SRM UNIVERSITY
(Under section 3 of UGC Act 1956)

B.TECH (Full Time) - COMPUTER SCIENCE AND ENGINEERING

Curriculum & Syllabus

2013 – 2014

Volume – I

(all courses except open electives)

FACULTY OF ENGINEERING AND TECHNOLOGY
SRM UNIVERSITY
SRM NAGAR, KATTANKULATHUR – 603 203

STUDENT OUTCOMES

The curriculum and syllabus for B.Tech programs (2013) conform to outcome based teaching learning process. In general, **ELEVEN STUDENT OUTCOMES** (a-k) 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 mathematics, science, and engineering

(b) An ability to design and conduct experiments, as well as to analyze and interpret data

(c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) An ability to function on multidisciplinary teams

(e) An ability to identify, formulate, and solve engineering problems

(f) An understanding of professional and ethical responsibility

(g) An ability to communicate effectively

(h) The broad education necessary to understand the impact of engineering solutions in global, economic, environmental, and societal context

(i) A recognition of the need for, and an ability to engage in life-long learning

(j) A knowledge of contemporary issues

(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

B.Tech. Computer Science and Engineering
Curriculum – 2013
(Applicable for students admitted from the academic year 2013-14 onwards)

SEMESTER I						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
PD1001	G	SOFT SKILLS I	1	0	1	1
LE1002	G	VALUE EDUCATION	1	0	0	1
CS1001	G	PROGRAMMING USING MATLAB	0	1	2	2
MA1001	B	CALCULUS AND SOLID GEOMETRY	3	2	0	4
PY1001	B	PHYSICS	3	0	0	3
PY1002	B	PHYSICS LAB	0	0	2	1
CY1001	B	CHEMISTRY	3	0	0	3
CY1002	B	CHEMISTRY LAB	0	0	2	1
BT1001	B	BIOLOGY FOR ENGINEERS	2	0	0	2
CE1001	E	BASIC CIVIL ENGINEERING	2	0	0	2
EE1001	E	BASIC ELECTRICAL ENGINEERING	2	0	0	2
IT1001*	E	COMPUTER HARDWARE AND TROUBLESHOOTING LAB	0	0	4	2
NC1001/ NS1001/ SP1001/ YG1001	G	*NCC/NSS/NSO/YOGA	0	0	1	1
Total			**17**	**3**	**12**	**25**
Total Contact Hours			**32**			

*IT1001, ME1005 May Be Taken Either in First or Second Semester

Legend:

L - Number of lecture hours per week
T - Number of tutorial hours per week
P - Number of practical hours per week
C - Number of credits for the course

Category of courses:
G - General
B - Basic Sciences
E - Engineering Sciences and Technical Arts
P - Professional Subjects

SEMESTER II						
Course Code	**Category**	**Course name**	**L**	**T**	**P**	**C**
LE1001	G	ENGLISH	1	2	0	2
PD1002	G	SOFT SKILLS II	1	0	1	1
MA1002	B	ADVANCED CALCULUS AND COMPLEX ANALYSIS	3	2	0	4
PY1003	B	MATERIAL SCIENCE	2	0	2	3
CY1003	B	PRINCIPLES OF ENVIRONMENTAL SCIENCE	2	0	0	2
ME1001	E	BASIC MECHANICAL ENGINEERING	2	0	0	2
EC1001	E	BASIC ELECTRONICS ENGINEERING	2	0	0	2
*ME1005	E	ENGINEERING GRAPHICS	0	1	4	3
CS1002	P	PROGRAMMING LANGUAGE DESIGN AND C PROGRAMMING	3	0	2	4
Total			**16**	**5**	**11**	**23**
Total Contact Hours			**30**			

SEMESTER III						
Course Code	**Category**	**Course name**	**L**	**T**	**P**	**C**
LE1003/ LE1004/ LE1005/ LE1006/ LE1007	G	GERMAN LANGUAGE PHASE I /FRENCH LANGUAGE PHASE I/JAPANESE LANGUAGE PHASE I/KOREAN LANGUAGE PHASE I /CHINESE LANGUAGE PHASE I	2	0	0	2
PD1003	G	APTITUDE I	1	0	1	1
MA1003	B	TRANSFORMS AND BOUNDARY VALUE PROBLEMS	4	0	0	4
EE1053	E	ELECTRIC CIRCUITS	3	0	0	3
CS1003	P	DIGITAL COMPUTER FUNDAMENTALS	3	0	0	3

SEMESTER III						
Course Code	**Category**	**Course name**	**L**	**T**	**P**	**C**
CS1005	P	OBJECT ORIENTED PROGRAMMING	3	0	0	3
CS1007	P	MICROPROCESSOR & INTERFACING	3	0	0	3
CS1009	P	OBJECT ORIENTED ANALYSIS AND DESIGN	3	0	0	3
CS1031	P	OBJECT ORIENTED PROGRAMMING LAB	0	0	2	1
CS1033	P	MICROPROCESSOR & INTERFACING LAB	0	0	2	1
Total			**22**	**0**	**5**	**24**
Total Contact Hours			**27**			

SEMESTER IV						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
LE1008/ LE1009/ LE1010/ LE1011/ LE1012	G	GERMAN LANGUAGE PHASE II/FRENCH LANGUAGE PHASE II/JAPANESE LANGUAGE PHASE II/KOREAN LANGUAGE PHASE II / CHINESE LANGUAGE PHASE II	2	0	0	2
PD1004	G	APTITUDE II	1	0	1	1
MA1014	B	PROBABILITY AND QUEUING THEORY	4	0	0	4
EC1006	E	ELECTRON DEVICES	3	0	0	3
CS1004	P	DATA STRUCTURES & ALGORITHM DESIGN	3	0	0	3
CS1006	P	COMPUTER NETWORKS	3	0	0	3
CS1008	P	COMPUTER ORGANIZATION & ARCHITECTURE	3	0	0	3
CS1010	P	COMPUTER SKILLS	0	1	2	2
	P	Dep. Elective I	3	0	0	3
CS1032	P	DATA STRUCTURES & ALGORITHMS LAB	0	0	2	1
CS1034	P	COMPUTER NETWORKS LAB	0	0	2	1
Total			**22**	**1**	**7**	**26**
Total Contact Hours			**30**			

SEMESTER V						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
PD1005	G	APTITUDE III	1	0	1	1
MA1015	B	DISCRETE MATHEMATICS	4	0	0	4
EC1018	E	COMMUNICATION THEORY	3	0	0	3
CS1011	P	OPERATING SYSTEMS	3	0	0	3
CS1013	P	THEORY OF COMPUTATION	3	0	0	3
CS1015	P	DATABASE MANAGEMENT SYSTEMS	3	0	0	3
CS1047	P	INDUSTRIAL TRAINING I (Training to be undergone after IV semester)	0	0	1	1
	P	Dep. Elective -II	3	0	0	3
		Open Elective I	3	0	0	3
CS1035	P	OPERATING SYSTEMS LAB	0	0	2	1
CS1037	P	DATABASE MANAGEMENT SYSTEMS LAB	0	0	2	1
Total			**23**	**0**	**6**	**26**
Total Contact Hours			**29**			

SEMESTER VI						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
PD1006	G	APTITUTE IV	1	0	1	1
MA1006	B	STATISTICAL AND NUMERICAL METHODS	4	0	0	4
IC1053	E	CONTROL SYSTEM ENGINEERING	3	0	0	3
CS1012	P	SOFTWARE ENGINEERING	3	0	0	3
CS1014	P	SYSTEM SOFTWARE & COMPILER DESIGN	3	0	0	3
CS1049	P	MINOR PROJECT	0	0	4	2
	P	Dep. Elective III	3	0	0	3
		Open Elective II	3	0	0	3
		Open Elective III	3	0	0	3
CS1036	P	SYSTEM SOFTWARE & COMPILER DESIGN	0	0	2	1
Total			**23**	**0**	**7**	**26**
Total Contact Hours			**30**			

SEMESTER VII						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
MB1016	G	MANAGEMENT FOR ENGINEERS	3	0	0	3
CS1017	P	ARTIFICIAL INTELIGENCE AND EXPERT SYSTEMS	3	0	0	3
CS1019	P	WEB TECHNOLOGY	3	0	0	3
CS1048	P	INDUSTRIAL TRAINING II (Training to be undergone after VI semester)	0	0	1	1
	P	Dep. Elective IV	3	0	0	3
	P	Dep. Elective V	3	0	0	3
CS1039	P	ARTIFICIAL INTELIGENCE AND EXPERT SYSTEMS LAB	0	0	2	1
CS1041	P	WEB TECHNOLOGY LAB	0	0	2	1
Total			**15**	**0**	**5**	**18**
Total Contact Hours			**20**			

SEMESTER VIII						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
CS1050	P	MAJOR PROJECT / PRACTICE SCHOOL	0	0	24	12
Total			**0**	**0**	**24**	***12***
Total Contact Hours			**24**			

DEPARTMENTAL ELECTIVES						
GROUP – I						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SEMESTER IV						
CS1101	P	DIGITAL IMAGE PROCESSING	3	0	0	3
CS1102	P	DIGITAL SIGNAL PROCESSING	3	0	0	3
CS1103	P	VISUALIZATION TECHNIQUES	3	0	0	3
SEMESTER V						
CS1104	P	NEURAL NETWORKS	3	0	0	3
CS1105	P	FUZZY LOGIC	3	0	0	3
CS1106	P	COLOR IMAGE PROCESSING	3	0	0	3

DEPARTMENTAL ELECTIVES						
GROUP – I						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SEMESTER VI						
CS1107	P	KNOWLEDGE BASED DECISION SUPPORT SYSTEMS	3	0	0	3
CS1108	P	SPEECH RECOGNITION	3	0	0	3
CS1109	P	BIOMETRICS	3	0	0	3
SEMESTER VII						
CS1110	P	NATURE INSPIRED COMPUTING TECHNIQUES	3	0	0	3
CS1111	P	GENETIC ALGORITHMS AND MACHINE LEARNING	3	0	0	3
CS1112	P	ROBOTICS	3	0	0	3
CS1113	P	HUMAN INTERFACE SYSTEM DESIGN	3	0	0	3
CS1114	P	PATTERN RECOGNITION TECHNIQUES	3	0	0	3
CS1115	P	CELLULAR AUTOMATA	3	0	0	3
CS1116	P	VISUAL PROGRAMMING	3	0	0	3
CS1117	P	VIRTUAL REALITY	3	0	0	3

DEPARTMENTAL ELECTIVES						
GROUP – II						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SEMESTER IV						
CS1118	P	NETWORK SECURITY	3	0	0	3
CS1119	P	OPTICAL NETWORKS	3	0	0	3
CS1120	P	TCP/IP PRINCIPLES & ARCHITECTURE	3	0	0	3
SEMESTER V						
CS1121	P	CLOUD COMPUTING	3	0	0	3
CS1122	P	WIRELESS NETWORKS	3	0	0	3
CS1123	P	INTERNET SECURITY & COMPUTER FORENSICS	3	0	0	3
SEMESTER VI						
CS1124	P	DISTRIBUTED COMPUTING	3	0	0	3
CS1125	P	WIRELESS SENSOR NETWORKS	3	0	0	3
CS1126	P	ETHICAL HACKING	3	0	0	3

DEPARTMENTAL ELECTIVES						
GROUP – II						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SEMESTER VII						
CS1127	P	APPLIED CRYPTOGRAPHY	3	0	0	3
CS1128	P	HIGH SPEED NETWORKS	3	0	0	3
CS1129	P	NETWORKS MEASUREMENTS & TESTING	3	0	0	3
CS1130	P	TRUST COMPUTING	3	0	0	3
CS1131	P	PERVASIVE COMPUTING	3	0	0	3
CS1132	P	NETWORK ROUTING ALGORITHMS	3	0	0	3
CS1133	P	HIGH PERFORMANCE COMPUTING	3	0	0	3
CS1134	P	LINUX INTERNALS	3	0	0	3

