost	1	C	4	1,4
19.	Quadrant Problem, Matrix Multiplications	2	C	4	1,4
20.	Parallel Sorting Algorithms	2	C	4	1,4
21.	MapReduce in Parallelism	1	C	4	1,4
UNIT V: APPLICATIONS		9			
22.	Introduction to Distributed Database, Issues, Systems	2	C	5	1,3
23.	Distribution Options, Database Integrity and Concurrency Control	2	C	5	1,3
24.	DDBM's Structure	2	C	5	1,3
25.	Introduction to Distributed Operating System, Network Operating Systems, Issues.	2	C	5	1,4
26.	Amoeba	1	C	5	1,4
Total contact hours		45*			

Sl. No.	LEARNING RESOURCES
1.	M.Sasi Kumar, "Introduction to Parallel Processing", PHI Edition, 2014, ISBN: 978812035031.
2.	David A. Patterson and John L. Hennessy, "Computer Organization and Design: The hardware/Software Interface", 3 rd Edition, 2007, Morgan Kaufmann, ISBN-13: 978-0124077263.
3.	Behrooz Parhami, "Introduction to Parallel Processing: Algorithms and Architectures", Illustrated Edition, 1999, Springer, ISBN: 9780306459702.
4.	Christian Bischof, "Parallel Computing: Architectures, Algorithms, and Applications", IOS press, 2008, ISBN-13: 978-1586037963.

Course nature				Theory			
Assessment Method (Weightage 100%)							
In semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
				X					X	X	X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area (For P Only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
													X		
4	Staff coordinator														

15IT441E	FORENSICS AND INCIDENT RESPONSE	L	T	P	C
		2	2	0	3
<i>Co:requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	Forensic science is the application of science to criminal and civil laws. Main purpose of this course is to learn how to collect, preserve, and analyses scientific evidence during the course of an investigation and how to respond to an incident as Incident Response is a set of procedures for an investigator to examine a computer security incident. This process involves determining what had happened and preserving information related to those events.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Describe the incident response methodology for all stages of an investigation	i				
2.	Describe and contrast the various steps in investigating windows/MAC and Unix systems.	m				
3.	Investigate System compromise Indicators.	m				
4.	Collect Evidence from volatile and Non Volatile.	i				

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INCIDENT RESPONSE PROCESS AND LEGAL CONSIDERATIONS		5			
1.	Building Incident Response Capability	1	C	1	1,4
2.	Incident Readiness Planning	1	C	1	1,4
3.	Internet Laws and Statutes, Legal Concerns and Privacy	1	C	1	1,4
4.	Court Admissibility of Evidence	1	C	1	1,4
5.	Real World Incidents	1	C	1	1,4
UNIT II : EVIDENCE COLLECTION AND PRESERVATION: VOLATILE		4			
6.	Volatile Data Collection, Pros and Cons of System Shutdown	1	C	4	1
7.	Memory Data Collection	1	C,O	4	1
8.	Network Data Collection	1	C,O	4	1
9.	Process, Registry Data Collection	1	D,O	4	1
UNIT III : EVIDENCE COLLECTION AND PRESERVATION: NONVOLATILE		5			
10.	Hard Drive Imaging : Physical Image	1	C,O	4	1
11.	Hard Drive Imaging : Logical Image	1	C,O	4	1
12.	Full/Partial Drive Encryption Scenarios	1	C,O	4	1
13.	Remote Forensics	1	C	4	1
14.	Securing the Evidence, Chain of Custody	1	C	4	1

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT IV : SYSTEM COMPROMISE INDICATORS		6			
15.	Misconfigured Firewall, IDS, IPS Rules	1	D,I	3	1,5
16.	Anti:Virus Logs, Critical System Log Files	1	C	3	1,5
17.	Browser Forensics, Temporary Internet Files	1	C	3	1,5
18.	Hosts File ,DNS Cache, Running Services	1	C	3	1,5
19.	Network Connections, Hidden and Protected Files	1	C	3	1,5
20.	Windows Registry: Registry Changes, System Info,. User activities, Auto start Locations.	1	C	3	1,5
UNIT V : FILE SYSTEM BASICS AND FORENSIC ANALYSIS		7			
21.	Windows (FAT/EXFAT/NTFS) Analysis	2	C,O	2	2,3
22.	Linux/OSX (EXT2/3/4/MAC OS FS) Analysis	2	C,O	2	2,3
23.	Time line Analysis	1	O	2	2,5
24.	File Signature Analysis, Hash Analysis	1	I,O	2	2,5
25.	Documentation : Evidence Report Writing	1	C,I,O	2	2,5
Total Contact Hours		30*			
Tutorial Hours		30			

Sl. No.	LEARNING RESOURCES
1.	Kevin Mandia , "Incident Response & Computer Forensics, 3rd Edition" : 2012. The McGraw: Hill, ISBN-13: 978-0071798686
2.	Steve Bunting, "EnCase Computer Forensics :: The Official EnCE: EnCase Certified Examiner Study Guide " : John Wiley and Sons,2012. ISBN: 978-0-470-90106-9
3.	Brian Carrier "File System Forensic Analysis" – by Addison Wesley, 1st edition,2005. ISBN-13: 978-0321268174
4.	Darren R. Hayes "A Practical Guide to Computer Forensics Investigations" 1st Edition, 2015. PEARSON ISBN-13: 978-0-7897-4115-8
5.	Bill Nelson, Amelia Philips and Christopher Steuart, “Guide to computer forensics and investigations”, course technology, Cengage Learning; 4 th edition, 2009. ISBN-13: 978-1-435-49883-9
6.	Dan Farmer, Wietsa Venema " forensic Discovery" 1 st Edition 2005, Addison Wesley , ISBN-13: 978-0321703255

Course nature					Theory +Tutorial	
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X				X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		X		X											
4	Staff coordinator														

15IT443E	Multilayer Switching	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15IT303J Computer Networks				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P Professional Elective				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	This Course provides theoretical and practical knowledge equivalent to Cisco Certified Network Professional. Course also addresses the design and deployment strategies of switching world and also gives an overview of Voice over IP Networks and its dependencies on Quality of service (QOS) related issues.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand and work with layer 2 and layer 3 switching devices	i					
2.	Understand the difference between the existing PSTN and VOIP networks.	j					
3.	Know the necessity of QOS while handling different types of network traffic	m					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTELLIGENT INFORMATION NETWORKS		9			
1.	Service Oriented Network Architecture (SONA) Architecture	1	C	1	1
2.	L2 Switching, L3 Routing	1	C	1	1
3.	Virtual Local Area Network (VLAN)	1	C	1	1
4.	VLAN Trunking Protocol	1	C	1	1
5.	VTP Pruning	1	C	1	1
6.	Inter VLAN Routing	1	C	1	1
7.	Redundant Topologies	1	C	1	1
8.	Spanning Tree Protocol (STP), Multi Spanning Tree Protocol (MSTP), Rapid Spanning Tree Protocol(RSTP)	2	C	1	1
UNIT II : HIGH AVAILABILITY AND SECURITY		9			
9.	HSRP	1	C	1	1
10.	Virtual Router Redundancy Protocol (VRRP)	1	C	1	1
11.	Gateway Load Balancing Protocol (GLBP)	1	C	1	1
12.	Security Issues: Port Security	1	C	1	1
13.	VLAN Hopping	1	C	1	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
14.	Dynamic Host Configuration Protocol (DHCP) Snooping	2	C	1	1
15.	VLAN Access Control List (ACL)	1	C	1	1
16.	Private VLAN and Protected Ports	1	C	1	1
UNIT III : INTRODUCTION TO VOICEOVER IP (VOIP)		9			
17.	Benefits and Components of VOIP network	1	C	2	4
18.	Digitizing and Packetizing voice	1	C	2	4
19.	Digital Voice encoding	1	C	2	4
20.	Video codec characteristics	1	C	2	4
21.	Bandwidth requirement for voip	1	C	2	4
22.	Real Time Transport Protocol (RTP), RTP Control Protocol (RTCP)	2	C	2	4
23.	H.323 and Session Initiation Protocols (SIP) as signaling protocols	2	C	2	4
UNIT IV: INTRODUCTION TO QUALITY OF SERVICE (QOS)		9			
24.	Congestion and Queuing	1	C	3	2
25.	Queuing Algorithms	1	C	3	2
26.	Converged Network quality issues	1	C	3	2
27.	Types of delay	1	C	3	2
28.	Traffic policy and shaping	1	C	3	2
29.	Implementing QOS	1	C	3	2
30.	Traffic classification	1	C	3	2
31.	3 QOS Models , DiffServ QOS Model	1	C	3	2
32.	Trust Boundaries	1	C	3	2
UNIT V: MULTIPROTOCOL LABEL SWITCHING (MPLS)		9			
33.	WAN Topologies	2	C	3	1
34.	Standard IP based switching	1	C	3	3
35.	Cisco Express Forwarding (CEF) based Multilayer Switching	2	C	3	3
36.	MPLS Characteristics	1	C	3	3
37.	MPLS Operation	1	C	3	3
38.	Wireless security, Wired Equivalent Privacy (WEP), WiFi Protection Access (WPA, WPA2, 802.1x)	1	C	3	1
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	Richard Froom, ErumFrahim and BalajiSivasubramanian “Implementing Cisco IP Switched Networks (SWITCH)”, 1 st Edition, 2010, Cisco Press , ISBN-10:1587058847 ISBN-13:9781587058844.
2.	Amir Ranjbar, “CCNP ONT Exam Certification Guide”, ,1 st edition 2007, Cisco Press, ISBN: 978-1-58720-176-3.
3.	Luc De Ghein 2006, “MPLS Fundamentals”, 1 st Edition, 2006, Cisco Press, ISBN: 978- 1-58705-197-5

Sl. No.	LEARNING RESOURCES
4.	Jeremy Cioara, Michael J. Cavanaugh, “CCNA Voice Official Exam Certification Guide”, 1 st Edition, 2008], Cisco Press , ISBN- 10: 1587202077 ISBN-13: 978-1587202070

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
										X	X			X		
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
													X			
3	Broad Area(for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
					X											
4	Staff coordinator															

15IT444E	Network Simulation and Modeling	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15IT303J Computer Networks				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	It is impractical to design, implement and test networks' performance. In this course, students are taught the fundamentals techniques for designing a network, model and simulate networks and design algorithms for performance enhancements.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Gain knowledge of simulation principles			c			
2.	Create simulation models of various network types			j			
3.	Acquire basic knowledge of network simulation principles			j			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION TO MODELING AND SIMULATION		9			
1.	Introduction	1	C	1	1
2.	Discrete-event Simulation	1	C	1	1
3.	Modeling for Computer Simulation	1	C	1	1
4.	Tools and Methods for Network Simulation	2	C	1	1
5.	The Simulation Platform	1	C	1	1
6.	Simulation Framework	1	C	1	1
7.	Tools and Modeling Approaches for Simulating Hardware	2	C	1	1
UNIT II : LOWER LAYER AND LINK LAYER WIRELESS MODELING		9			
8.	Physical Layer Modeling	1	C	2	1
9.	Description of the Main Components of the PHY Layer	1	C	2	1
10.	Accurate Simulation of Physical Layers	1	C	2	1
11.	Physical Layer Modeling for Network Simulations	1	C	2	1
12.	Link Layer Modeling, Medium Access Control (MAC) Protocols	2	C	2	1
13.	Logical Link Control , Medium Access Control (MAC) Protocols	1	C	2	1
14.	Forward and Backward Error Detection and Correction	1	C	2	1
15.	Queuing and Processing Delay	1	C	2	1
UNIT III : CHANNEL MODELING		9			
16.	The Physics of Radiation	1	C	2	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
17.	The Nature of Electromagnetic Radiation	1	C	2	1
18.	Classification of Propagation Models	1	C	2	1
19.	Deterministic Approaches by Classical Field Theory	1	C	2	1
20.	Deterministic Geometric Optical Approaches	1	C	2	1
21.	Empirical Path Loss Approaches	1	C	2	1
22.	Stochastic Shadowing Models, Stochastic Fading Models	2	C	2	1
23.	MIMO Channel Models	1	C	2	1
UNIT IV: MOBILITY MODELING		9			
24.	Categorization of Mobility Models	1	C	2	1
25.	Mobility Models	1	C	2	1
26.	Random Walk Model	1	C	2	1
27.	Random Waypoint Model	1	C	2	1
28.	Random Direction Model,	1	C	2	1
29.	Gauss-Markov Model	1	C	2	1
30.	Selection of Appropriate Mobility Models	2	C	2	1
31.	CASE STUDY	1	C	2	1
UNIT V: MODELING THE NETWORK TOPOLOGY		9			
32.	Abstraction of Network Topologies by Graphs	2	C	3	1
33.	Characterizing Graphs	1	C	3	1
34.	Common Topology Models	2	C	3	1
35.	Geometric Random Graphs	1	C	3	1
36.	The Waxman Model	1	C	3	1
37.	The Barabási-Albert Model	1	C	3	1
38.	Modeling the Internet	1	C	3	1
Total Contact Hours		45*			

LEARNING RESOURCES	
1.	K.Wehrle, Gunes, J.Gross, “Modeling and Tools for Network simulation”, 2010, Springer, ISBN-13: 978-3642123306
2.	William.H.Tranter, K. Sam Shanmugam, Theodore. S. Rappaport, Kurt L. Kosbar, “Principles of Communication Systems Simulation”, Pearson Education (Singapore) Pvt. Ltd, 2004, ISBN-13: 007-6092011552
3.	Nejat; Bragg, Arnold, “Recent Advances in Modeling and Simulation Tools for Communication Networks and Services”, 2007, Springer, ISBN-13: 978-1441944825