DEPARTMENTAL ELECTIVES						
GROUP – III						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SEMESTER IV						
CS1135	P	COMPUTATIONAL LINGUISTICS	3	0	0	3
CS1136	P	BIO INFORMATICS	3	0	0	3
CS1137	P	GEOGRAPHICAL INFORMATION SYSTEMS	3	0	0	3
SEMESTER V						
CS1138	P	MULTIMEDIA DATABASE	3	0	0	3
CS1139	P	NATURAL LANGUAGE PROCESSING	3	0	0	3
CS1140	P	INFORMATION STORAGE AND MANAGEMENT	3	0	0	3
SEMESTER VI						
CS1141	P	DATA MINING	3	0	0	3
CS1142	P	DATA WAREHOUSING	3	0	0	3
CS1143	P	MOBILE DATABASES	3	0	0	3
SEMESTER VII						
CS1144	P	TEXT MINING	3	0	0	3
CS1145	P	SEMANTIC WEB	3	0	0	3
CS1146	P	WEB MINING	3	0	0	3
CS1147	P	DATABASE SECURITY AND PRIVACY	3	0	0	3
CS1148	P	MULTIMEDIA MINING	3	0	0	3
CS1149	P	DATABASE TUNING	3	0	0	3
CS1150	P	ADVANCED JAVA PROGRAMMING	3	0	0	3

Summary of credits										
Category	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**Total**	**%**
G (Excluding open and departmental electives)	5	3	3	3	1	1	3		19	10.56
B (Excluding open and departmental electives)	14	9	4	4	4	4			39	21.67
E (Excluding open and departmental electives)	6	7	3	3	3	3			25	13.89
P (Excluding open and departmental electives)		4	14	13	12	9	9	12	73	40.55
Open Elective					3	6			9	5
Dep. Elective				3	3	3	6		15	8.33
Total	**24**	**23**	**24**	**26**	**25**	**26**	**17**	**12**	**180**	**100**

SEMESTER I

PD1001	SOFT SKILLS-I	L	T	P	C
	Total Contact Hours - 30	1	0	1	1
	Prerequisite				
	Nil				

PURPOSE

To enhance holistic development of students and improve their employability skills.

INSTRUCTIONAL OBJECTIVES

1.	To develop inter personal skills and be an effective goal oriented team player.
2.	To develop professionals with idealistic, practical and moral values.
3.	To develop communication and problem solving skills.
4.	To re-engineer attitude and understand its influence on behavior.

UNIT I - SELF ANALYSIS (4 hours)

SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem

UNIT II - ATTITUDE (4 hours)

Factors influencing Attitude, Challenges and lessons from Attitude.

Change Management

Exploring Challenges, Risking Comfort Zone, Managing Change

UNIT III - MOTIVATION (6 hours)

Factors of motivation, Self talk, Intrinsic & Extrinsic Motivators.

UNIT IV - GOAL SETTING (6 hours)

Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time Goals.

Time Management

Value of time, Diagnosing Time Management, Weekly Planner To do list, Prioritizing work.

UNIT V - CREATIVITY (10 hours)

Out of box thinking, Lateral Thinking

Presentation

ASSESSMENT

1. A practical and activity oriented course which has continuous assessment for 75 marks based on class room interaction, activities etc.
2. Presentation – 25 marks.

TEXT BOOK

1. INSIGHT, 2012, Career Development Centre, SRM Publications.

REFERENCES

1. Covey Sean, "*Seven Habits of Highly Effective Teens"*, New York, Fireside Publishers, 1998.
2. Carnegie Dale, "*How to win Friends and Influence People"*, New York: Simon & Schuster, 1998.
3. Thomas A Harris, "*I am ok, You are ok"* , New York-Harper and Row, 1972.
4. Daniel Coleman, "*Emotional Intelligence"*, Bantam Book, 2006.

<table>
<tr><th colspan="13">PD1001 - SOFT SKILLS-I</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Career Development Centre</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student Outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
<tr><td></td><td></td><td></td><td>X</td><td></td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td></tr>
<tr><td>2.</td><td>Mapping of instructional objectives with student outcome</td><td></td><td></td><td></td><td>1</td><td></td><td>2</td><td>3</td><td></td><td>4</td><td></td><td></td></tr>
<tr><td rowspan="2">3.</td><td rowspan="2">Category</td><td colspan="3">General (G)</td><td colspan="2">Basic Sciences (B)</td><td colspan="3">Engineering Sciences and Technical Arts (E)</td><td colspan="3">Professional Subjects (P)</td></tr>
<tr><td colspan="3">X</td><td colspan="2"></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>4.</td><td>Approval</td><td colspan="11">23rd meeting of Academic Council, May 2013</td></tr>
</table>

<table>
<tr><td rowspan="4">LE1002</td><td rowspan="2">VALUE EDUCATION</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>Total Contact Hours- 15</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Prerequisite</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>Nil</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6">PURPOSE</td></tr>
<tr><td colspan="6">To provide guiding principles and tools for the development of the whole person recognizing that the individual is comprised of Physical, Intellectual, Emotional and Spiritual dimensions.</td></tr>
</table>

INSTRUCTIONAL OBJECTIVES	
1.	To help individuals think about and reflect on different values.
2.	To deepen understanding, motivation and responsibility with regard to making personal and social choices and the practical implications of expressing them in relation to themselves, others, the community and the world at large
3.	To inspire individuals to choose their own personal, social, moral and spiritual values and be aware of practical methods for developing and deepening

UNIT I- INTRODUCTION (3 hours)

Definition, Relevance, Types of values, changing concepts of values

UNIT II- INDIVIDUAL AND GROUP BEHAVIOUR (3 hours)

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 (3 hours)

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 (3 hours)

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 (3 hours)

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

TEXT BOOK

1. Department of English and Foreign Languages SRM University, "*Rhythm of Life",* SRM Publications, 2013.

REFERENCE

1. *"Values (Collection of Essays".* Published by : Sri Ramakrishna Math, Chennai-4. 1996.

LE1002 VALUE EDUCATION												
Course designed by		**Department of English and Foreign Languages**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	J	k
							x			x		
2.	Mapping of instructional objectives with student outcome						1-3			1-3		
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
		x		--		--				--		
4.	Approval	23rd meeting of Academic Council, May 2013										

CS1001	PROGRAMMING USING MATLAB	L	T	P	C
	Total Contact hours - 45	**0**	**1**	**2**	**2**
	Prerequisite				
	Nil				

PURPOSE

This Lab Course will enable the students to understand the fundamentals and programming knowledge in MATLAB.

INSTRUCTIONAL OBJECTIVES

1.	To learn the MATLAB environment and its programming fundamentals
2.	Ability to write Programs using commands and functions
3.	Able to handle polynomials, and use 2D Graphic commands

LIST OF EXPERIMENTS

1. Practicing MATLAB environment with simple exercises to familiarize Command Window, History, Workspace, Current Directory, Figure window, Edit window, Shortcuts, Help files.
2. Data types, Constants and Variables, Character constants, operators, Assignment statements.
3. Control Structures: For loops, While, If control structures, Switch, Break, Continue statements.

4. Input-Output functions, Reading and Storing Data.
5. Vectors and Matrices, commands to operate on vectors and matrices, matrix Manipulations.
6. Arithmetic operations on Matrices, Relational operations on Matrices, Logical operations on Matrices.
7. Polynomial Evaluation, Roots of Polynomial, Arithmetic operations on Polynomials.
8. Graphics: 2D plots, Printing labels, Grid & Axes box, Text in plot, Bar and Pie chart.

TEXT BOOK

1. Bansal R.K, Goel A.K., Sharma M.K., "*MATLAB and its Applications in Engineering*", Pearson Education, 2012.

REFERENCES

1. Amos Gilat, *"MATLAB-An Introduction with Applications"*, Wiley India, 2009.
2. Stephen.J.Chapman, *"Programming in MATLAB for Engineers"*, Cengage Learning, 2011.

CS1001 PROGRAMMING USING MATLAB												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objective with student outcome	2,3	1,2, 3									1
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts(E)				Professional Subjects(P)		
		x										
4.	Approval	23rd meeting of Academic Council, May 2013										

MA1001	CALCULUS AND SOLID GEOMETRY	L	T	P	C
		3	2	0	4
	Total Contact Hours-75				
	(Common to all Branches of Engineering except Bio group)				

PURPOSE	
To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.	
INSTRUCTIONAL OBJECTIVES	
1.	To apply advanced matrix knowledge to Engineering problems.
2.	To equip themselves familiar with the functions of several variables.
3.	To familiarize with the applications of differential equations.
4.	To improve their ability in solving geometrical applications of differential calculus problems
5.	To expose to the concept of three dimensional analytical geometry.

UNIT I- MATRICES (15 Hours)

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values – Cayley – Hamilton theorem orthogonal reduction of a symmetric matrix to diagonal form – Orthogonal matrices – Reduction of quadratic form to canonical form by orthogonal transformations.

UNIT II- FUNCTIONS OF SEVERAL VARIABLES (15hours)

Function of two variables – Partial derivatives – Total differential – Taylor's expansion – Maxima and Minima – Constrained Maxima and Minima by Lagrangian Multiplier method – Jacobians – Euler's theorem for homogeneous function.

UNIT III- ORDINARY DIFFERENTIAL EQUATIONS (15hours)

Linear equations of second order with constant and variable coefficients – Homogeneous equation of Euler type – Equations reducible to homogeneous form – Variation of parameter – Simultaneous first order with constant co-efficient.

UNIT IV- GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS (15 hours)

Curvature – Cartesian and polar coordinates – Circle of curvature – Involutes and Evolutes – Envelopes – Properties of envelopes.

UNIT V- THREE DIMENSIONAL ANALYTICAL GEOMETRY (15 hours)

Equation of a sphere – Plane section of a sphere – Tangent Plane – Orthogonal Sphere - Equation of a cone – Right circular cone – Equation of a cylinder – Right circular cylinder.

TEXT BOOKS

1. Kreyszig.E, "*Advanced Engineering Mathematics*", John Wiley & Sons. Singapore, 10th edition, 2012.
2. K.Ganesan, Sundarammal Kesavan, K.S.Ganapathy Subramanian & V.Srinivasan, "*Engineering Mathematics*", Gamma publications, Revised Edition, 2013.

REFERENCES

1. Grewal B.S, "*Higher Engineering Mathematics*", Khanna Publications, 42nd Edition,2012.
2. Veerajan. T, "*Engineering Mathematics I*", Tata McGraw Hill Publishing Co, New Delhi, 5th edition, 2006.
3. Kandasamy P etal. "*Engineering Mathematics*", Vol.I (4th revised edition), S.Chand & Co., New Delhi, 2000.
4. Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., "*Advanced "Mathematics for Engineering students*", Volume I (2nd edition), S.Viswanathan Printers and Publishers, 1992.
5. Venkataraman M.K., "*Engineering Mathematics*" – First Year (2nd edition), National Publishing Co., Chennai, 2000.

MA1001 CALCULUS AND SOLID GEOMETRY												
Course designed by		**Department of Mathematics**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x				x						
2.	Mapping of instructional objectives with student outcome	1-5				1-5						
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
		--		x		--				--		
4.	Approval	23rd meeting of academic council, May 2013										

	PHYSICS	L	T	P	C
PY1001	Total Contact Hours-45	3	0	0	3
	Prerequisite				
	Nil				

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

1.	To understand the general scientific concepts required for technology
2.	To apply the Physics concepts in solving engineering problems
3.	To educate scientifically the new developments in engineering and technology
4.	To emphasize the significance of Green technology through Physics principles

UNIT I – MECHANICAL PROPERTIES OF SOLIDS AND ACOUSTICS (9 hours)

Mechanical properties of solids: Stress-strain relationship – Hooke's law – Torsional Pendulum – Young's modulus by cantilever – Uniform and non-uniform bending –— Stress-strain diagram for various engineering materials – Ductile and brittle materials – Mechanical properties of Engineering materials (Tensile strength, Hardness, Fatigue, Impact strength, Creep) – Fracture – Types of fracture (Elementary ideas).