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
				X							X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
				X									X		
4	Staff coordinator														

15IT445E	INTERACTIVE WEB PAGE SCRIPTING	L	T	P	C
		3	0	0	3
Co-requisite:	NIL				
Prerequisite:	15IT304J Web Programming				
Data Book / Codes/Standards	NIL				
Course Category	P PROFESSIONAL ELECTIVE				
Course designed by	Department of Information Technology				
Approval	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	The purpose of this course is to design and develop an interactive and dynamic website with database connectivity.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand basic principles of website design and user interface design.	k					
2.	Understand and create web page using client side and server side scripting	k					
3.	Understand web site dynamic behavior	i					
4.	Generate dynamic web pages using JSON and Python languages	i					
5.	Understand database connectivity using ASP.net	j					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : PRINCIPLES OF WEBSITE DESIGN and USABILITY		9			
1.	Design process and evaluation , Accessibility	2	C	1	3
2.	Page layout	2	C	1	3
3.	Text appearance, Links	3	C	1	3
4.	Writing web content and Content management	2	C	1	3
UNIT II : CLIENT SIDE SCRIPTING		9			
5.	Advanced JavaScript: Interacting with Images- windows and frames External Javascript, Javascript cookies , Objects and entities	3	C,I	2	5
6.	Browser and feature detection, Keyboard and printer interaction, Regular expression	3	C,I	2	5
7.	Java FX Applets: Develop and deploy javafx applets and applications	3	C,I	2	5
UNIT III : SERVER SIDE SCRIPTING		9			
8.	JSP:JSP overview, JSTL	2	C	3	8
9.	Embedding JSP code in HTML, creating dynamic web pages using JSP	2	C,I	3	8
10.	PHP:PHP overview, syntax	2	C	3	1
11.	Advanced functions, Embedding PHP scripts inside web pages	3	C,I	3	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT IV: ADVANCED SCRIPTING LANGUAGES		9			
12.	JSON: An alternative to xml technology	1	C	4	5
13.	overview and concepts of JSON, how to implement JSON in web sites	4	C,I	4	5
14.	Python: Python Fundamentals	4	C,I	4	2
UNIT V : DATABASE CONNECTION –ASP		9			
15.	Introduction, Relational Database, SQL	2	C	5	1
16.	MYSQL, Microsoft Language Integrate Query , LINQ to SQL	3	C,I	5	1
17.	Querying a Database using LINQ, dynamically binding LINQ to SQL	2	C,I	5	1
18.	ASP: ASP objects , program for database connection using ASP and MYSQL	2	C,I	5	4
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	Paul J. Deitel, Harvey Deitel, Abbey Deitel , “Internet and World Wide Web How to Program”, 5th Edition, 2011 , Prentice Hall, ISBN 0132151006, 9780132151009
2.	Timothy A Budd , Exploring Python, Oregon State, 2011 ISBN: 0073523372
3.	Michael O. Leavitt, Ben Shneiderman, Web Design & Usability Guidelines, U.S. Dept. of Health and Human Services, Rev Rep edition, 2007, ISBN 13: 9780160762703
4.	www.W3Schools.org as on date: 18/04/2016
5.	http://www.javascriptkit.com/javatutors/as on date: 18/04/2016
6.	http://www.dtlsite.com/www.dieajax.com as on date: 18/04/2016
7.	http://www.w3resource.com/JSON/introduction.php as on date: 18/04/2016
8.	http://www.tutorialspoint.com/jsp/as on date: 18/04/2016

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X	X	X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(For P Only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
								X							
		Not Applicable													
4	Staff coordinator														

15IT446E	PROGRAMMING MULTIMEDIA FOR THE WEB	L	T	P	C
		2	2	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	This course enables the students to build creative, interactive and well-designed websites with necessary tools and to motivate them to program for the web based multimedia applications.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the basics of event based programming using Adobe Flash	c					
2.	Understand the concepts of vector animation using action scripting in Adobe flash together with XML capabilities to render rich content in the browser.	i					
3.	Comprehend the basic programming models and standards of Flex by which applications can be deployed consistently on all major browsers, desktops, and devices.	j					
4.	Familiar with the skills necessary to design rich forms that apply the use of data binding and validation.	c					
5.	Understand the Adobe Integrated Runtime (AIR) for building Rich Internet applications (RIA).	k					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION TO ACTION SCRIPT IN FLASH		6			
1.	Programming Concepts , Variables, Data types	1	C	1	1
2.	Conditionals, Loops	1	C,I	1	1
3.	Arrays, Functions	1	C,I	1	1
4.	Custom objects : Properties, Methods and Events	2	C	1	1
5.	Display List, Timeline Control.	1	C	1	1
UNIT II : ADVANCED CONCEPTS IN ACTION SCRIPTING USING FLASH		6			
6.	OOP : Motion	1	C	1	1
7.	Drawing with Vectors and Pixels	2	C	1	
8.	Text	1	C	1	1
9.	Understanding XML	2	C	2	1
UNIT III : FLEX BASICS		6			
10.	Setting up the environment	1	C	3	3
11.	Using Design mode and Source mode	2	C	3	3
12.	Basics of Scripting	2	C,I	3	1,3

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
13.	Adding Interactivity with Action Script	1	C,I	3	2
UNIT IV: DATA BINDING AND VALIDATION		6			
14.	Using Data Binding	1	I	4	
15.	Laying Out the Application	1	C,I	3	1
16.	Creating Rich Forms	2	C,I	3	1,3
17.	Gathering and Displaying Data	2	C,I	3	1,3
UNIT V: ADOBE AIR		6			
18.	Introduction : Adobe air	1	C	5	3,4
19.	Applications, Windows, Menus	2	C	5	3,4
20.	File System Integration	1	C	5	3,4
21.	Using Local databases	1	C,I	4	3,4
22.	HTML in AIR.	1	C,I	4,5	3,4
Total Contact Hours		30*			
Tutorial Hours		30			

Sl. No.	LEARNING RESOURCES
1.	Rich Shupe and Zevan Rosser, “Learning ActionScript 3.0: A Beginner’s Guide”, Adobe Developer Library, First Edition, ISBN : 860-1416852249.
2.	ChaficKazoun and Joey Lott, “Programming Flex 3”, Adobe Developer Library, First Edition , ISBN : 9788184047233
3.	Michael Labriola, “Breaking out of Web Browser with Adobe AIR”, 2009, Prentice Hall, Inc., ISBN: 9783642022661
4	Joseph Lott, Kathryn Rotondo, Sam Ahn and Ashley Atkins, “Adobe AIR in Action”, 2009, Manning Publications Co, ISBN: 9781933988481

Course nature				Theory +Tutorial		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
				X						X	X	X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies				
		X						X								
		Not Applicable														
4	Staff coordinator															

15IT447E	ADVANCED WEB APPLICATION DEVELOPMENT	L	T	P	C
		2	2	0	3
Co-requisite:	NIL				
Prerequisite:	15IT304J Web Programming				
Data Book / Codes/Standards	NIL				
Course Category	P PROFESSIONAL ELECTIVE				
Course designed by	Department of Information Technology				
Approval	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	Advanced Internet-scale systems and applications are geographically distributed, highly available, incrementally scalable, and dynamically configurable. This course reviews concepts, techniques; frameworks involved in such advanced Internet application development and explore the different components (like databases, web services, scripting etc.) that are used to compose such applications.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Generate web page using AJAX, JQUERY and JSP	i					
2.	Understand web site dynamic behaviour and server side programming	i					
3.	Understanding persistence Data storage	j					
4.	Generate dynamic web pages using databases.	i					
5.	Develop web services and comprehend the significance of frameworks	l					

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : HTML5 and AJAX		6			
1.	Introduction : Rich Internet Applications.	1	C	5	1
2.	HTML 5 :Responsive web design HTML and CSS Frameworks. Introduction to Javascript, Objects and Events	2	C,I	2	1
3.	Basic AJAX, History of AJAX , AJAX using XMLHttpRequest object- using XML and DOM , creating a full scaled AJAX Enabled Application using JSON.	2	C,I	1	1
4.	DoJo Frameworks, Yahoo UI.	1	C	5	1
UNIT II : JQUERY		6			
5.	JQuery basic, jquery core ,events, effects, plugins	2	C,I	1	2,4
6.	user interface using jQuery UI	2	I	1	2,4
7.	Advanced Topics: code organization, advanced event handling, effects and DOM	2	C,I	1	2,4
UNIT III : JSP and SERVLETS		6			
8.	Overview of JSP2.2 and Servlet 3.1, creating dynamic web pages using JSPStandard	1	C	1,2	5
9.	Tag Library, Database Access, XML Data, Java Beans , Custom Tags	2	CI	1,2	5

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
10.	Expression Language , Annotations, Filters, Event handling	2	C,I	1,2	5
11.	Exception Handling, Asynchronous processing, Debugging, Security, Internationalization.	1	C	1,2	5
UNIT IV : DATABASE CONNECTIVITY		6			
12.	Introduction, Relational Database: SQL-MYSQL-JDBC-Driver and Connection Management, Understanding JDBC ODBC connectivity	2	C,I	3,4	1
13.	Connection and Pooled connection, Resultset, Datatype support	1	C,I	3,4	1
14.	Statements, Prepared statement, Callable statements	1	C,I	3,4	1
15.	Microsoft Language Integrate Query , LINQ to SQL , Querying a Database using LINQ, Dynamically binding LINQ to SQL	2	C,I	3,4	1
UNIT V : WEB SERVERS and WEB FRAMEWORKS		6			
16.	Web servers: Introduction , HTTP/HTTPS Transactions ,Multi tier Application architecture, Configuring web servers, Apache installation , Microsoft IIS Expressand web matrix- Web Frame works.	2	C,I	5	1
17.	MVC Struts, Java Server Faces (JSF) POJO	2	C	5	1
18.	WebSevices : WSDL, UDDI, SOAP-RPC and Restful web services. Introduction to Ruby on Rails	2	C,I	5	1
Total Contact Hours		30*			
Tutorial Hours		30			

Sl. No.	LEARNING RESOURCES
1.	Paul J. Deitel, Harvey Deitel, Abbey Deitel , Internet and World Wide Web How to Program ,Deitel Associates,5th Edition, 2011 ,ISBN: 0132151006, 9780132151009
2.	Jonathan Chaffer, Karl SwedbergLearningjQuery, Packt Publishing, 4 th Edition ,2013. ISBN13: 9781782163145
3.	Rebecca Murphey,“jQuery Fundamentals”, First Edition,2011, ISBN13 : 9781446671405
4.	www.W3Schools.com as on date: 18/04/2016
5.	http://www.tutorialspoint.com/jsp/ as on date: 18/04/2016

Course nature				Theory +Tutorial		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
										X	X		X		
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		X						X							
		Not Applicable													
4	Staff coordinator														

15IT448E	CLOUD APPLICATION DEVELOPMENT	L	T	P	C
		2	2	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	15SE205J Programming in Java				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	Nowadays cloud computing has drawn the attention of researchers and industries worldwide. Cloud computing increases the efficiency, flexibility, collaboration and solves the challenges faced by small businesses. Therefore, this course deals with design and development of various programming model and applications on private cloud environment.						
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES				
At the end of the course, student will be able to							
1.	Understand different virtualization technique through theoretical concepts and practical training	a	i				
2.	Understand the practical implementation of MapReduce application developments on cloud based hadoop framework	i	j				
3.	Become knowledgeable and expertise in cloud application development process	j	k				
4.	Develop and deploy applications on private cloud environment like Eucalyptus and Open nebula	j	l				

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION TO CLOUD COMPUTING AND RESOURCE VIRTUALIZATION		6			
1.	Cloud Computing delivery models and services, Introduction to Virtualization, Layering and virtualization, Virtual machine monitors, Virtual machines, Performance and Security Isolation	3	C	1	1
2.	Full virtualization and paravirtualization, Hardware support for virtualization, Case study: Xen, a VMM based on paravirtualization	3	C	1	1
UNIT II : CLOUD COMPUTING APPLICATIONS AND PARADIGMS		6			
3.	Challenges for cloud computing, Existing cloud applications and new application opportunities,	2	C	2	1
4.	Architectural styles for cloud applications	1	C	2	1

Session	Description of Topic (Theory)	Contact Hours	C-D-I-O	IOs	Reference
5.	Workflows: Coordination of multiple activities, Coordination based on a state machine model, ZooKeeper, MapReduce programming model, Install Hadoop on Windows system	3	C	2	1,2
UNIT III : CLOUD BASED APPLICATION DEVELOPMENT		6			
6.	Amazon Web Services: EC2 instances, Connecting clients to cloud instances through firewalls, Application and transport layer protocols in EC2	3	C,I	3	1,7
7.	Launch and connect EC2 Linux instance, Use S3 in Java, Install Simple Notification Service on Ubuntu, Create EC2 Placement Group and use MPI	3	C,I	3	1,7
UNIT IV: OPENNEBULA-A CLOUD ON VMWARE VCENTER		6			
8.	Overview of Components and Accounts, Simple Cloud Deployment, Download and Deploy vOneCloud, Import Existing vCenter, Create a Virtual Data Center, Interfaces	3	C,I	4	3
9.	Security and Resource Consumption Control, Guest Configuration, Infrastructure Configuration, Appliance Configuration	3	C,I	4	3
UNIT V: EUCALYPTUS OPEN-SOURCE PRIVATE CLOUD		6			
10.	Introduction to Eucalyptus, Eucalyptus Overview, Eucalyptus Components, System Requirements	2	C	4	4,5,6
11.	Eucalyptus Installation, Eucalyptus Network Migration and Upgrade, Eucalyptus Upgrade, Euca2ools Standalone Installation, Overview of Euca2ools, Installing Euca2ools, Configuring Euca2ools, EC2 Compatible Commands	4	C,D,I	4	4,5,6
Total Contact Hours		30*			
Tutorial Hours		30			

Sl. No.	LEARNING RESOURCES
1.	Dan C.Marinescu, "Cloud Computing - Theory and Practice", 1st Edition, Morgan Kaufmann is an imprint of Elsevier, 2013, ISBN:9780124046276.
2.	BirisLublinsky, Kevin T. Smith and Alexey Yakubovich, "Professional Hadoop Solutions", Reprint 2014, Wiley, ISBN 13:9788126551071.
3.	The Open Replacement for vCloud - Bring your VMware environment to the Cloud in 5 minutes. http://vonecloud.today/ , http://docs.vonecloud.com/1.8/as on date: 21/04/2016.

Sl. No.	LEARNING RESOURCES
4.	Eucalyptus 3.4.2 FastStart Guide. http://docs.hpcloud.com/pdf/static/Eucalyptus_3.4/faststart-guide-3.4.2.pdf as on date: 21/04/2016.
5.	Cloud services for your virtual infrastructure, Part 1: Infrastructure-as-a-Service (IaaS) and Eucalyptus. http://www.ibm.com/developerworks/library/os-cloud-virtual1/as on date: 21/04/2016.
6.	YohanWadia, "The Eucalyptus Open-Source Private Cloud". http://www.cloudbook.net/resources/stories/the-eucalyptus-open-source-private-cloud as on date: 21/04/2016.
7.	ArshdeepBahga, Vijay Madiseti, "Cloud Computing: A Hands-On Approach", University Press, 2016, ISBN: 9780996025508.

Course nature				Theory +Tutorial		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Tutorial	Total
	Weightage	10%	10%	15%	15% [Experiments (10%) + Mini Project(5%)]	50%
End semester examination Weightage :						50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
		X								X	X	X	X			
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
													X			
3	Broad Area(for p only)	Programming			Networking			Data base		Web System		Human Computer Interaction			Platform Technologies	
															X	
4	Staff coordinator															

OPEN ELECTIVES

15IT451E	INFORMATION SECURITY	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P OPEN ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	To provide impeccable knowledge on various technical aspects of Information Security and Principles of Computer Security.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Provide foundation for understanding the key issues associated with protecting Computer Systems and Information Assets.	j				
2.	Provide competency in designing consistent & reasonable Information security system with appropriate Scanning and Enumeration mechanisms, Code of Ethics in information security.	j				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION TO INFORMATION SECURITY		8			
1.	Components of Information Systems	1	C	1	1
2.	Need for Security: Espionage or Trespass	1	C	1	1
3.	Human Error and Sabotage	1	C	1	2
4.	Forces of Nature	1	C	1	1
5.	Software attacks	2	C	1	1
6.	Access Controls: System Access, Data Access	2	C	1	1
UNIT II: COMMUNICATION SECURITY		10			
7.	Introduction to cryptography and terminology	1	C	1	1
8.	Cipher Methods	2	C	1	1
9.	Cryptographic Algorithms	2	C,I	1	1
10.	Cryptographic Tool	2	C	1	1
11.	Protocol for Securing Email	1	C,I	1	1
12.	Protocol for Securing Internet and Web Transactions	1	C,I	1	1
13.	Securing TCP/IP and Wireless networks	1	C,I	1	1
UNIT III: NETWORK SECURITY		9			
14.	Introduction to Network Security	1	C	2	2
15.	E-mail Security	1	C,I	2	2
16.	IP Security	2	C,I	2	2

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
17.	Web Security	2	C,I	2	2
18.	Kerberos	2	C	2	2
19.	X.509 Techniques	1	C	2	2
UNIT IV: SCANNING AND ENUMERATION TECHNOLOGY		9			
20.	Access Control Mechanism	1	C,I	2	1
21.	Firewall Processing Modes and Firewall Architecture	2	C,I	2	1
22.	Firewall Rules and Managing firewall	2	C,I	2	1
23.	Virtual Private Network(VPN)	1	C,I	2	1
24.	Intrusion Detection and Prevention Systems(IDPS)	2	C,I	2	1
25.	Honeypots and Honeynets	1	C,I	2	1
UNIT V: LEGAL, ETHICAL AND PROFESSIONAL ISSUES IN INFORMATION SECURITY		9			
26.	Laws and Ethics in Information Security	1	C	1,2	1
27.	International Laws and Legal Bodies	2	C	1,2	1
28.	Ethical differences across cultures	1	C	1,2	1
29.	Ethics and Information Security	2	C	1,2	1
30.	Code of Ethics at professional organizations	2	C	1,2	1
31.	Code of ethics for Software professionals	1	C	1,2	1
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	Michael E. Whitman and Herbert J. Mattord, "Principles of Information Security", 5 th Edition, CENGAGE Learning, 2015, ISBN:9781285448367 ,
2.	William Stallings, "Cryptography and Network Security", 6th Edition, Pearson Education, 2014, ISBN:0133354695

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
											X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
				X									X		
4	Staff coordinator														

15IT452E	INTRODUCTION TO DATABASE MANAGEMENT SYSTEM	L	T	P	C
		3	0	0	3
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	P PROFESSIONAL ELECTIVE				
Course designed by	Department of Information Technology				
Approval	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	Designing database for different applications is an important area of program development. This course helps students to understand the problems with file processing system and how it can be handled effectively in Database System through various design tools, design techniques and query language.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able						
6.	To learn the fundamentals of Database management system and design database for a given problem.	c				
7.	To understand the basic and advanced features of SQL.	c				
8.	To understand various levels of Normalization techniques that helps to design a good database.	c	i			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION		8			
1.	File Processing System; Advantages of DBMS over File Processing System	1	C	1	1
2.	Data; Database; DBMS; Data model	1	C	1	1
3.	Data Independence; Data Catalog	1	C	1	1
4.	DBMS Architecture and Data Abstraction	1	C	1	1
5.	DBMS Languages	1	C	1	1
6.	DBMS System Structure	1	C	1	2
7.	ER Model: Objects, Attributes and its Type, Entity and Entity Set	1	C,D	1	1
8.	ER Model:Relationship and Relationship Set	1	C,D	1	1
UNIT II:DATABASE DESIGN		9			
9.	Design Issues in choosing attributes or entity set or relationship set;Constraints	2	C,D	1	2
10.	Super Key; Candidate Keys; Primary Key	1	C	1	1
11.	ER Diagram Notations; Goals of ER Diagram; Weak Entity Set	2	C,D	1	1
12.	ER Diagram Construction	3	C,D	1	1
13.	Tabular Representation of Various ER Schema	1	C	1	2
UNIT III:INTRODUCTION TO STRUCTURED QUERY LANGUAGE		8			
14.	Introduction to SQL and Databases	1	C	2	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
15.	DDL: Creating Databases and Tables; Selecting and Filtering Records	1	C,I	2	1
16.	DML: Data Manipulation Language, Inserts, Updates, and Deletes	2	C,I	2	1
17.	Union, Intersect, and Except	2	C,I	2	1
18.	Join operations:equi join and non equi join	2	C,I	2	1
UNIT IV:ADVANCED STRUCTURED QUERY LANGUAGE		10			
19.	SQL constraints; Using Views	1	C,I	2	1
20.	Using Sub queries	2	C,I	2	1,2
21.	Grouping Data and Using Aggregate Functions	3	C,I	2	1,2
22.	Procedures-Trigger	3	C,I	2	1,2
23.	SQL Transactions	1	C,I	2	
UNIT V: DEPENDENCIES AND NORMAL FORMS		10			
24.	Pitfalls in relational databases	1	C	3	3
25.	Decomposing bad schema; Need for Decomposition; Desirable Properties of Decomposition	2	C	3	3
26.	1NF; Super Key and Functional dependency: Closure of Functional Dependency Set; Closure of Attribute Set	3	C	3	3
27.	Minimal Functional Dependency Set	2	C	3	3
28.	2NF; BCNF; 3 NF	2	C	3	3
Total Contact Hours		45*			

LEARNING RESOURCES	
1.	Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", 6 th Edition , McGraw-Hill , 2010, ISBN:0-07-352332-1
2.	Raghu Ramakrishnan, Johannes Gehrke, "Database Management System", 3 rd Edition McGraw Hill., 2007, ISBN:978-0072465631
3.	Elmasri&Navathe, "Fundamentals of Database System", 6 th Edition, Addison-Wesley Publishing, 2010, ISBN:978-0136086208
4.	Date C.J, "An Introduction to Database", 8 th Edition , 2003, Addison-Wesley Pub Co, ISBN: 978-0321197849

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
				X						X						
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies			
						X										
4	Staff coordinator															

15SE329E	VISUAL PROGRAMMING	L	T	P	C
		2	2	0	3
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	P	PROFESSIONAL ELECTIVE			
Course designed by	Department of Software Engineering				
Approval	32 nd Academic Council Meeting, 23 rd July, 2016				

PURPOSE	To acquire knowledge in windows and visual programming concepts..						
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES				
At the end of the course, student will be able							
9.	Understand the basics of C# and .NET framework		a				
10.	Develop applications using object-oriented aspects of C#		a	b			
11.	Design Windows applications		a	b	e		
12.	Create Database applications using ActiveX Data Objects		a	b	e		
13.	Develop Web based applications		a	b	e		

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION TO C#		7			
1.	Introducing C# - Understanding .NET Framework	1	C	1	1
2.	Overview of C# - Literals – Variables Data Types – Operators – Constants - Expressions	1	C	1	1
3.	Program Control Statements: Branching, Looping	1	C,I	1	1
4.	Casting - Methods	1	C,I	1	1
5.	Arrays: Array Class, Array List	1	C,I	1	1
6.	Strings: String, String Builder	1	C,I	1	1
7.	Structures - Enumerations	1	C,I	1	1
UNIT II: OBJECT ORIENTED ASPECTS OF C#		6			
8.	Class – Objects, Constructors – Types of Constructors	2	C	3	1,3
9.	Inheritance and its types	1	C,I	2	1,2
10.	Indexers and Properties	1	C	2	1,2
11.	Polymorphism – Operator and Method Overloading	1	C,I	2	1,2
12.	Interfaces, Abstract Class	1	C,I	2	1,2
13.	Event Handling, Errors and Exception Handling	1	C,I	2	1,2
UNIT III: APPLICATION DEVELOPMENT ON .NET		6			
14.	Building Windows Application	1	C,I	3	2,3

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
15.	Creating Window Forms with Events and Controls	1	C,D	3	2,3
16.	Menu and Toolbar	1	C,D,I	3	2,3
17.	Delegates - Inheriting Window Forms	1	C,I	3	2,3
18.	SDI and MDI Application	1	C,I	3	2,3
19.	Dialog Box: Modal and Modeless	1	C,I	3	2,3
UNIT IV: DATABASE APPLICATION ON .NET		5			
20.	Accessing data with ADO.NET: DataSet, Typed DataSet, Data Adapter	1	C,D	4	2,3
21.	Updating Database using Stored Procedures	1	C,I	4	2,3
22.	SQL Server with ADO.NET	1	C,D,I	4	2,3
23.	Handling Exceptions – Validating Controls	1	C,I	4	2,3
24.	Windows Application Configuration	1	C	3	2,3
UNIT V: WEB BASED APPLICATION DEVELOPMENT ON .NET		6			
25.	Programming Web Application with Web Forms	1	C	5	2,5
26.	Introduction to ASP.NET, Working with XML and .NET	1	C,I	5	2,5
27.	Creating Virtual Directory and Web Application	1	C,D,I	5	2,5
28.	Session Management	1	C,D,I	5	2,5
29.	Web Services – web.config, Passing Datasets and Returning Datasets from Web Services	1	C,I	5	2,5
30.	Transaction Handling, Exception Handling – Returning Exceptions from SQL Server	1	C,I	5	2,5
31.					
Total Contact Hours		45			

Course designed by		Department of Software Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X	X			X									
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(For P Only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
										X					
4	Staff coordinator														

15SE333E	PERVASIVE COMPUTING	L	T	P	C
		3	0	0	3
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	P	PROFESSIONAL ELECTIVE			
Course designed by	Department of Software Engineering				
Approval	32 nd Academic Council Meeting, 23 rd July, 2016				

PURPOSE	This course provides a way to understand the concepts of WIRELESS LAN, WAP, WML, PDA and its issues..						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able							
1.	Understand the fundamental elements of pervasive computing.	b					
2.	Learn the design process of Pervasive Computing Environments and its solutions	c					
3.	Familiarize hardware, software and the aspects involved in pervasive computing	c	I				
4.	Comparative study of protocols, languages, models & technologies involved	g					
5.	Learn WAP and voice technology.	i	J				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I - INTRODUCTION		10			
32.	Pervasive Computing: Past, Present and Future Pervasive computing,	1	C	1	1,2
33.	The radio _frequency spectrum- Analog modulation schemes -Amplitude modulation-frequency and phase modulation	3	C	2	1,2
34.	Application examples: Retail, Airline check-in and booking, Healthcare	1	C,I	1,2	1,2
35.	Tracking , Car information system, Sales Force Automation , E-mail access via WAP and voice	1	C,I	1,2	1
36.	Device Technology: Hardware, Human machine interface	1	C	3	1
37.	Bio metrics, Operating systems	2	C	3	1
38.	Java for pervasive devices	2	C	4	1
UNIT II DEVICE CONNECTIVITY & WEBAPPLICATION CONCEPTS		9			
39.	Device connectivity : Protocols: wireless, mobile phone technologies, mobile internet protocol	2	C	3	1,3
40.	Synchronization and replication protocol, distributed services and message and transaction protocols	2	C	4	1,3