Acoustics: Intensity – Loudness – Absorption coefficient and its determination – Reverberation – Reverberation time – Factors affecting acoustics of buildings and their remedies – Sources and impacts of noise – Sound level meter – Strategies on controlling noise pollution – Ultrasonic waves and properties – Methods of Ultrasonic production (Magnetostriction and Piezoelectric) – Applications of Ultrasonics in Engineering and medicine.

UNIT II–ELECTROMAGNETIC WAVES, CIRCUITS AND APPLICATIONS (9 hours)

Del operator – grad, div, curl and their physical significances - displacement current –Maxwell's equations (derivation) – Wave equation for electromagnetic waves – Propagation in free space – Poynting theorem – Characteristic of Transverse electric and magnetic waves – Skin depth – Rectangular and circular waveguides – High powered vacuum-based cavity magnetrons – Applications including radars, microwave oven and lighting systems.

UNIT III– LASERS AND FIBER OPTICS (9 hours)

Lasers: Characteristics of Lasers – Einstein's coefficients and their relations – Lasing action – Working principle and components of CO_2 Laser, Nd-YAG Laser, Semiconductor diode Laser, Excimer Laser and Free electron Laser – Applications in Remote sensing, holography and optical switching – Mechanism of Laser cooling and trapping.

Fiber Optics: Principle of Optical fiber – Acceptance angle and acceptance cone – Numerical aperture – V-number – Types of optical fibers (Material, Refractive index and mode) – Photonic crystal fibers – Fiber optic communication – Fiber optic sensors.

UNIT IV– QUANTUM MECHANICS AND CRYSTAL PHYSICS (9 hours)

Quantum mechanics: Inadequacies of Classical Mechanics – Duality nature of electromagnetic radiation – De Broglie hypothesis for matter waves – Heisenberg's uncertainty principle –Schrödinger's wave equation – Particle confinement in 1D box (Infinite Square well potential). **Crystal Physics:** Crystal directions – Planes and Miller indices – Symmetry elements – Quasi crystals – Diamond and HCP crystal structure – Packing factor – Reciprocal lattice – Diffraction of X-rays by crystal planes – Laue method and powder method – Imperfections in crystals.

UNIT V– GREEN ENERGY PHYSICS (9 hours)

Introduction to Green energy – **Solar energy:** Energy conversion by photovoltaic principle – Solar cells – **Wind energy:** Basic components and principle of wind energy conversion systems – **Ocean energy:** Wave energy – Wave energy conversion devices – Tidal energy – single and double basin tidal power plants – Ocean Thermal Electric Conversion (OTEC) – **Geothermal energy:** Geothermal sources (hydrothermal, geo-pressurized hot dry rocks, magma) – **Biomass:** Biomass and bio-fuels – bio-energies from wastages – **Fuel cells**: H_2O_2 – **Futuristic Energy:** Hydrogen – Methane Hydrates – Carbon capture and storage (CCS).

* One problem sheet consisting of 10 to 15 problems is to be prepared for each unit and discussed in the class.
* Few problems based on design considerations related to appropriate branches of engineering can be incorporated in each problem sheet.

TEXT BOOKS

1. Thiruvadigal, J. D., Ponnusamy,S..Sudha.D. and Krishnamohan M., "*Physics for Technologists"*, Vibrant Publication, Chennai, 2013.
2. Dattu R.Joshi, "*Engineering Physics*", Tata McGraw- Hill,New Delih,2010.

REFERENCES

1. Wole Soboyejo, "*Mechanical Properties of Engineered Materials*", Marcel Dekker Inc., 2003.
2. Frank Fahy, "*Foundations of Engineering Acoustics*", Elsevier Academic Press, 2005.
3. Alberto Sona, "*Lasers and their applications*", Gordon and Breach Science Publishers Ltd., 1976.
4. David J. Griffiths, "*Introduction to electrodynamics*", 3rd ed., Prentice Hall, 1999.
5. Leonard. I. Schiff, "*Quantum Mechanics"*, Third Edition, Tata McGraw Hill, 2010.
6. Charles Kittel, "*Introduction to Solid State Physics*", Wiley India Pvt. Ltd, 7th ed., 2007.
7. Godfrey Boyle, "*Renewable Energy: Power sustainable future*", 2nd edition, Oxford University Press, UK, 2004.

PY1001 PHYSICS												
Course designed by		**Department of Physics and Nanotechnology**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x		x		x						x
2.	Mapping of instructional objectives with student outcome	1		4		2						3
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
		--		x			--			--		
4.	Approval	23rd meeting of Academic Council, May 2013										

PY1002	PHYSICS LABORATORY	L	T	P	C
	Total Contact Hours - 30	0	0	2	1
	Prerequisite				
	Nil				

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

1.	To gain knowledge in the scientific methods and learn the process of measuring different Physical variables
2.	Develop the skills in arranging and handling different measuring instruments
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.

LIST OF EXPERIMENTS

1. Determination of Young's modulus of a given material – Uniform / Non-uniform bending methods.
2. Determination of Rigidity modulus of a given material – Torsion pendulum
3. Determination of dispersive power of a prism – Spectrometer
4. Determination of laser parameters – divergence and wavelength for a given laser source –laser grating/ Particle size determination using laser
5. Study of attenuation and propagation characteristics of optical fiber cable
6. Calibration of voltmeter / ammeter using potentiometer
7. Construction and study of IC regulation properties of a given power supply
8. Study of electrical characteristics of a solar cell
9. Mini Project – Concept based Demonstration

TEXT BOOKS

1. Thiruvadigal, J. D., Ponnusamy,S..Sudha.D. and Krishnamohan M., "*Physics for Technologists"*, Vibrant Publication, Chennai, 2013
2. R.K.Shukla and Anchal Srivastava, "*Practical Physics*", 1st Edition, New Age International (P) Ltd, New Delhi, 2006.

REFERENCES

1. G.L.Souires, "*Practical Physics:*", 4th Edition, Cambridge University, UK, 2001.
2. D. Chattopadhyay, P. C. Rakshit and B. Saha, "*An Advanced Course in Practical Physics*", 2nd ed., Books & Allied Ltd., Calcutta, 1990.

PY1002 PHYSICS LABORATORY												
Course designed by		**Department of Physics and Nanotechnology**										
1	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x			x						
2	Mapping of instructional objectives with student outcome	1	3			2						
3	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
		--		x			--			--		
4	Approval	23rd meeting of Academic Council, May 2013										

CY1001	CHEMISTRY	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

To enable the students to acquire knowledge in the principles of chemistry for engineering applications

INSTRUCTIONAL OBJECTIVES

1.	The quality of water and its treatment methods for domestic and industrial applications.
2.	The classification of polymers, different types of polymerizations, preparation, properties and applications of important polymers and FRPs.
3.	The phase rule and its application to one and two component systems.
4.	The principle, types and mechanism of corrosion and protective coatings.
5.	The classification and selection of lubricants and their applications.
6.	The basic principles, instrumentation and applications of analytical techniques

UNIT I-WATER TREATMENT (9 hours)

Water quality parameters: Physical, Chemical & Biological significance - Hardness of water - estimation of hardness (EDTA method) - Dissolved oxygen – determination (Winkler's method), Alkalinity - determination - disadvantages of using hard water in boilers: Scale, sludge formation - disadvantages - prevention - treatment: Internal conditioning - phosphate, carbon and carbonate conditioning methods - External: Zeolite, ion exchange methods - desalination - reverse osmosis and electrodialysis - domestic water treatment.

UNIT II - POLYMERS AND REINFORCED PLASTICS (9 hours)

Classification of polymers - types of polymerization reactions - mechanism of addition polymerization: free radical, ionic and Ziegler - Natta - effect of structure on the properties of polymers - strength, plastic deformation, elasticity and crystallinity -Preparation and properties of important resins: Polyethylene, PVC, PMMA, Polyester, Teflon, Bakelite and Epoxy resins - compounding of plastics - moulding methods - injection, extrusion, compression and calendaring - reinforced plastics - FRP – Carbon and Glass- applications.

UNIT III - PHASE EQUILIBRIA, LUBRICANTS AND ADHESIVES (9 hours)

Phase rule: Statement - explanation of the terms involved - one component system (water system only). Condensed phase rule - thermal analysis - two component systems: simple eutectic, Pb-Ag; compound formation, Zn-Mg.

Lubricants: Classification –solid, semi solid, liquid, emulsion- properties – selection of lubricants for different purposes, Adhesives: classification-natural, synthetic, inorganic- Adhesive action - applications.

UNIT IV- CORROSION AND ITS CONTROL (9 hours)

Corrosion: Basic concepts - mechanism of chemical, electrochemical corrosion - Pilling Bedworth rule – Types of Electrochemical corrosion - galvanic corrosion - differential aeration corrosion - pitting corrosion - stress corrosion – Measurement of corrosion (wt. loss method only) - factors influencing corrosion. Corrosion control: Cathodic protection - sacrificial anodic method - corrosion inhibitors. Protective coatings: surface preparation for metallic coatings - electro plating (copper plating) and electroless plating (Nickel plating) - chemical conversion coatings - anodizing, phosphating & chromate coating.

UNIT V- INSTRUMENTAL METHODS OF ANALYSIS (9 hours)

Basic principles, instrumentation and applications of potentiometry, UV - visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy and flame photometry .

TEXT BOOKS

1. Kamaraj.P & Arthanareeswari. M, "*Applied Chemistry", 9th Edition*, Sudhandhira Publications, 2012.
2. S.S.Dara, A Text book of Engineering Chemistry, 10th Edition, S.Chand & Company Ltd., New Delhi, 2003

REFERENCES

1. Jain.P.C and Monika Jain, "*Engineering Chemistry*", Danpat Rai publishing company (P) Ltd, New Delhi, 2010.
2. Helen P Kavitha, "*Engineering Chemistry – I", Scitech* Publications, 2nd edition, 2008.

CY1001 CHEMISTRY												
Course designed by		Department of Chemistry										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x	x		x						x
2.	Mapping of instructional objective with student outcome	1-6	1,5	3		2						4
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
		--		x			--			--		
4.	Approval	23rd meeting of Academic Council, May 2013										

CY1002	CHEMISTRY LABORATORY	L	T	P	C
	Total Contact Hours - 30	0	0	2	1
	Prerequisite				
	Nil				

PURPOSE

To apply the concepts of chemistry and develop analytical skills for applications in engineering.

INSTRUCTIONAL OBJECTIVES

1. To enable the students to understand the basic concepts involved in the analyses.

LIST OF EXPERIMENTS

1. Preparation of standard solutions
2. Estimation of total, permanent and temporary hardness by EDTA method
3. Conductometric titration - determination of strength of an acid
4. Estimation of iron by potentiometry.
5. Determination of molecular weight of polymer by viscosity average method
6. Determination of dissolved oxygen in a water sample by Winkler's method
7. Determination of Na/K in water sample by Flame photometry (Demonstration)
8. Estimation of Copper in ore
9. Estimation of nickel in steel
10. Determination of total alkalinity and acidity of a water sample
11. Determination of rate of corrosion by weight loss method.

REFERENCES

1. Kamaraj & Arthanareeswari, Sudhandhira Publications "*Practical Chemistry*" (work book) , 2011.
2. Helen P. Kavitha "*Chemistry Laboratory Manual*", Scitech Publications, 2008.