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
41.	Security	2	C	3	1,3
42.	Device Management	1	C	3	1
43.	Web Application Concepts: WWW Architecture and Protocols	1	C	4	1
44.	Transcoding , Client Authentication via Internet	1	C	4	1
UNIT III WAP & VOICE TECHNOLOGY		8			
45.	WAP and Beyond: Introduction, Components of the WAP architecture	1	C	5	1
46.	WAP infrastructure, WAP security issues	1	C,O	5	1
47.	Wireless Markup Language , WAP push	2	C,D	4,5	1
48.	Products,i-Mode	1	C	5	1
49.	Voice Technology: Basics of Speech recognition, Voice Standards	2	C,I	5	1
50.	Speech Applications, Speech and Pervasive Computing, security	1	C,I	5	1
UNIT IV PDA & PERVASIVE WEB APPLICATION ARCHITECTURE		9			
51.	Device Categories, PDA operation Systems	2	C	3	1
52.	Device Characteristics, Software Components	1	C	3	1
53.	Standards, Mobile Applications, PDA Browsers	2	C	3	1
54.	Pervasive Web Application architecture: Background, Scalability and availability, Development of Pervasive Computing web applications	2	C	2,3	1
55.	Pervasive application architecture.	2	C	2	1
UNIT V –APPLICATION IN PERVASIVE COMPUTING		9			
56.	User Interface Issues in Pervasive Computing, Architecture	3	C	2	1
57.	Smart Card- based Authentication via internet and ordering Goods	2	C,I	2	1
58.	Access from WAP	2	C,I	2	1
59.	Access from personal digital assistants	2	C,I	2	1
60.	Access via voice	2	C,I	2	1
Total Contact Hours		45			

LEARNING RESOURCES

Sl. No.	TEXT BOOKS
6.	Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, "Pervasive Computing, Technology and Architecture of Mobile Internet Applications", Pearson Education, 2012. ISBN-13: 978-0201722154

REFERENCE BOOKS/OTHER READING MATERIAL

7.	UweHansmann, L. Merk, M. Nicklous, T. Stober, U. Hansmann, “PervasiveComputing (Springer Professional Computing) ”, 2003, Springer Verlag,ISBN:3540002189.
8.	Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, “Fundamentals of Mobile and Pervasive Computing”, McGraw Hill edition, 2006. ISBN-13: 978-0071412377

Coursenature				Theory			
AssessmentMethod(Weightage100%)							
In-semester	Assessment tool	CycletestI	CycletestII	CycletestIII	Surprisetest	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

Course Designed by		Department of Software Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
			X	X				X		X	X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
												X			
4	Staff coordinator														

15SE427E	WIRELESS AND MOBILE COMMUNICATION	L	T	P	C
		3	0	0	3
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book /	NIL				
Codes/Standards					
Course Category	P	PROFESSIONAL ELECTIVE			
Course designed by	Department of Software Engineering				
Approval	32 nd Academic Council Meeting, 23 rd July, 2016				

PURPOSE	The purpose of learning this course is to know about the fundamental concepts of mobile communications and wireless networks technologies.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able							
1.	Apply wireless technology concepts to Engineering problems related to communication	a					
2.	Improve their knowledge on digital and analog modulation techniques.	a	C				
3.	Equip themselves familiar with principles of mobile communication	a					
4.	Familiarize with the digital cellular standards	a	C				
5.	Expose to the emerging wireless technologies	a	B				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION TO ANALOG AND DIGITAL MODULATION SCHEMES		9			
1.	Introduction to wireless communication and Elements of a wireless communication system, signal and noise	2	C	1,2	1,2,3,4,5
2.	The radio frequency spectrum- Analog modulation schemes-Amplitude modulation-frequency and phase modulation	3	C	2	1,2,3,4
3.	Introduction to Digital modulation - Frequency shift keying-Phase shift keying	2	C,D	2	1,2,3,4
4.	Multiplexing and Multiple access- Spread spectrum systems.	2	C,D	2	1,2,3,4
UNIT II: PRINCIPLES OF MOBILE COMMUNICATION		9			
5.	Cellular concept- Cell area- signal strength and cell parameter-capacity of cell	2	C	2	1,3,4,6
6.	Co channel interference-Frequency reuse concept- Cell splitting – cell sectoring-multiple radio access protocols	2	C,D	2	1,2,3

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
7.	Frequency division Multiple Access – Time Division Multiple Access- Space Division Multiple Access-Code	3	D	2	2
8.	Division Multiple AccessOFDM- Comparison of multiple division techniques.	2	D,I	1,2	2
UNIT III: DIGITAL CELLULAR STANDARDS		9			
9.	GSM -frequency bands and channels- frames in GSM –Interfaces ,planes and layers of GSM	2	C	4	2,7
10.	Handoff-short messaging service-GPRS-EDGE-	2	D	4	1,2
11.	3G CELLULAR SYSTEMS-MMS-UMTS-Satellite systeminfrastructure-GPS-Limitations of GPS-Beneficiaries ofGPS-	3	C,D	4	2,9
12.	4G cellular systems - 4G– standards(LTE/wimax)	2	C,D	4	5,6,9
13.	Mobile IP-goals-IP Packet delivery-Tunneling-Reversetunneling	2	C,D	3	3,9
UNIT V: DEPENDENCIES AND NORMAL FORMS		10			
14.	IPV6-Dynamic host routing protocol	1	D	3	6
15.	Traditional TCP-Congestion control-classical TCP-Snooping-Mobile TCP	2	D	3	3
16.	Transaction oriented TCP-TCP over 2.5/3G WirelessNetworks	2	C	3	3
17.	Wireless Application protocol-architecture-wireless transportlayer security-wireless markup language-Push architecture.	2	C,D	3	3
UNIT V:EMERGING WIRELESS TECHNOLOGIES					
IEEE 802.11-IEEE802.15, Mobile ad hoc networks –					
18.	CharacteristicsRouting-AODV ,VANETS - wireless sensor networks	2	D,I	5	2
19.	RFID technology Wi –Fi standards – Wimax standards	2	C,D	5	2,8
20.	Femtocell network – Push -to –talk technology for SMS.	2	D,I	5	2
Total Contact Hours		45			

LEARNING RESOURCES	
Sl. No.	TEXT BOOKS
9.	Roy Blake, “Wireless communication technology” CENGAGE Learning, sixth Indian reprint 2013.
10.	Dharma PrakashAgrawal , Qing –An Zeng , “ Introduction to wireless and mobile systems” CENGAGE Learning, first edition 2014.
11.	Jochen Schiller, “Mobile Communications”, Addison Wesley, 2nd Edition, 2011
12.	Singal T.L. , “Wireless communication” Tata McGraw Hill Education private limited , 2011.
REFERENCE BOOKS/OTHER READING MATERIAL	
13.	G.I Papadimitriou, A.S. Pomportsis, P.Nicopolitidis, M.S.Obaidat, “Wireless Networks”, John-Wiley and Sons,2003.
14.	Gray J.Mullet,”Wireless Telecommunications Systems And Networks “,CengageLearning,Reprint
15.	UpenaDalal, “Wireless communication” Oxford University press, first edition 2009.
16.	KavehPahlavan&Prashant Krishnamurthy, “Wireless Networks” PHI,2002.
17.	MartynMallick, “Mobile and Wireless Design Essentials”, Wiley Dreamtech India Pvt. Ltd., 2004.

Coursenature				Theory			
AssessmentMethod(Weightage100%)							
In-semester	Assessment tool	CycletestI	CycletestII	CycletestIII	Surprisetest	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

Course designed by		Department of Software Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X	X	X											
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
				X											
4	Staff coordinator														

15CS322E	NEUROFUZZY AND GENETIC PROGRAMMING	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	Nil				
<i>Prerequisite:</i>	Nil				
<i>Data Book/Codes/Standards</i>	Nil				
<i>Course Category</i>	P Professional Elective				
<i>Course designed by</i>	Department of Computer Science and Engineering				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	This course provides a way to understand the concepts of Neural Networks, Fuzzy Systems and Genetic Algorithms and its applications				
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES		
At the end of the course, students will be able to					
1.	Understand the fundamentals of Neural Networks	a			
2.	Learn the various topologies and learning algorithms of ANN	a	i		
3.	Understand the principles and fundamentals of Fuzzy Logic	a			
4.	Understand the Fuzzy Rule based systems	a	i		
5.	Understand the concepts and techniques of Genetic Algorithms	a	i		

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
UNIT I FUNDAMENTALS OF ARTIFICIAL NEURAL NETWORKS AND SIMPLE MODELS		8			
1.	Biological and Artificial Neuron, History of ANN	1	C	1	1,2,4
2.	ANN architectures and Learning Algorithms	1	C	1	1,2,4
3.	Activation Functions, Bias Threshold and other parameters	1	C	1	1,2,4
4.	McCulloch Pitts model, Simulation of Logic Functions	1	C	1	1,2,4
5.	Perceptron Network, Hebbian network	1	C	1	1,2,4
6.	Linear Separability problem and solutions	1	C	1	1,2,4
7.	ADALINE and MADALINE networks	1	C	1	1,2,4
8.	Practice of Neural Network tool: Simple Logic functions, XOR problem,	1	C,I	1	1,2,4
UNIT II FEEDFORWARD NETWORK, PATTERN ASSOCIATION, UNSUPERVISED LEARNING		10			
9.	Delta Rule, Derivation of GDR	1	C	2	1,2,4
10.	Backpropagation Algorithm, Local Minima Problem	1	C	2	1,2,4
11.	Radial Basis Function	1	C	2	1,2,4
12.	Pattern Association, Auto Associative nets	1	C	2	1,2,4
13.	Hetero Associative nets	1	C	2	1,2,4
14.	Bidirectional Associative Memory	1	C	2	1,2,4
15.	Hopfield network	1	C	2	1,2,4
16.	Competitive networks: Maxnet, SOM	1	C	2	1,2,4

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
17.	Learning Vector Quantization, Adaptive Resonance Theory	1	C	2	1,2,4
18.	Practice of Neural Network tool: Delta rule, Associative memory, LVQ	1	C,I	2	1,2,4
UNIT III FUNDAMENTALS OF FUZZY LOGIC		10			
19.	Crisp sets, Fuzzy sets, Fuzzy membership functions	1	C	3	1,2,5
20.	Operations of Fuzzy sets, Fuzzy Relations, Operations	1	C	3	1,2,5
21.	Fuzzy Extension Principle	1	C	3	1,2,5
22.	Crisp Relations, Fuzzy relations, Properties, operations,	2	C	3	1,2,5
23.	Crisp Logic, Propositional Logic, Predicate Logic Rules of Inference	2	C,D	3	1,2,5
24.	Fuzzy Truth, Fuzzy Rules,	1	C	3	1,2,5
25.	Fuzzy Reasoning	1	C	3	1,2,5
26.	Practice of Fuzzy Logic tool: Fuzzy functions, operations	1	C,I	3	1,2,5
UNIT IV FUZZY RULE BASED AND INFERENCE SYSTEMS		8			
27.	Fuzzification of Input Variables, Application of Fuzzy operations	1	C	4	1,5
28.	Evaluation of Fuzzy rules, Aggregation of output Fuzzy sets	1	C	4	1,2,5
29.	Rule based systems, Conventional programs vs Rule based systems	1	C	4	1,2,5
30.	Fuzzy Propositions	1	C	4	2,5
31.	Fuzzification and Defuzzification	1	C	4	1,2,5
32.	Fuzzy Controller: Air conditioner control, Cruise Controller	1	C	4	1
33.	Fuzzy Decision making	1	C	4	1,2
34.	Practice of Fuzzy Logic tool: Fuzzy controller design and applications	1	C,I	4	1,2
UNIT V CONCEPTS AND TECHNIQUES OF GENETIC ALGORITHMS		9			
35.	History of Evolutionary Computing, Genetic Algorithms, basic concepts	1	C	5	1,2,3,6
36.	GA Cycle, Fitness Function, Introduction to GA Operators	1	C	5	1,2,3,6
37.	Selection Operators, Crossover, Mutation Operations	2	C	5	1,2,3,6
38.	Schema Theorem, Example	1	C,D	5	1,2,3,6
39.	Classification of Genetic Algorithm	1	C	5	1,2,3
40.	Holland Classifier Systems	1	C	5	1,2,3
41.	Genetic Programming, Data Representation	1	C	5	1,2,3

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
42.	Application of Genetic Algorithm, Genetic Operators	1	C,D,I	5	1,2,3,6
Total contact hours		45*			