CY1002 CHEMISTRY LABORATORY												
Course designed by		**Department of Chemistry**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objective with student outcome	1	1									1
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts(E)			Professional Subjects (P)		
		--		x			--			--		
4.	Approval	23rd meeting of Academic Council, May 2013										

BT1001	**BIOLOGY FOR ENGINEERS**	**L**	**T**	**P**	**C**
	Total Contact Hours - 30	**2**	**0**	**0**	**2**
	Prerequisite				
	Nil				

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	
1.	To familiarize the students with the basic organization of organisms and subsequent building to a living being
2.	To impart an understanding about the machinery of the cell functions that is ultimately responsible for various daily activities.
3.	To provide knowledge about biological problems that require engineering expertise to solve them

UNIT I- BASIC CELL BIOLOGY (6 hours)

Introduction: Methods of Science-Living Organisms: Cells and Cell theory Cell Structure and Function, Genetic information, protein synthesis, and protein structure, Cell metabolism-Homoeostasis- Cell growth, reproduction, and differentiation.

UNIT II- BIOCHEMISTRY AND MOLECULAR ASPECTS OF LIFE (5 hours)

Biological Diversity --Chemistry of life: chemical bonds--Biochemistry and Human biology--Protein synthesis—Stem cells and Tissue engineering.

UNIT III- ENZYMES AND INDUSTRIAL APPLICATIONS (5 hours)

Enzymes: Biological catalysts, Proteases, Carbonic anhydrase, Restriction enzymes, and Nucleoside monophosphate kinases—Photosynthesis

UNIT IV- MECHANOCHEMISTRY (7 hours)

Molecular Machines/Motors—Cytoskeleton—Bioremediation—Biosensors

UNIT V- NERVOUS SYSTEM, IMMUNE SYSTEM, AND CELL SIGNALING (7 hours)

Nervous system--Immune system- General principles of cell signaling.

TEXT BOOK

1. S. ThyagaRajan, N. Selvamurugan, M. P. Rajesh, R. A. Nazeer, Richard W. Thilagaraj, S. Barathi, and M. K. Jaganathan, "*Biology for Engineers*," Tata McGraw-Hill, New Delhi, 2012.

REFERENCES

1. Jeremy M. Berg, John L. Tymoczko and Lubert Stryer, "*Biochemistry*," W.H. Freeman and Co. Ltd., 6th Ed., 2006.
2. Robert Weaver, "*Molecular Biology*," MCGraw-Hill, 5th Edition, 2012.
3. Jon Cooper, "*Biosensors A Practical Approach*" Bellwether Books**, 2**004.

4. Martin Alexander, "*Biodegradation and Bioremediation,"* Academic Press, 1994.
5. Kenneth Murphy, "*Janeway's Immunobiology*," Garland Science; 8th edition, 2011.
6. Eric R. Kandel, James H. Schwartz, Thomas M. Jessell, "Principles of Neural Science, McGraw-Hill, 5th Edition, 2012.

BT1001 BIOLOGY FOR ENGINEERS												
Course designed by		**Department of Biotechnology**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x			x						x	
2.	Mapping of instructional objectives with student outcome	1			2						3	
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
				x								
4.	Approval	23rd meeting of Academic Council, May 2013										

CE1001	**BASIC CIVIL ENGINEERING**	**L**	**T**	**P**	**C**
	Total Contact Hours - 30	**2**	**0**	**0**	**2**
	Prerequisite				
	Nil				

PURPOSE

To get exposed to the glimpses of Civil Engineering topics that is essential for an Engineer.

INSTRUCTIONAL OBJECTIVES

1.	To know about different materials and their properties
2.	To know about engineering aspects related to buildings
3.	To know about importance of surveying and the transportation systems
4.	To get exposed to the rudiments of engineering related to dams, water supply, and sewage disposal

UNIT I - BUILDING MATERILAS (6hours)

Introduction – Civil Engineering – Materials: Bricks – composition – classifications – properties –uses. Stone – classification of rocks – quarrying – dressing – properties –uses. Timber - properties –uses –ply wood. Cement – grades –types – properties –uses. Steel – types – mild steel – medium steel – hard steel – properties – uses – market forms. Concrete – grade designation – properties – uses.

UNIT II - MATERIAL PROPERTIES (6hours)

Stress – strain – types – Hook's law – three moduli of elasticity – poisons ratio – relationship – factor of safety. Centroid - center of gravity – problems in symmetrical sections only (I, T and channel sections). Moment of inertia, parallel, perpendicular axis theorems and radius of gyration (definitions only).

UNIT III - BUILDING COMPONENTS (6hours)

Building – selection of site – classification – components. Foundations –functions – classifications – bearing capacity. Flooring – requirements – selection – types – cement concrete marble – terrazzo floorings. Roof – types and requirements.

UNIT IV - SURVEYING AND TRANSPORTATION (6hours)

Surveying – objectives – classification – principles of survey. Transportation – classification – cross section and components of road – classification of roads. Railway – cross section and components of permanent way –functions. Water way – docks and harbor – classifications – components. Bridge – components of bridge.

UNIT V- WATER SUPPLY AND SEWAGE DISPOSAL (6hours)

Dams – purpose – selection of site – types –gravity dam (cross section only). Water supply – objective – quantity of water – sources – standards of drinking water – distribution system. Sewage – classification – technical terms – septic tank – components and functions.

TEXT BOOKS

1. Raju K.V.B., Ravichandran P.T., "*Basics of Civil Engineering"*, Ayyappa Publications, Chennai, 2012.
2. Rangwala,S.C., "*Engineering Materials"*, Charotar Publishing House, Anand, 2012.

REFERENCES

1. Ramesh Babu, "*Civil Engineering"* , VRB Publishers, Chennai, 2000.
2. National Building Code of India, Part V, "*Building Material's"*, 2005.
3. Surendra Singh, "*Building Material"s*, Vikas Publishing Company, New Delhi, 1996.

CE1001 - BASIC CIVIL ENGINEERING												
Course designed by		**Department of Civil Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x				x						x
2.	Mapping of instructional objectives with student outcome	1 - 4				1-4						2-4
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
							x					
4.	Approval	23rd meeting of academic council , May 2013										

EE1001	**BASIC ELECTRICAL ENGINEERING**	**L**	**T**	**P**	**C**
	Total Contact Hours - 30	**2**	**0**	**0**	**2**
	Prerequisite				
	Nil				

PURPOSE

This course provides comprehensive idea about circuit analysis, working principles of machines and common measuring instruments.

INSTRUCTIONAL OBJECTIVES

1.	Understand the basic concepts of magnetic circuits, AC & DC circuits.
2.	Explain the working principle, construction, applications of DC & AC machines and measuring instruments.
3.	Gain knowledge about the fundamentals of wiring and earthing

UNIT I – FUNDAMENTALS OF DC CIRCUITS (6 hours)

Introduction to DC and AC circuits, Active and passive two terminal elements, Ohms law, Voltage-Current relations for resistor, inductor, capacitor , Kirchhoff's laws, Mesh analysis, Nodal analysis, Ideal sources –equivalent resistor, current division, voltage division

UNIT II – MAGNETIC CIRCUITS (6 hours)

Introduction to magnetic circuits-Simple magnetic circuits-Faraday's laws, induced emfs and inductances

UNIT III – AC CIRCUITS (6 hours)

Sinusoids, Generation of AC, Average and RMS values, Form and peak factors, concept of phasor representation, J operator. Analysis of R-L, R-C, R-L-C circuits. Introduction to three phase systems - types of connections, relationship between line and phase values.

UNIT IV–ELECTRICAL MACHINES & MEASURING INSTRUMENTS (6 hours)

Working principle, construction and applications of DC machines and AC machines (1 - phase transformers, single phase induction motors: split phase, capacitor start and capacitor start & run motors). Basic principles and classification of instruments -Moving coil and moving iron instruments.

UNIT V– ELECTRICAL SAFETY, WIRING &INTRODUCTION TO POWER SYSTEM (6 hours)

Safety measures in electrical system- types of wiring- wiring accessories-staircase, fluorescent lamps & corridor wiring- Basic principles of earthing-Types of earthing- Simple layout of generation, transmission & distribution of power.

TEXT BOOK

1. S.S.Dash,C.Subramani,K.Vijayakumar,"BasicElectrical Engineering", First edition, Vijay Nicole Imprints Pvt.Ltd,2013

REFERENCES

1. Smarajt Ghosh, "*Fundamentals of Electrical & Electronics Engineering*", Second edition, PHI Learning, 2007.
2. V.K.Metha, Rohit Metha, "*Basic Electrical Engineering*", Fifth edition, S.Chand & Co, 2012.
3. Kothari D. P and Nagrath IJ, "*Basic Electrical Engineering*", Second edition, Tata McGraw - Hill, 2009
4. S. K. Bhattacharya, "*Basic Electrical and Electronics Engineering"*, First edition, Pearson Education, 2011

EE1001 - BASIC ELECTRICAL ENGINEERING												
Course designed by		Department of Electrical and Electronics Engineering										
1.	Student outcomes	a	b	c	d	e	f	g	h	i	j	k
		x				x						
2.	Mapping of instructional objectives with student outcome	1-3				1						
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts(E)				Professional Subjects(P)		
		--		--		x				--		
4.	Approval	23rd meeting of Academic Council, May 2013										

IT1001	COMPUTER HARDWARE AND TROUBLESHOOTING LAB	L	T	P	C
	Total contact hours - 60	0	0	4	2
	Prerequisite				
	Nil				

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

1.	Understand the components on the motherboard
2.	Perform system administration tasks
3.	Understand different storage media
4.	Understand system related problems and methods of troubleshooting

LIST OF EXPERIMENTS

1. Study and Identification of standard desktop personal computer
2. Understanding of Motherboard and its interfacing components
3. Install and configure computer drivers and system components.
4. Disk formatting, partitioning and Disk operating system commands
5. Install, upgrade and configure Windows operating systems.
6. Remote desktop connections and file sharing.
7. Identify, Install and manage network connections Configuring IP address and Domain name system
8. Install, upgrade and configure Linux operating systems.
9. Installation Antivirus and configure the antivirus.
10. Installation of printer and scanner software.

11. Disassembly and Reassembly of hardware.
12. Trouble shooting and Managing Systems

REFERENCES

1. Craig Zacker& John Rourke, "*The complete reference : PC hardware*", Tata McGraw- Hill, New Delhi, 2001.
2. Mike Meyers, "*Introduction to PC Hardware and Troubleshooting*", Tata McGraw-Hill, New Delhi, 2003.
3. Govindarajulu B., "*IBM PC and Clones hardware trouble shooting and maintenance*", Tata McGraw-Hill, New Delhi, 2002.

IT1001 COMPUTER HARDWARE AND TROUBLESHOOTING LAB															
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			
2.	Mapping of instructional objectives with student outcome									2		1,3, 4			
3.	Category	General (G)		Basic Sciences (B)	Engineering Sciences and Technical Arts (E)								Professional Subjects (P)		
													x		
4.	Broad Area	Program ming		Net working	Data base		Web System		Human Computer Interaction				Platform Technolo -gies		
				x											
5.	Approval	23rd meeting of the Academic Council , May 2013													

NC1001/ NS1001/ SP1001/ YG1001	**NATIONAL CADET CORPS (NCC)/ NATIONAL SERVICE SCHEME (NSS)/ NATIONAL SPORTS ORGANIZATION (NSO) / YOGA**	**L**	**T**	**P**	**C**
	Total Contact Hours – 15 (minimum, but may vary depending on the course)	**0**	**0**	**1**	**1**
	Prerequisite				
	Nil				

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	
1.	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, Kiriyas, Bandas, Muthras

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

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

Analysis of Thought - Meditation Santhi Physical Exercises III & IV

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

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

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

Benefits of Blessings - Meditation Santhi Kayakalpa Asanas, Kiriyas, 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.

TEXT BOOKS

1. Yogiraj Vethathiri Maharishi, "*Yoga for Modern Age*", Vethathiri Publishers, 1989.
2. Vethathiri Maharishi, T., "*Simplified Physical Exercises*", Vethathiri Publishers, 1987.

NC1001/ NS1001/ SP1001/ YG1001		**National Cadet Corps (NCC)/ National Service Scheme (NSS)/ National Sports Organization (NSO)/YOGA**										
Course designed by		**NCC/NSS/NSO/YOGA PRACTITIONERS**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
2.	Mapping of instructional objectives with student outcome				X					X		
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
		X										
4.	Approval	23rd meeting of Academic Council, May 2013										

SEMESTER II

LE1001	ENGLISH	L	T	P	C
	Total Contact Hours-45	1	2	0	2
	Prerequisite				
	Nil				

PURPOSE

To help students achieve proficiency in English and develop their professional communication skills to meet the demand in the field of global communication to enable them to acquire placement anywhere with ease and confidence.

INSTRUCTIONAL OBJECTIVES

1.	To enable students improve their lexical, grammatical and communicative competence.
2.	To enhance their communicative skills in real life situations.
3.	To assist students understand the role of thinking in all forms of communication.
4.	To equip students with oral and appropriate written communication skills.
5.	To assist students with employability and job search skills.

UNIT I - INVENTIONS **(9 hours)**

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

UNIT II- ECOLOGY **(9 hours)**

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

UNIT III- SPACE **(9 hours)**

1. Grammar and Vocabulary – tense and concord; word formation
2. Listening and Speaking – Distinction between native and Indian English (Speeches by TED and Kalam) – accent, use of vocabulary and rendering;
3. Writing – Definitions and Essay writing
4. Reading Comprehension – Predicting the content

UNIT IV- CAREERS **(9 hours)**

1. Grammar and Vocabulary –Homonyms and Homophones
2. Listening and Speaking – – Group Discussion
3. Writing Applying for job, cover letter and resume
4. Reading, etymology (roots ; idioms and phrases), Appreciation of creative writing.

UNIT V- RESEARCH **(9 hours)**

1. Grammar and Vocabulary – Using technical terms, Analogies
2. Listening and Speaking -- Presentation techniques (Speech by the learner)
3. Writing – Project Proposal
4. Reading Comprehension -- Referencing Skills for Academic Report Writing (Research Methodology – Various methods of collecting data) Writing a report based on MLA Handbook

TEXTBOOK

1. Department of English and Foreign Languages. "*English for Engineers*", SRM University Publications, 2013.

REFERENCES

1. Dhanavel, S.P. "*English and Communication Skills for Students of Science and Engineering*"**,** Orient Blackswan Ltd., 2009.
2. Meenakshi Raman and Sangeetha Sharma**.** "*Technical Communication-Principles and Practice*", Oxford University Press, 2009.
3. Day, R A.. Scientific English: "*A Guide for Scientists and Other Professionals*", 2nd ed. Hyderabad: Universities Press, 2000.

LE1001 ENGLISH												
Course designed by		**Department of English and Foreign Languages**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
					x		x	x		x		
2.	Mapping of instructional objectives with student outcome				1-5		1-5	1-5		1-5		
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
		x		--			--			--		
4.	Approval	23rd meeting of Academic Council, May 2013										

PD1002	SOFT SKILLS-II	L	T	P	C
	Total Contact Hours - 30	1	0	1	1
	Prerequisite				
	Nil				

PURPOSE

To enhance holistic development of students and improve their employability skills.

INSTRUCTIONAL OBJECTIVES

1.	To develop inter personal skills and be an effective goal oriented team player.
2.	To develop professionals with idealistic, practical and moral values.
3.	To develop communication and problem solving skills.
4.	To re-engineer attitude and understand its influence on behavior.

UNIT I - INTERPERSONAL SKILLS (6 hours)

Understanding the relationship between Leadership Networking & Team work, Realizing Ones Skills in Leadership, Networking & Team Work, and Assessing Interpersonal Skills Situation description of Interpersonal Skill.

Team Work

Necessity of Team Work Personally, Socially and Educationally

UNIT II - LEADERSHIP (4 hours)

Skills for a good Leader, Assessment of Leadership Skills

Change Management
Exploring Challenges, Risking Comfort Zone, Managing Change

UNIT III - STRESS MANAGEMENT (6 hours)
Causes of Stress and its impact, how to manage & distress, Understanding the circle of control, Stress Busters.
Emotional Intelligence
What is Emotional Intelligence, emotional quotient why Emotional Intelligence matters, Emotion Scales. Managing Emotions.

UNIT IV - CONFLICT RESOLUTION (4 hours)
Conflicts in Human Relations – Reasons Case Studies, Approaches to conflict resolution.

UNIT V - DECISION MAKING (10 hours)
Importance and necessity of Decision Making, process of Decision Making, Practical way of Decision Making, Weighing Positives & Negatives.
Presentation

ASSESSMENT
1. A practical and activity oriented course which has a continuous assessment for 75 marks based on class room interaction, activities etc.,
2. Presentation - 25 marks

TEXT BOOK
1. INSIGHT, 2009. Career Development Centre, SRM Publications.

REFERENCES
1. Covey Sean, "*Seven Habit of Highly Effective Teens"*, New York, Fireside Publishers, 1998.
2. Carnegie Dale, "*How to win Friends and Influence People"*, New York: Simon & Schuster, 1998.
3. Thomas A Harris, "*I am ok, You are ok* , New York-Harper and Row", 1972.
4. Daniel Coleman, "*Emotional Intelligence"*, Bantam Book, 2006.

PD1002 - SOFT SKILLS-II												
Course designed by		**Career Development Centre**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
					X		X	X		X		
2.	Mapping of instructional objectives with student outcome				1		2	3		4		
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
		X										
4.	Approval	23rd meeting of Academic Council, May 2013										

MA1002	**ADVANCED CALCULUS AND COMPLEX ANALYSIS**	**L**	**T**	**P**	**C**
	Total Contact Hours -75	**3**	**2**	**0**	**4**
	(Common to all Branches of Engineering except Bio group)				

PURPOSE

To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.

INSTRUCTIONAL OBJECTIVES

1.	To have knowledge in multiple calculus
2.	To improve their ability in Vector calculus
3.	To equip themselves familiar with Laplace transform
4.	To expose to the concept of Analytical function
5.	To familiarize with Complex integration

UNIT I- MULTIPLE INTEGRALS **(15 hours)**

Double integration in Cartesian and polar coordinates – Change of order of integration – Area as a double integral – Triple integration in Cartesian coordinates – Conversion from Cartesian to polar – Volume as a Triple Integral.

UNIT II- VECTOR CALCULUS **(15 hours)**

Gradient, divergence, curl – Solenoidal and irrotational fields – Vector identities (without proof) – Directional derivatives – Line, surface and volume integrals –

Green's, Gauss divergence and Stoke's theorems (without proof) – Verification and applications to cubes and parallelopipeds only.

UNIT III- LAPLACE TRANSFORMS (15 hours)

Transforms of simple functions – Basic operational properties – Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem – periodic functions – Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficients only.

UNIT IV- ANALYTIC FUNCTIONS (15 hours)

Definition of Analytic Function – Cauchy Riemann equations – Properties of analytic functions - Determination of harmonic conjugate – Milne-Thomson's method – Conformal mappings: 1/z, az, az+b and bilinear transformation.

UNIT V- COMPLEX INTEGRATION (15 hours)

Line integral – Cauchy's integral theorem (without proof) – Cauchy's integral formulae and its applications – Taylor's and Laurent's expansions (statements only) – Singularities – Poles and Residues – Cauchy's residue theorem – Contour integration – Unit circle and semi circular contour.

TEXT BOOKS

1. Kreyszig.E, "*Advanced Engineering Mathematics*", 10th edition, John Wiley & Sons. Singapore, 2012.
2. K.Ganesan, Sundarammal Kesavan, K.S.Ganapathy Subramanian & V.Srinivasan, "*Engineering Mathematics*", Gamma publications, Revised Edition, 2013.

REFERENCES

1. Grewal B.S, "*Higher Engg Maths*", Khanna Publications, 42nd Edition, 2012.
2. Veerajan, T., "*Engineering Mathematics I*", Tata McGraw Hill Publishing Co., New Delhi, 5th edition, 2006.
3. Kandasamy P etal. "*Engineering Mathematics*", Vol.I (4th revised edition), S.Chand &Co., New Delhi, 2000.
4. Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., "*Advanced Mathematics*" for Engineering students, Volume I (2nd edition), S.Viswanathan Printers and Publishers, 1992.
5. Venkataraman M.K., "*Engineering Mathematics*" – First Year (2nd edition), National Publishing Co., Chennai, 2000.

MA1002 ADVANCED CALCULUS AND COMPLEX ANALYSIS												
Course designed by		Department of Mathematics										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x				x						
2.	Mapping of instructional objectives with student outcome	1-5				1-5						
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
		--		x		--				--		
4.	Approval	23rd meeting of academic council, May 2013										

PY1003	MATERIALS SCIENCE	L	T	P	C
	Total Contact Hours - 60	2	0	2	3
	Prerequisite				
	Nil				

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

1.	To acquire basic understanding of advanced materials, their functions and properties for technological applications
2.	To emphasize the significance of materials selection in the design process
3.	To understand the principal classes of bio-materials and their functionalities in modern medical science
4.	To get familiarize with the new concepts of Nano Science and Technology
5.	To educate the students in the basics of instrumentation, measurement, data acquisition, interpretation and analysis

UNIT I– ELECTRONIC AND PHOTONIC MATERIALS (6 hours)

Electronic Materials: Fermi energy and Fermi–Dirac distribution function – Variation of Fermi level with temperature in intrinsic and extrinsic semiconductors – Hall effect – Dilute Magnetic Semiconductors (DMS) and their applications

Superconducting Materials: Normal and High temperature superconductivity – Applications.

Photonic Materials: LED – LCD – Photo conducting materials – Photo detectors – Photonic crystals and applications – Elementary ideas of Non-linear optical materials and their applications.

UNIT II– MAGNETIC AND DIELECTRIC MATERIALS (6 hours)

Magnetic Materials: Classification of magnetic materials based on spin – Hard and soft magnetic materials – Ferrites, garnets and magnetoplumbites – Magnetic bubbles and their applications – Magnetic thin films – Spintronics and devices (Giant magneto resistance, Tunnel magneto resistance and Colossal magneto resistance).

Dielectric Materials: Polarization mechanisms in dielectrics – Frequency and temperature dependence of polarization mechanism – Dielectric loss – Dielectric waveguide and dielectric resonator antenna – Piezoelectric, pyroelectric and ferroelectric materials and their applications.

UNIT III– MODERN ENGINEERING AND BIOMATERIALS (6 hours)

Modern Engineering Materials: Smart materials – Shape memory alloys – Chromic materials (Thermo, Photo and Electro) – Rheological fluids – Metallic glasses – Advanced ceramics – Composites.

Bio-materials: Classification of bio-materials (based on tissue response) – Comparison of properties of some common biomaterials – Metallic implant materials (stainless steel, cobalt-based and titanium-based alloys) – Polymeric implant materials (Polyamides, polypropylene, Acrylic resins and Hydrogels) – Tissue replacement implants – Soft and hard tissue replacements – Skin implants – Tissue engineering – Biomaterials for organ replacement (Bone substitutes) – Biosensor.

UNIT IV– INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY (6 hours)

Basic concepts of Nanoscience and Nanotechnology – Quantum wire – Quantum well – Quantum dot – fullerenes – Graphene – Carbon nanotubes – Material processing by chemical vapor deposition and physical vapor deposition – Principle of SEM, TEM, AFM, Scanning near-field optical microscopy (SNOM) – Scanning ion-conducting microscopy (SCIM) – Potential uses of nanomaterials in electronics, robotics, computers, sensors, sports equipment, mobile electronic devices, vehicles and transportation – Medical applications of nanomaterials.

UNIT V– MATERIALS CHARACTERIZATION (6 hours)

X-ray diffraction, Neutron diffraction and Electron diffraction– X-ray fluorescence spectroscopy – Fourier transform Infrared spectroscopy (FTIR) – Ultraviolet and visible spectroscopy (UV-Vis) – Thermogravimetric Analysis (TGA) – Differential Thermal Analysis (DTA) – Differential Scanning Calorimetry (DSC).