LEARNING RESOURCES

Sl.No.	TEXT BOOKS
1.	Samir Roy, Udit Chakraborty, "Introduction to Soft Computing: Neuro-Fuzzy and Genetic Algorithms", Pearson Education, 2013
2.	B.K. Tripathy, J. Anuradha, "Soft Computing", Cengage Learning, 2015
3.	S.N. Sivanadam, S.N. Deepa, "Principles of Soft Computing, Wiley India Edition, 2007
4.	Laurene Fausett, "Fundamentals of Neural Networks, Architectures, Algorithms and Applications", Pearson Education, 2008
REFERENCE BOOKS/OTHER READING MATERIAL	
5.	Timothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill International Editions, 1995
6.	David E. Goldberg, "Genetic Algorithms - In Search, optimization and Machine Learning", Pearson Education

Coursenature				Theory			
AssessmentMethod(Weightage100%)							
In-semester	Assessmenttool	CycletestI	CycletestII	CycleTestIII	SurpriseTest	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

* Excluding Assessment Hours

Course Designed by		Department of Computer Science and Engineering														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
		X								X						
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
												X				
3	Broad Area (for p only)	Programming			Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
		X					X		X							
4	Staff coordinator															

15CS323E	DISTRIBUTED COMPUTING	L	T	P	C
		3	0	0	3
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book/Codes/Standards	Nil				
Course Category	P Professional Elective				
Courses designed by	Department of Computer Science and Engineering				
Approval	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	To provide knowledge on principles and practice underlying in the design of distributed systems.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Layout foundations of Distributed Systems.			a			
2.	Get familiar with the idea of middleware and related issues			a			
3.	Understand in detail the system level and support required for distributed system			a			
4.	Understand the issues involved in studying data and cryptographic algorithms			a	e		
5.	Exposure to the concept of design and implementation of distributed file systems			a	c		

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION		7			
1.	Introduction - overview of syllabus-Applications	1	C	1-5	1-3
2.	Examples of Distributed Systems	2	C	1	1
3.	Trends in Distributed Systems	2	C	1	1
4.	Focus on resource sharing	1	C	1	1
5.	Challenges	1	C	1	1
UNIT II: COMMUNICATION IN DISTRIBUTED SYSTEM		9			
6.	System Model – Physical model	1	C,D	2	1
7.	Architectural Model	1		2	1,3
8.	Fundamental Model	2	C,D	2	1
9.	Interprocess Communication	1	C,D	2	1
10.	External data representation and Multicast communication	1	C,D	2	1
11.	API for internet protocols	1	C,D	2	1
12.	Network Virtualization: Overlay Networks	1	C,D	2	1
13.	Case Study: MPI	1	C,D	2	1
UNIT III: REMOTE METHOD INVOCATION AND OBJECTS		10			
14.	Remote Invocation – Introduction	1	C	3	1
15.	Request-reply protocols	1	C	3	1
16.	Remote procedure call	1	C	3	1
17.	Remote method invocation	1	C	3	1,2
18.	Design Issues	2	C,D	3	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
19.	Group communication - Publish-subscribe systems	2	C,D	3	1,3
20.	Shared memory approaches - Distributed objects	1	C	3	1,3
21.	Case study: CORBA	1	C	3	1
UNIT IV: SECURITY		10			
22.	Introduction - Overview of security techniques	1	C	4	1
23.	Cryptographical algorithms	3	C,I	4	1
24.	Digital Signatures	2	C,I	4	1
25.	Cryptography pragmatics	2	C	4	1
26.	Case study: Kerberos	2	I	4	1
UNIT V: Distributed File System and Name Services		9			
27.	Distributed File Systems - Introduction	1	C	5	1
28.	File service architecture	2	C,D	5	1
29.	Case study: Andrew Filesystem	2	C	5	1
30.	Name Services - Introduction	1	C	5	1
31.	Name Services and Domain Name System	1	C	5	1
32.	Directory Services	1	C	5	1
33.	Case study: The X.500 Directory Service	1	C	5	1
Total Contact Hours		45*			

LEARNING RESOURCES

Sl.No.	TEXT BOOKS
1.	George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design" Fifth edition - 2011 - Addison Wesley.
REFERENCE BOOKS/OTHER READING MATERIAL	
2.	Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Pearson Education, 2007.
3.	Liu M.L., "Distributed Computing, Principles and Applications", Pearson Education, 2004.

Coursenature				Theory			
AssessmentMethod(Weightage100%)							
In-semester	Assessmenttool	CycletestI	CycletestII	CycleTestIII	SurpriseTest	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

* Excluding Assessment Hours

Course Designed by		Department of Computer Science and Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n
		X		X		X									
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
				X											
4	Staff coordinator														

15CS324E	MACHINE LEARNING	L	T	P	C
		3	0	0	3
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book/Codes/Standards	Nil				
Course Category	P Professional Elective				
Courses designed by	Department of Computer Science and Engineering				
Approval	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	This Course will enable the students to study various aspects of Machine Learning and its applications useful in modern data processing						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, students will be able to							
1.	Understand the concepts of machine learning	a					
2.	Understand the clustering techniques and their utilization in machine learning	a	b				
3.	Study the neural network systems for machine learning	a	b				
4.	Learn and understand the linear learning models in machine learning	a					
5.	Study the tree based machine learning techniques and to appreciate their capability	a					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I: Introduction		9			
1.	Machine learning: What and why?	1	C	1	1,6
2.	Types of Machine Learning- Supervised Learning- Unsupervised Learning- reinforcement	1	C	1	1,2,6
3.	The Curse of dimensionality	1	C	1	1,6
4.	Overfitting and linear regression	1	C	1	1,6
5.	Bias and Variance	1	C	1	1,6
6.	Learning Curve	1	C	1	1,6
7.	Classification	1	C	1	1,6
8.	Error and noise	1	C	1	2,6
9.	Parametric vs. non-parametric models- Linear models	1	C	1	1,6
UNIT II: Clustering Approaches		9			
10.	Measuring (dis)similarity- Evaluating the output of clustering method	1	C	2	2,7
11.	Spectral clustering- Graph Laplacian - Normalized graph Laplacian	1	C	2	2,7
12.	Hierarchical clustering- Agglomerative clustering - Divisive clustering- Choosing the number of clusters	1	C	2	2,7
13.	Bayesian hierarchical clustering	1	C	2	2,7
14.	Clustering data points and features	1	C	2	2,7
15.	Bi-clustering	1	C	2	2,7
16.	Multi-view clustering	1	C	2	2,7

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
17.	K-Means clustering	1	C	2	2,7
18.	K-means clustering	1	C	2	2,7
UNIT III: NEURAL NETWORKS		9			
19.	Biological motivation for Neural Network; Neural network Representation	1	C	3	4
20.	Perceptrons	1	C	3	4
21.	Feedforward networks	1	C	3	4
22.	Multilayer Networks and Backpropagation Algorithms	2	C	3	4
23.	Convergence and local minima and Hidden layer representation in backpropagation	1	C,D	3	4
24.	Recurrent networks	1	C	3	4
25.	Application of neural network- Face recognition using neural network	2	C,D	3	4
UNIT IV: LINEAR MODELS		9			
26.	Linear Regression	1	C	4	2,5
27.	Logistic Regression	1	C	4	2,5
28.	Maximum Likelihood estimation (least squares)	1	C	4	1,5
29.	Robust linear regression	1	C	4	1,5
30.	Robust Linear Regression	1	C	4	1,5
31.	Ridge Regression	1	C	4	1,5
32.	Principal Component Analysis	1	C	4	1,5
33.	Bayesian Classifier	1	C	4	1 & 3
34.	Support Vector Machines	1	C	4	1
UNIT V: TREE LEARNING		9			
35.	Directed and Undirected trees	1	C	5	1
36.	Decision tree representation	1	C	5	3
37.	Basic decision tree learning algorithm	1	C	5	3
38.	Inductive bias in decision tree	1	C	5	3
39.	Issues in decision tree	1	C	5	3
40.	Classification and regression trees (CART)	1	C	5	1
41.	Random forest	1	C	5	1
42.	Multivariate adaptive regression trees (MART)	1	C	5	1
43.	Decision tree algorithm	1	C	5	1
Total contact hours		45*			

LEARNING RESOURCES

Sl.No. TEXT BOOKS

1.	Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012
2.	Ethem Alpaydin, "Introduction to Machine Learning", Prentice Hall of India, 2005
3.	Tom Mitchell, "Machine Learning", McGraw-Hill, 1997.
4.	Laurene Fausett, "Fundamentals of Neural Networks, Architectures, Algorithms and Applications", Pearson Education, 2008
REFERENCE BOOKS/OTHER READING MATERIAL	
5.	Hastie, Tibshirani, Friedman, "The Elements of Statistical Learning" (2nd ed.), Springer, 2008
6.	Stephen Marsland, "Machine Learning – An Algorithmic Perspective", CRC Press, 2009

LEARNING RESOURCES	
Sl.No.	TEXT BOOKS
7.	Christopher Bishop, “Pattern Recognition and Machine Learning” Springer, 2006

Coursenature				Theory			
AssessmentMethod(Weightage100%)							
In-semester	Assessmenttool	CycletestI	CycletestII	CycleTestIII	SurpriseTest	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

* Excluding Assessment Hours

Course designed by		Department of Computer Science and Engineering														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	l	m	n	
		X	X													
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies			
				X		X										
4	Staff coordinator															

15CS332E	WIRELESS SENSOR NETWORKS	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	Nil				
<i>Prerequisite:</i>	Nil				
<i>Data Book/Codes/Standards</i>	Nil				
<i>Course Category</i>	P Professional Elective				
<i>Course designed by</i>	Department of Computer Science and Engineering				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE This course provides a broad coverage of challenges and research results related to the design and management of wireless sensor networks

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES					
At the end of the course, student will be able to							
1.	Understand basic sensor network concepts	A					
2.	Know physical layer issues, Medium Access Control Protocols	A	b				
3.	Comprehend network and transport layer characteristics and protocols	A	b				
4.	Understand the network management and Middleware services	A	b				

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
UNIT I: FUNDAMENTALS OF SENSOR NETWORKS		9			
1.	Introduction to computer and wireless sensor networks and Overview of the syllabus	1	C	1-4	1-4
2.	Motivation for a network of Wireless Sensor nodes- Sensing and sensors-challenges and constraints	2	C	1	1-4
3.	node architecture-sensing subsystem, processor subsystem-communication interfaces- prototypes	2	C,D	1	1
4.	Application of Wireless sensors	4	C,D	1	1
UNIT II: COMMUNICATION CHARACTERISTICS AND DEPLOYMENT MECHANISMS		11			
5.	Wireless Transmission Technology and systems- Radio Technology Primer- Available Wireless Technologies	2	C	1,3	2
6.	Hardware- Telosb, Micaz motes	4	C,I	1-3	2
7.	Time Synchronization- Clock and the Synchronization Problem	1	C	1	1
8.	Basics of time synchronization- Time synchronization protocols	2	C	1	1
9.	Localization- Ranging Techniques- Range based Localization- Range Free Localization- Event driven Localization	2	C	1,3	1
UNIT III: MAC LAYER		7			
10.	Overview- Wireless Mac Protocols- Characteristics of MAC protocols in Sensor networks	3	C	2	1-4
11.	Contention free MAC Protocols- characteristics- Traffic Adaptive Medium Access- Y-MAC, Low energy Adaptive Clustering	2	C,I	2	1

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
12.	ContentionbasedMAC Protocols-PowerAwareMulti-Accesswithsignaling,SensorMAC-TimeoutMAC-DatagatheringMAC	2	C,I	2	1
UNITIV:Routingin WirelessSensorNetworks		9			
13.	DesignIssues in WSN routing- Data DisseminationandGathering-RoutingChallenges in WSN	1	C	3	1-4
14.	Flooding-FlatBasedRouting– SAR,DirectedDiffusion-MCFA-Coherentandnon-CoherentProcessing	3	C,I	3	1,3
15	HierarchicalRouting-LEACH,PEGASIS,TEEN,APTEEN	3	C,I	3	1,3
16	QueryBasedRouting-NegotiationBasedRouting-GeographicalBasedRouting	2	C,I	3	1,3
UNITV :MIDDLEWAREANDSECURITYISSUES		9			
17.	WSNmiddlewareprinciples-Middlewarearchitecture-Existingmiddleware	3	C	4	2
18.	operatingsystems forwireless sensors networks-performance andtrafficmanagement	4	C	4	2
19.	Fundamentals ofnetworksecurity-challengesandattacksProtocols and mechanisms forsecurity	2	C	2-4	1-4
Totalcontacthours		45*			

LEARNING RESOURCES

Sl.No.	TEXT BOOKS
1.	WaltenegusDargie, Christian Poellabauer , “Fundamentals of Wireless Sensor Networks, TheoryandPractice”, WileySeriesonwirelessCommunicationand Mobile Computing, 2011
2.	KazemSohraby,Danielmanoli , “WirelessSensor networks-Technology,ProtocolsandApplications”, WileyInterScience Publications 2010.
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	Bhaskar Krishnamachari , “ NetworkingWirelessSensors”,Cambridge UniversityPress, 2005
4.	C.S Raghavendra, Krishna M.Sivalingam,Taiebznati , “WirelessSensor Networks”, SpringerScience 2004.

Coursenature				Theory			
AssessmentMethod(Weightage100%)							
In-semester	Assessment tool	CycletestI	CycletestII	CycleTestIII	ProgrammingAssignment-1	ProgrammingAssignment-2	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

* ExcludingAssessmentHours

Course designed by		Department of Computer Science and Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	L	m	n
		X	X												
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area (For P Only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
				X											
4	Staff coordinator														

15CS401	ARTIFICIAL INTELLIGENCE	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	Nil				
<i>Prerequisite:</i>	Nil				
<i>Data Book/Codes/Standards</i>	Nil				
<i>Course Category</i>	P Professional Core				
<i>Courses designed by</i>	Department of Computer Science and Engineering				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE Introduce the concepts of Artificial Intelligence; Learn the methods of solving problems using Artificial Intelligence in Graph Playing, Natural Language Processing, Expert Systems and Machine Learning.