PRACTICAL EXPERIMENTS (30 hours)

1. Determination of resistivity and band gap for a semiconductor material – Four probe method / Post-office box
2. Determination of Hall coefficient for a semiconducting material
3. To study V-I characteristics of a light dependent resistor (LDR)
4. Determination of energy loss in a magnetic material – B-H curve
5. Determination of paramagnetic susceptibility – Quincke's method
6. Determination of dielectric constant for a given material
7. Calculation of lattice cell parameters – X-ray diffraction
8. Measurement of glucose concentration – Electrochemical sensor
9. Visit to Advanced Material Characterization Laboratory (Optional)

TEXT BOOKS

1. Thiruvadigal, J. D., Ponnusamy,S..Sudha.D. and Krishnamohan M., "*Materials Sciences"*, Vibrant Publication, Chennai, 2013
2. Rajendran.V, "*Materials Science*",Tata McGraw- Hill,New Delhi,2011

REFERENCES

1. Rolf E. Hummel, "*Electronic Properties of Materials"*, 4th ed., Springer, New York, 2011.
2. Dennis W. Prather, "*Photonic Crystals: Theory, Applications, and Fabrication"*, John Wiley & Sons, Hoboken, 2009.
3. James R. Janesick, "*Scientific Charge-Coupled Devices",* Published by SPIE - The International Society for Optical Engineering, Bellingham, Washington, 2001.
4. David M. Pozar, "*Microwave Engineering*", 3rd ed., John Wiley & Sons, 2005.
5. F. Silver and C. Dillion, "*Biocompatibility: Interactions of Biological and Implantable Materials*", VCH Publishers, New York, 1989.
6. Severial Dumitriu, "*Polymeric Biomaterials*" Marcel Dekker Inc, CRC Press, Canada 2001.
7. G. Cao, "*Nanostructures and Nanomaterials: Synthesis, Properties and Applications*", Imperial College Press, 2004.
8. T.Pradeep, "*A Text Book of Nanoscience and Nanotechnology*", Tata McGraw Hill, New Delhi, 2012.
9. Sam Zhang, "*Materials Characterization Techniques*", CRC Press, 2008.

PY1003 MATERIALS SCIENCE												
Course designed by		Department of Physics and Nanotechnology										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x		x	x						x
2.	Mapping of instructional objectives with student outcome	1	5		4	2						3
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
		--		x			--			--		
4.	Approval	23rd meeting of Academic Council, May 2013										

CY1003	PRINCIPLES OF ENVIRONMENTAL SCIENCE	L	T	P	C
	Total Contact Hours - 30	2	0	0	2
	Prerequisite				
	Nil				

PURPOSE

The course provides a comprehensive knowledge in environmental science, environmental issues and the management.

INSTRUCTIONAL OBJECTIVES

To enable the students

1.	To gain knowledge on the importance of environmental education and ecosystem.
2.	To acquire knowledge about environmental pollution- sources, effects and control measures of environmental pollution.
3.	To understand the treatment of wastewater and solid waste management.
4.	To acquire knowledge with respect to biodiversity, its threats and its conservation and appreciate the concept of interdependence.
5.	To be aware of the national and international concern for environment for protecting the environment

UNIT I- ENVIRONMENTAL EDUCATION AND ECOSYSTEMS (6 hours)

Environmental education: Definition and objective. Structure and function of an ecosystem – ecological succession –primary and secondary succession -

ecological pyramids – pyramid of number, pyramid of energy and pyramid of biomass.

UNIT II- ENVIRONMENTAL POLLUTION (6 hours)

Environmental segments – structure and composition of atmosphere - Pollution – Air, water, soil , thermal and radiation – Effects – acid rain, ozone layer depletion and green house effect – control measures – determination of BOD, COD, TDS and trace metals.

UNIT III- WASTE MANAGEMENT (6 hours)

Waste water treatment (general) – primary, secondary and tertiary stages.
Solid waste management: sources and effects of municipal waste, bio medical waste - process of waste management.

UNIT IV- BIODIVERSITY AND ITS CONSERVATION (6 hours)

Introduction: definition - genetic, species and ecosystem diversity – bio diversity hot spots - values of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - threats to biodiversity: habitat loss, poaching of wildlife – endangered and endemic species of India, Conservation of biodiversity: in-situ and ex-situ conservations.

UNIT V- ENVIRONMENTAL PROTECTION (6 hours)

National concern for environment: Important environmental protection acts in India – water, air (prevention and control of pollution) act, wild life conservation and forest act – functions of central and state pollution control boards - international effort – key initiatives of Rio declaration, Vienna convention, Kyoto protocol and Johannesburg summit.

TEXT BOOKS

1. Kamaraj.P & Arthanareeswari.M, "*Environmental Science – Challenges and Changes"*, 4th Edition, Sudhandhira Publications, 2010.
2. Sharma.B.K. and Kaur, "*Environmental Chemistry",* Goel Publishing House, Meerut, 1994.

REFERENCES

1. De.A.K., "*Environmental Chemistry"*, New Age International, New Delhi, 1996.
2. Helen P Kavitha, "*Principles of Environmental Science*", Sci tech Publications, 2nd Edition, 2008.

CY1003 – PRINCIPLES OF ENVIRONMENTAL SCIENCE													
Course designed by		**Department of Chemistry**											
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k	
				x		x	x		x	x	x		
2.	Mapping of instructional objective with student outcome			5		2	4		1,3	3	2, 5		
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)				
				x		--			--				
4.	Approval	23rd meeting of Academic Council, May 2013											

ME1001	BASIC MECHANICAL ENGINEERING	L	T	P	C
	Total Contact Hours - 30	2	0	0	2
	Prerequisite				
	Nil				

PURPOSE

To familiarize the students with the basics of Mechanical Engineering.

INSTRUCTIONAL OBJECTIVES

1. To familiarize with the basic machine elements
2. To familiarize with the Sources of Energy and Power Generation
3. To familiarize with the various manufacturing processes

UNIT I - MACHINE ELEMENTS - I (5 hours)

Springs: Helical and leaf springs – Springs in series and parallel. **Cams:** Types of cams and followers – Cam profile.

UNIT II- MACHINE ELEMENTS– II (5 hours)

Power Transmission: Gears (terminology, spur, helical and bevel gears, gear trains). Belt drives (types). Chain drives. Simple Problems.

UNIT III- ENERGY (10 hours)

Sources: Renewable and non-renewable (various types, characteristics, advantages/disadvantages). **Power Generation:** External and internal combustion

engines – Hydro, thermal and nuclear power plants (layouts, element/component description, advantages, disadvantages, applications). Simple Problems.

UNIT IV - MANUFACTURING PROCESSES - I (5 hours)

Sheet Metal Work: Introduction – Equipments – Tools and accessories – Various processes (applications, advantages / disadvantages). **Welding:** Types – Equipments – Tools and accessories – Techniques employed -applications, advantages / disadvantages – Gas cutting – Brazing and soldering.

UNIT V - MANUFACTURING PROCESSES– II (5 hours)

Lathe Practice: Types - Description of main components – Cutting tools – Work holding devices – Basic operations. Simple Problems. **Drilling Practice:** Introduction – Types – Description – Tools. Simple Problems.

TEXT BOOKS

1. Kumar, T., Leenus Jesu Martin and Murali, G., *"Basic Mechanical Engineering"*, Suma Publications, Chennai, 2007.
2. Prabhu, T. J., Jai Ganesh, V. and Jebaraj, S., *"Basic Mechanical Engineering"*, Scitech Publications, Chennai, 2000.

REFERENCE BOOKS

1. Hajra Choudhary, S.K. and HajraChoudhary, A. K., "*Elements of Workshop Technology", Vols. I & II*, Indian Book Distributing Company Calcutta, 2007.
2. Nag, P.K., "*Power Plant Engineering"*, Tata McGraw-Hill, New Delhi, 2008.
3. Rattan, S.S., "*Theory of Machines"*, Tata McGraw-Hill, New Delhi, 2010.

<table>
<tr><th colspan="14">ME1001 BASIC MECHANICAL ENGINEERING</th></tr>
<tr><th colspan="2">Course designed by</th><th colspan="12">Department of Mechanical Engineering</th></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student Outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
<tr><td>X</td><td></td><td></td><td></td><td>x</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.</td><td>Mapping of instructional objectives with student outcome</td><td>1- 3</td><td></td><td></td><td></td><td>1- 3</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">3.</td><td rowspan="2">Category</td><td colspan="2">General (G)</td><td colspan="2">Basic sciences (B)</td><td colspan="4">Engineering sciences and technical art (E)</td><td colspan="3">Professional subjects (P)</td></tr>
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<tr><td>4.</td><td>Approval</td><td colspan="12">23rd meeting of the Academic Council , May 2013</td></tr>
</table>

EC1001	BASIC ELECTRONICS ENGINEERING	L	T	P	C
	Total Contact Hours – 30	2	0	0	2
	Prerequisite				
	Nil				

PURPOSE

This course provides comprehensive idea about working principle, operation and characteristics of electronic devices, transducers, Digital Electronics and Communication Systems.

INSTRUCTIONAL OBJECTIVES

At the end of the course students will be able to gain knowledge about the

1.	Fundamentals of electronic components, devices, transducers,
2.	Principles of digital electronics, and
3.	Principles of various communication systems

UNIT I-ELECTRONIC COMPONENTS (4 hours)

Passive components – resistors, capacitors & inductors (properties, common types, I-V relationship and uses).

UNIT II-SEMICONDUCTOR DEVICES (7 hours)

Semiconductor Devices - Overview of Semiconductors - basic principle, operation and characteristics of PN diode, zener diode, BJT, JFET, optoelectronic devices (LDR, photodiode, phototransistor, solar cell, optocouplers)

UNIT III-TRANSDUCERS (5 hours)

Transducers - Instrumentation – general aspects, classification of transducers, basic requirements of transducers, passive transducers - strain gauge, thermistor, Hall-Effect transducer, LVDT, and active transducers – piezoelectric and thermocouple.

UNIT IV-DIGITAL ELECTRONICS (7 hours)

Number systems – binary codes - logic gates - Boolean algebra, laws & theorems - simplification of Boolean expression - implementation of Boolean expressions using logic gates - standard forms of Boolean expression.

UNIT V-COMMUNICATION SYSTEMS (7 hours)

Block diagram of a basic communication system – frequency spectrum - need for modulation - methods of modulation - principles of AM, FM, pulse analog and

pulse digital modulation – AM / FM transmitters & receivers (block diagram description only)

TEXT BOOKS

1. Thyagarajan T., SendurChelvi K.P., Rangaswamy T.R., *"Engineering Basics: Electrical, Electronics and Computer Engineering"*, New Age International, Third Edition, 2007.
2. Somanathan Nair B.,. Deepa S.R, "*Basic Electronics",* I.K. International Pvt. Ltd., 2009.

REFERENCES

1. Thomas L. Floyd, *"Electronic Devices",* Pearson Education, 9th Edition, 2011.
2. Rajput R.K., *"Basic Electrical and Electronics Engineering"*, Laxmi Publications, First Edition, 2007.

<table>
<tr><th colspan="13">EC1001 BASIC ELECTRONICS ENGINEERING</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Electronics and Communication Engineering</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td>4.</td><td>Approval</td><td colspan="11">23rd meeting of Academic Council, May 2013</td></tr>
</table>

	ENGINEERING GRAPHICS	L	T	P	C
ME1005	Total Contact Hours - 75	0	1	4	3
	Prerequisite				
	Nil				

First Angle Projection is to be followed - Practice with Computer Aided Drafting tools

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	
1.	To familiarize with the construction of geometrical figures
2.	To familiarize with the projection of 1D, 2D and 3D elements
3.	To familiarize with the sectioning of solids and development of surfaces
4.	To familiarize with the Preparation and interpretation of building drawing

UNIT I- FUNDAMENTALS OF ENGINEERING GRAPHICS (2 hours)

Lettering – Two dimensional geometrical constructions – Conics – Representation of three-dimensional objects – Principles of projections – Standard codes – Projection of points.