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES					
At the end of the course, student will be able to							
1.	Identify problems that are amenable to solution by AI methods.	A	b				
2.	Identify appropriate AI methods to solve a given problem.	A	b				
3.	Formalize a given problem in the language/framework of different AI methods	A	b				
4.	Design and carry out an empirical evaluation of different algorithms on a problem formalization, and state the conclusion that the evaluation supports	A	b	c			

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
UNIT I: Introduction		9			
1.	Introduction to Artificial Intelligence- History of AI- AI Techniques	1	C	1	1,2,3,4
2.	Problem Solving with AI- AI models- Data Acquisition and Learning Aspects in AI	3	C	1	1,2,3,4
3.	Problem-Solving Process – Formulating Problems- Problem Types and Characteristics- Problem Analysis and Representation	3	C,D	1	1,2,3,4
4.	Performance Measuring- Problem Space and Search- Toy Problems- Real-world problems- Problem Reduction Methods	2	C,D	1	1,2,3,4
UNIT II: Heuristic Search Techniques		9			
5.	General Search algorithm – Uniformed Search Methods – BFS, Uniform Cost Search	2	C	2-4	1,2,3,4
6.	Depth First search , Depth Limited search (DLS), Iterative Deepening	2	C,D	2-4	1,2,3,4
7.	Informed Search- Introduction- Generate and Test, BFS, A* Search, Memory Bounded Heuristic Search.	3	C,D	2-4	1,2,3,4
8.	Local Search Algorithms and Optimization Problems – Hill climbing and Simulated Annealing	2	D,I	2-4	1,2,3,4

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
UNIT III: Knowledge and Reasoning		9			
9.	Knowledge Representation- Knowledge based Agents- The Wumpus World	2	C	3	1,2,3,4
10.	Logic-Propositional Logic-Predicate Logic- Unification and Lifting	3	C,D,I	3	1,2,3,4
11.	Representing Knowledge using Rules- Semantic Networks-Frame Systems	2	C,D	3	1,2,3,4
12.	Inference – Types of Reasoning	2	C	3	1,2,3,4
UNIT IV: Planning		9			
13.	Planning Problem– Simple Planning agent– Blocks world	2	C	4	1,2,3,4
14.	Goal Stack Planning-Means Ends Analysis- Planning as a State-space Search	2	D,I	4	1,2,3,4
15.	Partial Order Planning-Planning Graphs- Hierarchical Planning-Non-linear Planning- Conditional Planning-Reactive Planning	1	C,D,I	4	1,2,3,4
16.	Knowledge based Planning- Using Temporal Logic– Execution Monitoring and Re-planning- Continuous Planning-Multi-agent Planning- Job shop Scheduling Problem	2	C,D	4	1,2,3,4
17.	NLP-Introduction-Level of NLP- Syntactic and Semantic analysis- Discourse and Pragmatic Processing- Information Retrieval- Information Extraction-Machine Translation- NLP and its Application	2	C,D,I	1-4	1,2,3,4,5
UNIT V: Game Playing		9			
18.	Introduction-Important Concepts of Game Theory	1	C	3-4	1,2,3
19.	Game Playing and Knowledge Structure- Game as a Search Problem	2	C, D	3-4	1,2,3
20.	Alpha-beta Pruning- Game Theory Problems Game Theory	3	C,D,I	3-4	1,2,3
21.	Expert System-Architecture- Knowledge acquisition- Rule based Expert System-Frame based and Fuzzy based expert system-Casestudy in AI Applications	3	C,D, I	1-4	1
Total contact hours		45*			

LEARNING RESOURCES

Sl.No.	
1.	Parag Kulkarni, Prachi Joshi, “Artificial Intelligence–Building Intelligent Systems” PHI learning private Ltd, 2015
2.	Kevin Night and Elaine Rich, Nair B., “Artificial Intelligence (SIE)”, McGraw Hill-2008.

LEARNING RESOURCES	
Sl.No.	
3.	Stuart Russel and Peter Norvig “AI – A Modern Approach”, 2nd Edition, Pearson Education 2007.
4.	Deepak Khemani “Artificial Intelligence”, Tata McGraw Hill Education 2013.
5.	Akshar Bharati, Vineet Chaitanya, Rajeev Sangal, “Natural Language Processing: A Paninian Perspective”, Prentice Hall India Ltd., New Delhi, 1996

Coursenature				Theory			
AssessmentMethod(Weightage100%)							
In-semester	Assessmenttool	CycletestI	CycletestII	CycleTestIII	SurpriseTest	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

* Excluding Assessment Hours

Course Designed by		Department of Computer Science and Engineering														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	L	m	n	
		X	X	X												
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies				
				X						X						
4	Staff coordinator															

15CS421E	NATURAL LANGUAGE PROCESSING	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	Nil				
<i>Prerequisite:</i>	Nil				
<i>Data\Book/Codes/Standards</i>	Nil				
<i>Course Category</i>	P Professional Elective				
<i>Course designed by</i>	Department of Computer Science and Engineering				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE This course provides a sound understanding of Natural Language Processing and challenges involved in that area

INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES				
At the end of the course, student will be able to							
1.	Provide the student with knowledge of various levels of analysis involved in NLP	A	b				
2.	Understand the applications of NLP	A	j				
3.	Gain knowledge in automated Natural Language Generation and Machine Translation	A					

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
UNIT I: OVERVIEW AND MORPHOLOGY		9			
1	Introduction – Models and Algorithms -- Regular Expressions Basic Regular Expression Patterns – Finite State Automata	3	C	1	1,2
2	Morphology- Inflectional Morphology- Derivational Morphology-	3	C,D	1	1,2
3	Finite-State Morphological Parsing -- Porter Stemmer	3	C,I		1,2
UNIT II : WORD LEVEL AND SYNTACTIC ANALYSIS		9			
4	N-grams Model of Syntax- Counting Words - Unsmoothed N-grams	3	C,D	1	1,2
5	Smoothing- Backoff Deleted Interpolation – Entropy- English Word Classes- Tagsets for English	2	C	1,2	1,2
6	Part of Speech Tagging- Rule Based Part of Speech Tagging- Stochastic Part of Speech Tagging - Transformation-Based Tagging-	4	C,D,I	1,2	1,2
UNIT III : CONTEXT FREE GRAMMARS		9			
7	Context Free Grammars for English Syntax- Context-Free Rules and Trees-	3	C	1,2	1,2
8	Sentence-Level Constructions – Agreement – Sub Categorization	2	C	1,2	1,2
9	Parsing – Top-down – Earley Parsing- feature Structures – Probabilistic Context-Free Grammars	4	C	1,2	1,2
UNIT IV: SEMANTIC ANALYSIS		9			

Session	Description of Topic	Contact hours	C-D-I- O	IOs	Reference
10	Representing Meaning -Meaning Structure of Language-First Order Predicate Calculus	2	C	1,2	1,2
11	Representing Linguistically Relevant Concepts- Syntax-Driven Semantic Analysis- Semantic Attachments -Syntax-Driven Analyzer	3	C,D	1,2	1,2
12	-Robust Analysis -Lexemes and Their Senses- Internal Structure- Word Sense Disambiguation- Information Retrieval	4	D,I	1,2	1,2
UNIT V : LANGUAGE GENERATION AND DISCOURSE ANALYSIS		9			
13	Discourse-Reference Resolution- Text Coherence-Discourse Structure- Coherence	2	D,I	1,2,3	1,3
14	Dialog and Conversational Agents-Dialog Acts- Interpretation -Conversational Agents -	2	D,I	1,2,3	1,3
15	Language Generation- Architecture - Surface Realizations-Discourse Planning.	2	D,I	1,2,3	1,3
16	Machine Translation-Transfer Metaphor- Interlingua-Statistical Approaches	3	D,I	1,2,3	1,3
Total contact hours		45*			

LEARNING RESOURCES

SL No.	TEXT BOOKS
1.	Daniel Jurafsky and James H Martin, "Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition", Prentice Hall, 2nd Edition, 2008.
2.	C. Manning and H. Schutze, "Foundations of Statistical Natural Language Processing", MIT Press, Cambridge, MA., 1999
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	James Allen, Benjamin Cummings, "Natural Language Understanding", 2nd edition, 1995.

Course nature				Theory			
Assessment Method(Weightage 100%)							
In-semester	Assessment tool	Cycle testI	Cycle testII	Cycle TestIII	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examinationWeightage :							50%

* Excluding Assessment Hours

Course Designed by		Department of Computer Science and Engineering														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	L	m	n	
		X	X								X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies			
				X		X				X						
4	Staff coordinator															

15CS422E	KNOWLEDGE BASED DECISION SUPPORT SYSTEMS	L	T	P	C
		3	0	0	3
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book/Codes/Standards	Nil				
Course Category	P Professional Elective				
Courses designed by	Department of Computer Science and Engineering				
Approval	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	The purpose of this course is to impart knowledge on decisions support systems and implementation						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Get an overview of decisions support systems	A					
2.	Get Familiarize on group decisions support systems	A	d				
3.	Learn about knowledge management	A					
4.	Study about Intelligent DSS	A					
5.	Get familiarize on building decisions support systems	A	c				

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION TO DECISION SUPPORT SYSTEMS		9			
1	Management Support Systems: An Overview, Changing Business Environments and Computerized Decision	1	C	1	1
2	Managerial Decision Making and Techniques of Managerial Decision Support	1	C	1	1
3	The Concept of Decision Support Systems (DSS)	1	C	1	1
4	Decision Support Systems: An Overview	1	C	1	1
5	DSS configurations, description, characteristics and capabilities, classifications, components and subsystems.	1	C	1	1
6	Decision Making, Systems, Modeling, and Support	1	C	1	1
7	Decision Making: Introduction, Definitions, Models	1	C	1	1
8	Phases of the Decision Making Process: The Intelligence Phase, the Design Phase, the Choice Phase, the Implementation Phase	1	C	1	1
9	Supporting Decisions	1	C	1	1
UNIT II: GROUP DECISION SUPPORT SYSTEMS		9			
10	Making Decisions in Groups: Characteristics, Process, Benefits, and Dysfunctions – Supporting Groupwork with Computerized systems	3	C	2	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
11	Tools for Indirect Support of Decision Making – Products and Tools for GDSS/GSS and Successful Implementation.	2	C, D	2	1
12	Decision Analysis with Decision Tables and Decision Trees	1	C	2	1
13	Applications of Data Mining	2	C	2	1-2
14	Role of Data Warehouses in decisions support	1	C	2	1-2
UNIT III: KNOWLEDGE MANAGEMENT		9			
15	Knowledge Management: Introduction – Organizational Learning and Transformation – Knowledge Management Activities – Approaches to Knowledge Management	3	C	3	1
16	Information Technology (IT) in Knowledge Management – Knowledge Management Systems Implementation -	3	C	3	1
17	Roles of People in Knowledge Management – Ensuring the success of knowledge Management Efforts.	3	C	3	1
UNIT IV: INTELLIGENT DECISION SUPPORT SYSTEMS		9			
18	Artificial Intelligence: Concepts, Definition and Applications	3	C	4	1
19	Expert Systems: Basic Concepts, Applications, Knowledge engineering, Suitable Problem Areas, Benefits, Limitations, and success Factors.	3	C	4	1
20	Advanced Intelligent Systems: Machine Learning techniques – Genetic Algorithms – Fuzzy inference systems – Support Vector machines – Intelligent agents.	3	C	4	1
UNIT V: BUILDING DECISION SUPPORT SYSTEMS		9			
21	Building decision support systems	3	C, D	5	1-2
22	Management support systems: RFID and New BI Application opportunities – Reality Mining – Online Social Networking – Cloud Computing and Business Intelligence	3	C, D	5	1
23	The impact of Management support systems – Impact on Organizations and Individuals	3	C	5	1
Total contact hours		45*			

LEARNING RESOURCES	
Sl.No.	TEXT BOOKS
1	Efraim Turban, Jay Aronson E., Ting-Peng Liang, "Decision Support Systems and Intelligent Systems", 9th Edition, Pearson Education, 2014.
REFERENCE BOOKS/OTHER READING MATERIAL	
2	George M. Marakas, "Decision Support Systems in the 21st century", Pearson, 2016.