UNIT II- PROJECTION OF LINES AND SOLIDS (4 hours)

Projection of straight lines – Projection of planes - Projection of solids – Auxiliary projections.

UNIT III- SECTIONS AND DEVELOPMENTS (3 hours)

Sections of solids and development of surfaces.

UNIT IV- PICTORIAL PROJECTIONS (4 hours)

Conversion of Projections: Orthographic projection – Isometric projection of regular solids and combination of solids.

UNIT V- BUILDING DRAWING (2 hours)

Plan, Elevation and section of single storied residential (or) office building with flat RCC roof and brick masonry walls having not more than 3 rooms (planning / designing is not expected in this course) with electrical wiring diagram.

PRACTICAL (60 hours)

TEXT BOOKS

1. Venugopal, K. and Prabhu Raja, V., "*Engineering Graphics"*, Eighth Edition (Revised), New Age International Publishers, Chennai, 2007.
2. Natarajan, K.V., "*A Text Book of Engineering Graphics"*, 21st Edition, Dhanalakshmi Publishers, Chennai, 2012.
3. Jeyapoovan, T., "*Engineering Drawing and Graphics using AutoCAD"*, Vikas Publishing House Pvt. Ltd., New Delhi, 2010.

REFERENCES

1. Bethune, J.D., "Engineering Graphics with AutoCAD 2013", PHI Learning Private Limited, Delhi, 2013.
2. Bhatt, N.D., "*Elementary Engineering Drawing (First Angle Projection)"*, Charotar Publishing Co., Anand, 1999.
3. Narayanan, K. L. and Kannaiah, P., "*Engineering Graphics"*, Scitech Publications, Chennai, 1999.
4. Shah, M. B. and Rana, B. C., "*Engineering Drawing"*, Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2005.

ME1005 ENGINEERING GRAPHICS												
Course designed by		**Department of Mechanical Engineering**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
			x	x				x				
2.	Mapping of instructional objectives with student outcome		1-4	1-4				1-4				
3.	Category	General (G)		Basic sciences (B)		Engineering sciences and technical art (E)				Professional subjects (P)		
		--		--		x				--		
4.	Approval	23rd meeting of the Academic Council , May 2013										

CS1002	**PROGRAMMING LANGUAGE DESIGN AND C PROGRAMMING**	**L**	**T**	**P**	**C**
	Total contact hours – 60	**3**	**0**	**2**	**4**
	Prerequisite				
	Nil				

PURPOSE

This fundamental course will enable the students to learn the concepts of Programming Language and design principles along with understanding of C Language.

INSTRUCTIONAL OBJECTIVES	
1.	To understand the concepts of Programming language
2.	To learn the basics of C declarations, operators and expressions
3.	To learn on the manipulation of strings, functions and pointers
4.	To apply concepts and techniques for implementation

UNIT I-PRELIMINARY CONCEPTS (8 hours)

Introduction-Programming language design- programming language processing-Machine Language-Low level language- High level language-Syntax Specification-Regular Expressions- Formal Parameters-Classification of Grammars-Syntax Tree- Ambiguity.

UNIT II-IMPERATIVE LANGUAGES & OBJECT ORIENTED LANGUAGES (8 hours)

Imperative programming languages –Design Principles-control flow-execution steps-desirable & undesirable characteristics-General Characteristics of Object Based programming – Design Principles for Object oriented programming-Implementing Object oriented programming.

UNIT III-CONTROL STRUCTURES AND LOOPING (9 hours)

Introduction to the C language-Structure of C program-Expressions – type conversion-selection making decisions-Two way selection – Multi way selection-Repetition –Initialization and updating – loops in C –looping Applications- Library functions – Input, Output statements.

UNIT IV-FUNCTIONS AND ARRAYS (10 hours)

Functions –– calling Functions – Passing arguments- Arrays – Defining and processing an array – Array Functions-Passing arrays to Functions – Multidimensional Arrays – Strings-arrays of Strings- String Manipulation functions

UNIT V-STRUCTURES AND POINTERS (10 hours)

Structures & Unions- definition – Processing structures – Passing structures to a function – User defined data types – Pointers: Operations on Pointers – Pointers and Multidimensional Arrays - Arrays of pointers- bitwise operators- Files: File creation – File processing – Opening and closing a file.

LIST OF EXPERIMENTS (15 hours)

1. Program to understand the basic data types.
2. Program for looping and decision statements.

3. Program for finding Fibonacci series.
4. Finding a factorial for a given number.
5. Programs using library functions.
6. Programs using built-in math functions.
7. Programs on functions.
8. Programs on arrays.
9. Programs on string manipulations.
10. Programs on structures and unions.
11. Programs on pointers.
12. Programs on basic file operations.

TEXT BOOKS

1. Seyed H Roosta,"*Foundations of programming languages design & implementation"*, Cengage Learning. 2009. (For Unit 1 &2 Refer Chapter No. 1 -9).
2. Behrouz A.Forouzan and Richard F.Gilberg," *Computer Science, A structured programming Approach Using C*.", third edition, Cengage learning, 2008. (For Unit 3-5 Refer Chapter No. 4 – 10).

REFERENCES

1. Ravi Sethi, "*Programming Language Concepts and Constructs*", Pearson Education, 2006.
2. Ashok N. Kamthane, "*Programming with ANSI and Turbo C",* Pearson Education, 2007
3. Pradip Dey, Manas Ghosh, "Programming in C", second edition, Oxford University Press, 2011.

<table>
<tr><th colspan="14">CS1002 PROGRAMMING LANGUAGE DESIGN AND C PROGRAMMING</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="12">Department of Computer Science and Engineering</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student Outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td>2.</td><td>Mapping of instructional objectives with student outcome</td><td>2,3</td><td>1,4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1,4</td></tr>
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SEMESTER III

LE1003	**GERMAN LANGUAGE PHASE I**	**L**	**T**	**P**	**C**
	Total Contact Hours – 30	**2**	**0**	**0**	**2**
	Prerequisite				
	Nil				

PURPOSE

Germany offers infinite opportunities for students of engineering for higher studies, research and employment in Germany. B.Tech Students are offered German Language 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

1.	To introduce the language, phonetics and the special characters in German language
2.	To introduce German culture & traditions to the students.
3.	By the end of Phase – I, the students will be able to introduce themselves and initiate a conversation..
4.	We endeavor to develop the ability among the students to read and understand small texts written in German
5.	To enable the students to elementary conversational skills.

UNIT I **(6 hours)**

Wichtige Sprachhandlungen: Phonetics – Sich begrüßen - Sich und andere vorstellen formell / informell - Zahlen von 1 bis 1 Milliarde - verstehen & sprechen **Grammatik:** regelmäßige Verben im Präsens - "sein" und haben im Präsens - Personalpronomen im Nominativ

UNIT II **(6 hours)**

Wichtige Sprachhandlungen Telefon Nummern verstehen und sprechen Uhrzeiten verstehen und sagen Verneinung "nicht und kein" (formell und informell) **Grammatik** : Wortstellung – Aussagesatz – W-Frage und Satzfrage (Ja/Nein Frage) Nomen buchstabieren und notieren bestimmter und unbestimmter Artikel und Negativartikel im Nom. & Akkusativ

UNIT III **(6 hours)**

Wichtige Sprachhandlungen Tageszeiten verstehen und über Termine sprechen -Verabredungen verstehen - Aufgaben im Haushalt verstehen **Grammatik** Personalpronomen im Akkusativ und Dativ - W-Fragen "wie, wer, wohin,wo, was

usw.- Genitiv bei Personennamen - Modalverben im Präsens “können, müssen, möchten”

UNIT IV **(6 hours)**

Wichtige Sprachhandlungen Sich austauschen, was man kann, muss – Bezeichnungen Lebensmittel – Mengenangaben verstehen – Preise verstehen und Einkaufzettel schreiben

Grammatik Wortstellung in Sätzen mit Modalverben – Konnektor ”und” – “noch”-kein-------mehr – “wie viel, wie viele, wie alt, wie lange” –Possessivartikel im Nominativ.

UNIT V **(6 hours)**

Wichtige Sprachhandlungen Freizeitanzeigen verstehen – Hobbys und Sportarten Anzeigen für Freizeitpartner schreiben bzw. darauf antworten – Vorlieben und Abneigungen ausdrucken

Grammatik Verben mit Vokalwechsel im Präsens – Modalverben im Präsens “ dürfen, wollen und mögen - “haben und sein” im Präteritum – regelmäßige Verben im Perfekt – Konnektoren “denn, oder, aber

TEXT BOOK

1. Studio d A1. Deutsch als Fremdsprache with CD.(Kursbuch und Sprach training).

REFERENCES

1. German for Dummies
2. Schulz Griesbach

<table>
<tr><th colspan="13">LE1003 GERMAN LANGUAGE PHASE I</th></tr>
<tr><th colspan="2">Course designed by</th><th colspan="11">Department of English and Foreign Languages</th></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td>4.</td><td>Approval</td><td colspan="11">23rd meeting of Academic Council, May 2013</td></tr>
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LE1004	FRENCH LANGUAGE PHASE I	L	T	P	C
	Total Contact Hours - 30	2	0	0	2
	Prerequisite				
	Nil				

PURPOSE

To enable the student learners acquire a basic knowledge of the French language and concepts of general French for everyday interactions and technical French at the beginner's level and also to get to know the culture of France.

INSTRUCTIONAL OBJECTIVES

1.	To enable students improve their grammatical competence.
2.	To enhance their listening skills.
3.	To assist students in reading and speaking the language.
4.	To enhance their lexical and technical competence.
5.	To help the students introduce themselves and focus on their communication skills.

UNIT I **(6 hours)**

1. Grammar and Vocabulary: Usage of the French verb "se presenter", a verb of self- introduction and how to greet a person- "saluer"
2. Listening and Speaking – The authentic sounds of the letters of the French alphabet and the accents that play a vital role in the pronunciation of the words.
3. Writing – correct spellings of French scientific and technical vocabulary.
4. Reading -- Reading of the text and comprehension – answering questions.

UNIT II **(6 hours)**

1. Grammar and Vocabulary – Definite articles , "prepositions de lieu" subject pron ouns
2. Listening and Speaking – pronunciation of words like Isabelle, presentez and la liaison – vous etes, vous appelez and role play of introducing each other – group activity
3. Writing – particulars in filling an enrollment / registration form
4. Reading Comprehension – reading a text of a famous scientist and answering questions.

UNIT III **(6 hours)**

1. Grammar and Vocabulary – verb of possession "avoir' and 1st group verbs "er", possessive adjectives and pronouns of insistence- moi, lui..and numbers from 0 to 20
2. Listening and Speaking –nasal sounds of the words like feminine, ceinture , parfum and how to ask simple questions on one's name, age, nationality, address mail id and telephone number.
3. Writing –conjugations of first group verbs and paragraph writing on self – introduction and introducing a third person.
4. Reading Comprehension – reading a text that speaks of one's profile and answering questions

UNIT IV **(6 hours)**

1. Grammar and Vocabulary –negative sentences, numbers from 20 to 69, verb "aimer"and seasons of the year and leisure activities.
2. Listening and Speaking – To express one's likes and dislikes and to talk of one's pastime activities (sports activities), je fais du ping-pong and nasal sounds of words – janvier, champagne
3. Writing- conjugations of the irregular verbs – faire and savoir and their usage. Paragraph writing on one's leisure activity- (passé temps favori)
4. Reading- a text on seasons and leisure activities – answering questions.