Coursenature					Theory		
AssessmentMethod(Weightage100%)							
In-semester	Assessmenttool	CycletestI	CycletestII	CycleTestIII	SurpriseTest	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

* Excluding Assessment Hours

Course Designed by		Department of Computer Science and Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	L	m	n
		X		X	X										
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)			
												X			
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
						X		X		X					
4	Staff coordinator														

15CS423E	SOFTWARE DEFINED NETWORKS	L	T	P	C
		3	0	0	3
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book/Codes/Standards	NIL				
Course Category	P Professional Elective				
Course designed by	Department of Computer Science and Engineering				
Approval	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	This course introduces software defined networking, an emerging paradigm in computer networking that allows a logically centralized software program to control the behavior of an entire network.				
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES		
At the end of the course, student will be able to					
1. Differentiate between traditional networks and software defined networks	A				
2. Understand advanced and emerging networking technologies	A	b	c		
3. Obtain skills to do advanced networking research and programming	A	b	c		k
4. Learn how to use software programs to perform varying and complex networking tasks	A	b	c		k
5. Expand upon the knowledge learned and apply it to solve real world problems	A	b	g		

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCING SDN		9			
1.	SDN Origins and Evolution – Introduction – Why SDN?	1	C	1	1,4,5
2.	Centralized and Distributed Control and Data Planes	2	C	1	2,4,5
3.	The Genesis of SDN	2	C	1	1,4,5
4.	Introducing Mininet	4	D,I	3	1,2,3,7
UNIT II: SDN ABSTRACTIONS		11			
5.	How SDN Works	2	C,D	1,2	1,5,6
6.	The Openflow Protocol	1	C,D	2	1,2,3
7.	SDN Controllers: Introduction - General Concepts - VMware - Nicira - VMware/Nicira	1	D,I	3	1,2,3,5
8.	OpenFlow-Related-Mininet-NOX/POX-Trema - Ryu-BigSwitch Networks/Floodlight	2	D,I	3	1,2,3,5
9.	Layer 3 Centric - Plexxi-Cisco OnePK	1	D,I	3	2
10.	Setting up the Environment and Implementation of Controllers in Mininet	4	D,I	3	1,2,3,8
UNIT III: PROGRAMMING SDN'S		8			
11.	Network Programmability	2	I,O	4	2,6
12.	Network Function Virtualization	2	I,O	2	2,5
13.	NetApp Development, Network Slicing	4	I,O	3,4	1,2,3
UNIT IV: SDN APPLICATIONS AND USE		11			

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
CASES					
14.	SDN in the Data Center	2	I	2	1,2,5
15.	SDN in Other Environments	1	I	2	1
16.	SDN Applications	2	I	5	1,2
17.	SDN Use Cases	2	I	5	1,2,5
18.	The Open Network Operating System	4	D,I,O	3	1,2,3
UNIT V: SDN'S FUTURE AND PERSPECTIVES		6			
19.	SDN Open Source	2	C	2	1
20.	SDN Futures	2	C	1,5	1,6
21.	Final Thoughts and Conclusions	2	C	5	1,2
Total contact hours		45*			

LEARNING RESOURCES	
Sl.No.	TEXT BOOKS
1.	Software Defined Networks: A Comprehensive Approach by Paul Goransson and Chuck Black, Morgan Kaufmann Publications, 2014
2.	SDN-Software Defined Networks by Thomas D. Nadeau & Ken Gray, O'Reilly, 2013
3.	Software Defined Networking with OpenFlow By Siamak Azodolmolky, Packt Publishing, 2013
REFERENCE BOOKS/OTHER READING MATERIAL	
4.	Feamster, Nick, Jennifer Rexford, and Ellen Zegura. "The road to SDN: an intellectual history of programmable networks." <i>ACM SIGCOMM Computer Communication Review</i> 44.2 (2014): 87-98.
5.	Kreutz, Diego, et al. "Software-defined networking: A comprehensive survey." <i>Proceedings of the IEEE</i> 103.1 (2015): 14-76.
6.	Nunes, Bruno A A, et al. "A survey of software-defined networking: Past, present, and future of programmable networks." <i>Communications Surveys & Tutorials, IEEE</i> 16.3 (2014): 1617-1634.
7.	Lantz, Bob, Brandon Heller, and Nick McKeown. "A network in a laptop: rapid prototyping for software-defined networks." <i>Proceedings of the 9th ACM SIGCOMM Workshop on Hot Topics in Networks</i> . ACM, 2010.
8.	Monsanto, Christopher, et al. "Composing software defined networks." <i>Presented as part of the 10th USENIX Symposium on Networked Systems Design and Implementation (NSDI)</i> 13. 2013.

Coursenature					Theory		
AssessmentMethod(Weightage100%)							
In-semester	Assessmenttool	CycletestI	CycletestII	CycleTestIII	Assignments	Quiz	Total
	Weightage	5%	5%	10%	25%	5%	50%
End semesterexamination Weightage :							50%

* Excluding Assessment Hours

Course Designed by		Department of Computer Science and Engineering														
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	L	m	n	
		X	X	X				X				X				
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)					
											X					
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies			
		Not Applicable														
4	Staff coordinator															

15CS424E	SEMANTIC WEB	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	Nil				
<i>Prerequisite:</i>	Nil				
<i>Data Book/Codes/Standards</i>	Nil				
<i>Course Category</i>	P Professional Elective				
<i>Courses designed by</i>	Department of Computer Science and Engineering				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	This course provides the students with the concepts to create the Semantic Web include a systematic treatment of the different languages like XML, RDF, OWL, and rules and technologies (explicit metadata, ontologies, and logical inference) that are central to Semantic Web development.
----------------	--

INSTRUCTIONAL OBJECTIVES		STUDENT OUTCOMES					
At the end of the course, student will be able to							
1. Understand the XML technologies, RDF and OWL		A	i				
2. Develop semantic web application using protégé		A	i				
3. Develop semantic web services		A	i				

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
UNIT I: THE SEMANTIC WEB VISION		9			
1.	Levels of semantics, Semantic Web Technologies – Layered Architecture.	3	C	2	1
2.	Thinking and Intelligent Web application tools. The information age.	3	C, D	2	1
3.	Today's World Wide Web Limitations, syntactic web, data-unstructured, semistructured and structured	3	C, D	1	2
UNIT II: ONTOLOGY DEVELOPMENT		9			
4.	The role of XML – XML and the web – Web services – XML technologies – XML revolution - Structuring with schemas – presentation technologies.	4	C, D	1	5 and 6
5.	Introduction to RDF, Syntax for RDF, Simple Ontologies in RDF Schema, An Example.	2	C, D	1	1, 2, 3, 5, 6 and 7
6.	Querying in RDF. OWL language – OWL Syntax and Intuitive Semantics, OWL species, examples.	3	C, D	2	1, 2, 3, 5, 6 and 7,
UNIT III : ONTOLOGY RULES AND QUERYING		9			
7.	Ontology tools- Ontology development using protégé, Description Logics, Automated Reasoning with OWL	2	C, D	2	1, 2, 3, 4, 5, 6 and 7,
8.	Exercises – First-Order Rule Language, Combining Rules with OWL DL.	4	C, D, I	2	1, 2, 3, 4, 5, 6 and 7,

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
9.	SPARQL: Query Language for RDF, Conjunctive Queries for OWL DL, Exercises, Ontology Engineering.	3	C,D,I	2	1,2 3,4,5,6 and 7,
UNIT IV: SEMANTIC WEB SERVICE		9			
10.	Semantic webservice concepts	3	C	1	5 and 6
11.	Representation mechanisms for semantic webservices	3	C,D	1	5 and 6
12.	WSMO– WSDL-S – Related work in the area of semantic webservice frameworks.	3	C, D	3	5 and 6
UNIT V: SEMANTIC WEB SERVICE DISCOVERY		9			
13	Shortcomings and limitation of conventional webservice discovery	2	C	3	5 and 6
14	Centralized discovery architecture – P2P discovery architecture– Algorithm approaches	4	C,D	3	5 and 6
15	Web service modeling ontology– Conceptual model for service discovery–Discovery based on semantic descriptions	3	C,D	3	5 and 6
Total contact hours		45*			

LEARNING RESOURCES

1.	Grigoris Antoniou and Frank Van Harmelen, “A Semantic Web Primer”, The MIT Press, Cambridge, Massachusetts London, England, 2004.
2.	Pascal Hitzler, Markus Krötzsch and Sebastian Rudolph, “Foundations of Semantic Web Technologies” Chapman & Hall/CRC, 2009.
3.	Toby Segaran, Colin Evans, Jamie Taylor, “Programming the Semantic Web Build Flexible Applications with Graph Data,” O'Reilly Media, 2009.
4.	www.semanticweb.org
5.	Frank. P. Coyle, “XML, Web Services and the data revolution”, Pearson Education, 2002.
6.	Jorge Cardoso, “Semantic webservices: Theory, tools and applications”, Information science, 2007.
7.	Michael C, Daconta, Leo J. Obrst and Kevin T. Smith, “The semantic Web: A guide to the future of XML, web services, and knowledge management”, John Wiley & sons, 2003.

Coursenature				Theory			
AssessmentMethod(Weightage100%)							
In-semester	Assessmenttool	CycletestI	CycletestII	CycleTestIII	SurpriseTest	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

* Excluding Assessment Hours

Course Designed by		Department of Computer Science and Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	L	m	n
		X								X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
						X									
4	Staff coordinator														

15CS433E	Network Design And Management	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	Nil				
<i>Prerequisite:</i>	Nil				
<i>Data Book/Codes/Standards</i>	Nil				
<i>Course Category</i>	P Professional Elective				
<i>Courses designed by</i>	Department of Computer Science and Engineering				
<i>Approval</i>	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	To give understanding of how to design, manage and secure a computer network and how to capture and analyze the network and network data.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the various types of networks and the network management basics	a					
2.	Understand the architecture behind standards based network management	a					
3.	Understand the Simple Network Management Protocol	a					
4.	Use the network management Tools	a	i				
5.	Design and troubleshooting the network	a	c				

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
UNIT I: NETWORK MANAGEMENT OVERVIEW		8			
1.	Telephone network and management, Distributed computing Environment, Internet and Intranet	1	C	1	1
2.	Communication protocols and standards, Network, systems and services, Challenges in IT Managers	2	C	1	1
3.	Network Management and Architecture	1	C	1	1
4.	Network management perspective, Current status and future of network management	1	C	1	1
5.	Network Management standards and model, Organizational model, Information model, Communication model, Functional model, ASN.1	3	C	1	1
UNIT II: SNMPv1, SNMPv2, SNMPv3		10			
6.	SNMP v1 model, Organization Model, System overview	1	C	2	1,5
7.	SNMP v1 Information model	2	C	2	1,5
8.	SNMPv1 Communication model and Functional model	2	C	2	1,5
9.	SNMPv2	3	C	2	1,5
10.	SNMPv3	2	C	2	1,5

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
UNIT III: REMOTE MONITORING, NETWORK MANAGEMENT TOOLS AND ENGINEERING		9			
11.	RMON1	1	C,I	3	1
12.	RMON2	1	C,I	3	1
13.	System Utilities for management	1	C,I	3	1
14.	Network Statistics Measurements systems	1	C,I	3	1
15.	MIB Engineering	1	C,I	2	1
16.	Network Management System Design	2	C,I	2	1
17.	Network Management Applications	2	C,I	1	1
UNIT IV: FAULT MANAGEMENT, CONFIGURATION MANAGEMENT, PERFORMANCE MANAGEMENT AND ACCOUNT MANAGEMENT		9			
18.	Fault management architecture, Algorithm, Self-healing, Avoiding failures,	3	C	1	2,6
19.	Configuration setting, Configuration discovery and Change Control, Configuration management applications, Patch management	3	C	1	2,6
20.	Approaches for performance management, Performance monitoring and reporting, Performance troubleshooting, Capacity Planning, Account management	3	C	1	2,6
UNIT V: SECURITY MANAGEMENT		9			
21.	Small Business Network	2	C	4,5	3,4
22.	Network Administration and Support	2	C	4,5	3,4
23.	Enterprise and Wide Area Networks	2	C	4,5	3,4
24.	Solving Network Problems	3	C,I	4,5	3,4
Total contact hours		45*			

LEARNING RESOURCES

Sl.No	TEXT BOOKS
1.	Mani Subramanian "Network Management Principles and Practice", Second Edition, Pearson Publication, 2012
2.	Dinesh Chandra Verma, "Principles of Computer Systems and Network Management", Springer, 2009
3.	Greg Tomsho, Ed Tittel, David Johnson, "Guide to Network Essentials", Fifth Edition, Cengage Learning, 2010
REFERENCE BOOKS/OTHER READING MATERIAL	
4.	Brijendra Singh, "Network Security and Management", Third Edition, PHI Learning Private Limited, 2015
5.	Stallings Williams, "SNMP, SNMPv2, SNMPv3 and RMON 1 and 2", Pearson publication, 2012
6.	Kauffman, "Network Management Problems, standards and strategies", Addison Wesley, 1992

Coursenature							Theory
AssessmentMethod(Weightage100%)							
In-semester	Assessmenttool	CycletestI	CycletestII	CycleTestIII	SurpriseTest	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semesterexamination Weightage :							50%

* ExcludingAssessmentHours

Course Designed by		Department of Computer Science and Engineering													
1	Students Outcome	a	b	c	d	e	f	g	h	I	j	k	L	m	n
		X		X						X					
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad area (for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
				X											
4	Staff coordinator														

COURSES CUSTOMIZED TO OTHER DEPARTMENTS

15IT470E	FUNDAMENTALS OF BIG DATA ANALYTICS	L	T	P	C
		3	0	0	3
Co-requisite:	NIL				
Prerequisite:	NIL				
Data Book / Codes/Standards	NIL				
Course Category	P PROFESSIONAL ELECTIVE				
Course designed by	Department of Information Technology				
Approval	32 nd Academic Council Meeting, 23 rd July 2016				

PURPOSE	The objective is to provide basic concepts of big data analytics using R Programming and Hadoop tools for analyzing and managing the real-time data according to current business and industrial needs.					
INSTRUCTIONAL OBJECTIVES			STUDENT OUTCOMES			
At the end of the course, student will be able to						
1.	Bring together several key technologies used for manipulating, storing, and analyzing big data from basic analytics perspectives.	a	i			
2.	Understand the basics of R programming, Hadoop and Database	i	j			
3.	Understand the basics of MapReduce and the Integration of R and Hadoop tools.	i	j			
4.	Learn about the basics of big data analytics and to understand the various supervised and unsupervised learning techniques for industrial applications.	k	l			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : Introduction To Big Data Analytics		9			
1.	Big Data Overview, Data Structures, Analyst Perspective on Data Repositories, State of the Practice in Analytics, BI versus Data Science, Current Analytical Architecture	2	C	1	1
2.	Drivers of Big Data, Emerging Big Data Ecosystem and a New Approach to Analytics, Key Roles for the New Big Data Ecosystem, Examples of Big Data Analytics	3	C	1	1
3.	Data Analytics Lifecycle Overview, Key Roles for a Successful Analytics Project, Background and Overview of Data Analytics Lifecycle, Case Study: Global Innovation Network and Analysis	4	C	1	1
UNIT II : Review of Basic Data Analytics Method Using R		9			
4.	Introduction to R, R Graphical User Interfaces, Data Import and Export, Attribute and Data Types	2	C	1	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
5.	Descriptive Statistics, Exploratory Data Analysis, Visualization Before Analysis, Dirty Data, Visualizing a Single Variable, Examining Multiple Variables	2	C,D,I	1	1
6.	Data Exploration Versus Presentation, Statistical Methods for Evaluation, Hypothesis Testing, Difference of Means, Wilcoxon Rank-Sum Test	3	C	1	1
7.	Type I Errors, Type II Errors, Power and Sample Size, ANOVA Test	2	C	1	1
UNIT III : Getting Ready to Use R and Hadoop		9			
8.	Installing R, Installing R Studio, Features of R language, Using R Packages, Performing Data Operations, Increasing Community Support, Performing Data Modeling in R	1	C	2,3	2
9.	Installing Hadoop, Understanding Different Hadoop Modes, Single Node Cluster, Multinode Cluster, ClouderaHadoop	1	C,D,I	2,3	2
10.	Understanding Hadoop Features, HDFS, Characteristics of HDFS, MapReduce, Learning the HDFS and MapReduce Architecture, Understanding the HDFS Architecture, HDFS Components, MapReduce Architecture, MapReduce Components	3	C	2,3	2,4
11.	Writing a HadoopMapReduce Example, Run a MapReduce Job, Monitor and Debug a HadoopMapReduce Job, Exploring HDFS Data	2	C,D,I	2,3	2,4
12.	Different ways to write HadoopMapReduce in R, Learning RHadoop, RHIPE, Hadoop Streaming	2	C	2,3	2
UNIT IV : Importing and Exporting Data from Various DBs		9			
13.	Introduction to MySQL, List the Tables and their Structure, Importing and Data Manipulation in MySQL, NoSQL, Understanding Excel, Importing and Exporting the data to Excel	2	C	2	2
14.	Understanding SQLite, Importing and Exporting the data to SQLite, PostgreSQL, Importing and Exporting the data to PostgreSQL, Understanding Pig, Hbase, Mahout	3	C	2	1,2
15.	Installing Hive, Setting up Hive Configurations, Installing RHive, Rhive Operations, Installing MongoDB, Importing and Data Manipulation in MongoDB	4	C,D,I	2	1,2
UNIT V : Understanding Big Data Analysis with Machine Learning		9			

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
16.	Introduction to Machine Learning Algorithms, Linear Regression, Logistic Regression, Use Cases, Model Descriptions, Overview of Clustering, K-means, Use Cases, Overview of the Methods	3	C	4	1,2,3
17.	Determining the Number of Clusters, Additional Algorithms, Association Rules, Overview, Apriori Algorithm, Evaluation of Candidate Rules, Application of Association Rules, Transactions in a Grocery Store Example	4	C	4	1
18.	Groceries Dataset, Frequent Itemset Generation, Rule Generation and Visualization, Validation and Testing	2	C,D,I	4	1
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	David Dietrich, Barry Heller and Beibei Yang, “Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data”, Reprint 2015, EMC Education Services, Wiley, ISBN:9788126556533.
2.	VigneshPrajapati, "Big Data Analytics with R and Hadoop", OpenSource, 1 st Edition, Packt Publishing, 2013, ISBN: 9781782163282.
3.	Stephen Marsland, “Machine Learning – An Algorithmic Perspective”, 2 nd Edition, 2015, Chapman & Hall / CRC Press, Taylor& Francis Group, ISBN:9781466583283.
4.	BirisLublinsky, Kevin T. Smith and Alexey Yakubovich, “Professional Hadoop Solutions”, Reprint 2014, Wiley, ISBN 13:9788126551071.

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	G	h	I	j	k	l	m	n
		X								X	X	X	X		
2	Category	GENERAL (G)				BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)				PROFESSIONAL SUBJECTS (P)		
													X		
3	Broad area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
						X									
4	Staff coordinator														

15IT370E	FUNDAMENTALS OF CLOUD COMPUTING	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL ELECTIVE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	To understand the fundamental concepts of cloud computing technology that leverage the today's IT industries and business market through the design and development of various cloud service models.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Learn basic concepts of cloud computing and its evolution	i					
2.	Learn cloud enabling technologies and its applications	i	j				
3.	Understand the basic concept of cloud computing architecture	i					
4.	Analyze the cost metrics and construct different cloud delivery design models	k					
5.	Understand the security threats in cloud	i					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : CLOUD COMPUTING FUNDAMENTALS AND MODELS		8			
1.	Understanding cloud computing: origin and influences, Basic Concepts and Terminology	3	C	1	1,2,3,4
2.	Goals and Benefits, Risks and Challenges	2	C	1	1,2,3,4
3.	Cloud service provider and consumer ,Cloud Characteristics	1	C	1,2	1,2,3,4
4.	Cloud Service Models, Cloud Deployment Models	2	C	1,2	1,2,3,4
UNIT II : CLOUD-ENABLING TECHNOLOGY AND APPLICATIONS		7			
5.	Broadband Networks , Internet Architecture, Data Center Technology, Virtualization Technology	2	C	2	1
6.	Web Technology, Multitenant Technology ,Service Technology	2	C	2	1
7.	Applications: Cloud computing for healthcare, energy systems, Transportation systems, Manufacturing industry, Government, Education and Mobile Communication	3	C	2	1,2,3,4

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT III : CLOUD COMPUTING ARCHITECTURE		10			
8.	Workload Distribution Architecture, Resource Pooling Architecture, Dynamic Scalability Architecture	4	C	3	1
9.	Elastic Resource Capacity Architecture ,Service Load Balancing Architecture, Cloud Bursting Architecture, Elastic Disk Provisioning Architecture	3	C	3	1
10.	Redundant Storage Architecture	3	C	3	1
UNIT IV : COST METRICS AND SERVICE QUALITY METRICS		12			
11.	Cost Metrics and Pricing Models: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations	3	C	4	1,2,3,4
12.	Service Quality Metrics and SLAs: Service Quality Metrics, SLA Guidelines	2	C	4	1,2,3,4
13.	Fundamental Cloud Architectures: Illustration with case study	2	C	1,2,3,4	1,2,3,4
14.	Design approaches with Case Study, Design methodology for IaaS Service Model, Google API	2	C,D,I	1,2,3,4	2,4
15.	Design methodology for PaaS Service Model, Study of SaaS Service model	3	C,D,I	1,2,3,4	2,4
UNIT V : CLOUD SECURITY		8			
16.	Encryption, Hashing, Digital Signature, Public Key Infrastructure (PKI), Identity and Access Management (IAM)	3	C	5	1,2,3,4
17.	Single Sign On (SSO) : Kerberos authentication- One-time password- Basic cloud data security mechanisms	3	C	5	1,2,3,4
18.	Cloud Based Security Groups, Hardened Virtual Server Images	2	C	5	1,2,3,4
Total Contact Hours		45*			

Sl. No.	LEARNING RESOURCES
1.	Thomas Erl, Zaigham Mahmood, Richardo Puttini, "Cloud Computing: Concepts, Technology & Architecture", Fourth Printing, Prentice Hall/Pearson PTR, 2014, ISBN: 9780133387520.
2.	Arshdeep Bahga, Vijay Madisetti, "Cloud Computing: A Hands-On Approach", University Press, 2016, ISBN: 9780996025508.
3.	K. Chandrasekaran, "Essentials of Cloud Computing", Chapman and Hall/CRC Press, 2014, ISBN 9781482205435.
4.	Thomas Erl, Robert Cope, Amin Naserpour, "Cloud Computing Design Patterns", Prentice Hall/Service Tech Press, Pearson, 2015, ISBN: 978-0133858563.

Course nature	Theory
---------------	--------

Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	G	h	I	j	k	l	m	n
										X	X	X			
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area (FOR P ONLY)	Programming		Networking		Data base		Web System		Human Computer Interaction			Platform Technologies		
				X											
4	Staff coordinator														

15IT371	COMPUTER NETWORKING	L	T	P	C
		3	0	0	3
<i>Co-requisite:</i>	NIL				
<i>Prerequisite:</i>	NIL				
<i>Data Book / Codes/Standards</i>	NIL				
<i>Course Category</i>	P PROFESSIONAL CORE				
<i>Course designed by</i>	Department of Information Technology				
<i>Approval</i>	32 nd Academic Council Meeting , 23 rd July 2016				

PURPOSE	Sharing information through computer networks is vital part of any organization these days. This course provides a foundation to understand various principles, protocols and design aspects of computer networks and also helps to achieve the fundamental purpose of networks in the form of providing access to shared resources.						
INSTRUCTIONAL OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Understand the evolution of computer networks using the layered network architecture.	b					
2.	Understand the various Medium Access Control techniques and also the application layer protocols	c					
3.	Design computer networks using routing concepts	m					
4.	Understand the transport layer protocols , application layer protocol and its characteristics	m					

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
UNIT I : INTRODUCTION TO COMPUTER NETWORKS		9			
1.	Evolution of Computer Networks	1	C	1	1
2.	Classification of Computer Networks LAN,WAN,MAN	1	C	1	1
3.	Network Topology : BUS, STAR, RING, MESH	2	C	1	1
4.	OSI Layered Architecture	2	C	1	1
5.	TCP/IP Model	2	C	1	1
6.	Networking Devices: Hub, Switch, Bridge, Router	1	C	1	1
UNIT II : DATA LINK LAYER PROTOCOLS		9			
7.	Medium Access Control Techniques	1	C	2	1
8.	Random, Round Robin, Reservation, ALOHA	1	C	2	1
9.	Pure and Slotted, Carrier Sense Multiple Access with Collision Detection (CSMA/CD)	1	C	2	1
10.	Carrier Sense Multiples Access with Collision Avoidance (CSMA/CA), Ethernet, Token Ring, Token Bus	2	C	2	1

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
11.	Automatic Repeat Query (ARQ) 3 Types	1	C	2	1
12.	Error Detection Codes, Parity Check, Checksum	2	D, I	2	1
13.	Error Correction Codes, Hamming codes	1	D, I	2	1
UNIT III : NETWORK LAYER PROTOCOLS		9			
14.	Internet Protocol (IP) Header	1	C	3	1
15.	IP Private and Public Address	1	D, I	3	1
16.	Static Routing	1	C	3	1
17.	Introduction to dynamic Routing Protocols	1	C	3	1
18.	Distance Vector Routing	1	C	3	1
19.	Routing Information Protocol (RIP) v1 and RIP v2	2	C	3	1
20.	Link State Routing	1	C	3	1
21.	Open Shortest Path First (OSPF) Protocol	1	C	3	1
UNIT IV: TRANSPORT LAYER PROTOCOLS		9			
22.	Transmission Control Protocol (TCP) Header	1	C	3	1
23.	TCP Connection Establishment and Termination Process	2	C	3	1
24.	TCP Flow Control	2	C	3	1
25.	TCP Congestion Control	2	C	3	1
26.	TCP Error Control	1	C	3	1
27.	UDP datagram and its operation	1	D	3	1
UNIT V: -APPLICATION LAYER PROTOCOLS		9			
28.	Domain Name System (DNS)	2	C	3	1
29.	TELNET	1	C	3	1
30.	File Transfer Protocol (FTP)	1	C	3	1
31.	Hypertext Transfer Protocol (HTTP)	1	C	3	1
32.	World Wide Web (WWW)	1	C	3	1
33.	Dynamic Host Configuration Protocol (DHCP)	1	C	3	1
34.	Simple Mail Transfer Protocol (SMTP), Post office Protocol(POP3)	2	C	3	1
Total Contact Hours		45*			

Sl.No	LEARNING RESOURCES
1.	Behrouz A. Forouzan, "Data Communications and Networking", 15 th Edition, July 1, 2012, McGraw-Hill ISBN-10: 0073376221, ISBN-13: 978-0073376226
2.	Todd Lammle, "CCNA Study Guide", 7 th Edition, 2011, Sybex, ISBN-10: 0470901071 ISBN-13: 978-0470901076
3.	William Stallings, "Data and Computer Communications", 9 th Edition, 2010, Pearson, ISBN-13: 9780131392052 .

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%

* - Excluding Assessment Hours

Course Designed by		Department of Information Technology													
1	Students Outcome	a	b	c	d	e	f	G	h	I	j	k	l	m	n
			X	X										X	
2	Category	GENERAL (G)			BASIC SCIENCES (B)			ENGINEERING SCIENCES AND TECHNICAL ART (E)			PROFESSIONAL SUBJECTS (P)				
											X				
3	Broad Area(for p only)	Programming		Networking		Data base		Web System		Human Computer Interaction		Platform Technologies			
				X											
4	Staff coordinator														