UNIT V **(6 hours)**

1. Grammar and Vocabulary – les verbes de direction- to ask one's way and to give directions, verbes- pouvoir and vouloir and 2nd group verbs , a droite, la premiere a gauche and vocabulary relating to accommodation.
2. Listening and Speaking – to read and understand the metro map and hence to give one directions – dialogue between two people.
3. Writing –paragraph writing describing the accommodation using the different prepositions like en face de, derriere- to locate .
4. Reading Comprehension -- a text / a dialogue between two on location and directions- ou est la poste/ la pharmacie, la bibliotheque?.....

TEXT BOOK

Tech French

REFERENCES

1. French for Dummies.
2. French made easy-Goyal publishers
3. Panorama

LE1004 FRENCH LANGUAGE PHASE I												
Course designed by		Department of English and Foreign Languages										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
								x				
2.	Mapping of instructional objectives with student outcome							1-5				
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
		x		--		--				--		
4.	Approval	23rd meeting of Academic Council, May 2013										

LE 1005	JAPANESE LANGUAGE PHASE I	L	T	P	C
	Total Contact Hours - 30	2	0	0	2
	Prerequisite				
	Nil				

PURPOSE

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

INSTRUCTIONAL OBJECTIVES

1.	To help students learn the Japanese scripts viz. hiragana and a few basic kanji.
2.	To make the students acquire basic conversational skill.
3.	To enable students to know about Japan and Japanese culture.
4.	To create an advantageous situation for the students to have better opportunity for employability by companies who have association with Japan.

UNIT I **(8 hours)**

1. Introduction to Japanese language. Hiragana Chart 1 - vowels and consonants and related vocabulary.
2. Self introduction
3. Grammar – usage of particles wa, no, mo and ka and exercises
4. Numbers (1-100)
5. Kanji – introduction and basic kanjis – naka, ue, shita, kawa and yama
6. Greetings, seasons, days of the week and months of the year

7. Conversation – audio
8. Japan – Land and culture

UNIT II **(8 hours)**

1. Hiragana Chart 1 (contd.) and related vocabulary
2. Grammar – usage of kore, sore, are, kono, sono, ano, arimasu and imasu. Particles – ni (location) and ga. Donata and dare.
3. Numbers (up to 99,999)
4. Kanji – numbers (1-10, 100, 1000, 10,000 and yen)
5. Family relationships and colours.
6. Conversation – audio
7. Festivals of Japan

UNIT III **(5 hours)**

Hiragana Charts 2&3, double consonants, vowel elongation and related vocabulary
Lesson 3
Grammar - particles ni (time), kara, made and ne. Koko, soko, asoko and doko.
Time expressions (today, tomorrow, yesterday, day before, day after)
Kanji – person, man, woman, child, tree and book
Directions – north, south, east and west

UNIT IV **(5 hours)**

Grammar - directions,-kochira, sochira, achira and dochira. Associated vocabulary (mae, ushiro, ue, shita, tonari, soba, etc.)
Conversation – audio
Japanese art and culture like ikebana, origami, etc.

UNIT V **(4hours)**

Kanji – hidari, migi, kuchi
Japanese sports and martial arts

TEXT BOOK

1. First lessons in Japanese, ALC Japan

REFERENCES

1. Japanese for dummies. Wiley publishing co. Inc., USA.
2. Kana workbook, Japan foundation.

LE1005 JAPANESE LANGUAGE PHASE I												
Course designed by		**Department of English and Foreign Languages**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
								x				
2.	Mapping of instructional objectives with student outcome							1 - 4				
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
		x		--		--			--			
4.	Approval	23rd meeting of Academic Council, May 2013										

LE1006	KOREAN LANGUAGE PHASE I	L	T	P	C
	Total Contact Hours-30	2	0	0	2
	Prerequisite				
	Nil				

PURPOSE

To enable students achieve a basic exposure on Korea, Korean language and culture. To acquire basic conversational skill in the language.

INSTRUCTIONAL OBJECTIVES

1.	To help students learn the scripts.
2.	To make the students acquire basic conversational skill.
3.	To enable students to know about Korean culture.
4.	To create an advantageous situation for the students to have better opportunity for employability by companies who have association with Korea.

UNIT I **(6 hours)**

Lesson 1 < Introduction to Korean Language >, Lesson2 < Consonants and Vowels >, <Basic Conversation, Vocabularies and Listening >

UNIT II **(10 hours)**

Lesson 3 < Usage of "To be" >, Lesson 4 < Informal form of "to be" >, Lesson 5 <Informal interrogative form of "to be" >, Lesson 6 < To be, to have, to stay >, < Basic Conversation, Vocabularies and Listening >

UNIT III (**10 hours)**

Lesson 7 < Interrogative practice and Negation >, < Basic Conversation, Vocabularies and Listening >

UNIT IV **(4 hours)**

Lesson 8 < Korean Culture and Business Etiquette >, < Basic Conversation, Vocabularies and Listening

TEXT BOOK

1. Korean Through English 1 (Basic Korean Grammar and Conversation).

REFERENCES

1. Bharati Korean (Intermediate Korean Grammar).
2. Hand-outs.
3. Various visual mediums such Movie CD, Audio CD.
4. Collection of vocabularies for engineering field.

LE1006 KOREAN LANGUAGE PHASE I												
Course designed by		**Department of English and Foreign Languages**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
								x				
2.	Mapping of instructional objectives with student outcome							1- 4				
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
		x		--		--				--		
4.	Approval	23rd meeting of Academic Council, May 2013										

LE1007	**CHINESE LANGUAGE PHASE I**	**L**	**T**	**P**	**C**
	Total contact hours- 30	**2**	**0**	**0**	**2**
	Prerequisite				
	NIL				

PURPOSE

To enable students achieve a basic exposure on China, Chinese language and culture. To acquire basic conversational skill in the language.

INSTRUCTIONAL OBJECTIVES

1.	To help students learn the Chinese scripts.
2.	To make the students acquire basic conversational skill.

3	To enable students to know about China and Chinese culture.
4.	To create an advantageous situation for the students to have better opportunity for employability by companies who have association with china.

UNIT I

Introduction of Chinese Language

UNIT II

Phonetics and Notes on pronunciation

a) 21 Initials:

b p m f d t n l g k h j q x z c s zh ch sh r

b) 37 Finals:

a	o	e	i	u	ü
ai	ou	ei	ia	ua	üe
an	ong	en	ian	uai	üan
ang		eng	iang	uan	ün
ao		er	iao	uang	
			ie	uei(ui)	
			in	uen(un)	
			ing	ueng	
			iong	uo	
			iou(iu)		

c) The combination of Initials and Finals - Pinyin

UNIT III

Introduction of Syllables and tones

a) syllable=initial+final+tone
b) There are four tones in Chinese: the high-and-level tone, the rising tone, the falling-and-rising tone, and the falling tone. And the markers of the different tones.

UNIT IV

A. Tones practice

B. the Strokes of Characters

1. Introduction of Chinese Characters
2. The eight basic strokes of characters

UNIT V

1. **Learn to read and write the Characters:**
   八(eight) 不(not) 马(horse) 米(rice) 木(wood).
2. **classes are organized according to several Mini-dialogues.**

TEXT BOOK

1. A New Chinese Course 1- Beijing Language and Culture University Press.

REFERENCES

1. "*New Practical Chinese Reader Textbook (1)"* – Beijing Language and Culture University Press.
2. "*40 Lessons For Basic Chinese Course I"* – Shanghai Translation Press.
3. "*My Chinese Classroom"* - East China Normal University Press.

LE1007 CHINESE LANGUAGE PHASE I												
Course designed by		**Department of English and Foreign Languages**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
								x				
2.	Mapping of instructional objectives with student outcome							1- 4				
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
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4.	Approval	23rd meeting of Academic Council, May 2013										

PD1003	**APTITUDE-I**	**L**	**T**	**P**	**C**
	Total Contact Hours - 30	**1**	**0**	**1**	**1**
	Prerequisite				
	Nil				

PURPOSE	
To enhance holistic development of students and improve their employability skills.	
INSTRUCTIONAL OBJECTIVES	
1.	To improve aptitude, problem solving skills and reasoning ability of the student.
2.	To collectively solve problems in teams & group.

UNIT – I – NUMBERS **(6 hours)**

Types and Properties of Numbers, LCM, GCD, Fractions and decimals, Surds

UNIT II - ARITHMETIC – I **(6 hours)**

Percentages, Profit & Loss, Simple Interest & Compound Interest, , Clocks & calendars.

UNIT III - ALGEBRA - I **(6 hours)**

Logarithms, Problems on ages

UNIT IV - MODERN MATHEMATICS - I **(6 hours)**

Permutations, Combinations, Probability

UNIT V - REASONING **(6 hours)**

Logical Reasoning, Analytical Reasoning

ASSESSMENT

1. Objective type – Paper based / Online – Time based test

REFERENCES

1. Agarwal.R.S – *Quantitative Aptitude for Competitive Examinations,* S.Chand Limited 2011
2. Abhijit Guha*, Quantitative Aptitude for Competitive Examinations,* Tata McGraw Hill, 3rd Edition*,* 2011
3. Edgar Thrope, *Test Of Reasoning for Competitive Examinations,* Tata McGraw Hill, 4th Edition, 2012
4. *Other material related to quantitative aptitude*

<table>
<tr><th colspan="13">PD1003 – APTITUDE-I</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Career Development centre</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student Outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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MA1003	TRANSFORMS AND BOUNDARY VALUE PROBLEMS	L	T	P	C
		4	0	0	4
	Total Contact Hours - 60				
	(Common to CSE, SWE, ECE, EEE, ICE, EIE, TCE & MECT)				

PURPOSE

To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.

INSTRUCTIONAL OBJECTIVES

1.	To know to formulate and solve partial differential equations
2.	To have thorough knowledge in Fourier series
3.	To be familiar with applications of partial differential equations
4.	To gain good knowledge in the application of Fourier transform
5.	To learn about Z- transforms and its applications

UNIT I PARTIAL DIFFERENTIAL EQUATIONS (12 Hours)

Formation – Solution of standard types of first order equations – Lagrange's equation – Linear homogeneous partial differential equations of second and higher order with constant coefficients - Classification of second order linear partial differential equations including the reduction to the above types – Separable Variable Method.

UNIT II FOURIER SERIES (12 Hours)

Dirichlet's conditions – General Fourier series – Half range Sine and Cosine series – Parseval's identity – Harmonic Analysis.

UNIT III ONE DIMENSIONAL WAVE & HEAT EQUATION (12 Hours)

Boundary and initial value problems - Transverse vibrations of elastic string with fixed ends – Fourier series solutions – One dimensional heat equation - Steady and transient states – problems – Excluding thermally insulated ends.

UNIT IV FOURIER TRANSFORMS (12 Hours)

Statement of Fourier integral theorem(proof omitted) – Fourier transform pairs – Fourier Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity – Integral equations.

UNIT V Z-TRANFORMS AND DIFFERENCE EQUATIONS (12 Hours)

Z-transform – Elementary properties – Inverse Z-transfrom – Convolution theorem – Formation of Difference equations – Solution of difference equations using Z-transform.

TEXT BOOKS

1. Kreyszig.E, "*Advanced Engineering Mathematics"*, 10th edition, John Wiley & Sons. Singapore, 2012.
2. Grewal B.S, *"Higher Engg Maths",* Khanna Publications, 42nd edition, 2012.

REFERENCES

1. Kandasamy P etal. *"Engineering Mathematics",* Vol. II & Vol. III (4th revised edition), S.Chand & Co., New Delhi, 2000.
2. Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., *"Advanced Mathematics for Engineering students"*, Volume II & III (2nd edition), S.Viswanathan Printers and Publishers, 1992.
3. Venkataraman M.K., *"Engineering Mathematics"* – Vol.III – A & B (13th edition), National Publishing Co., Chennai, 1998.
4. Sankara Rao, "*Introduction to Partial Differential Equations"*, 2nd Edition, PHI Learning Pvt. Ltd., 2006.
5. Sivaramakrishna Das P. and Vijayakumari.C, *"A text book of Engineering Mathematics-III"*,Viji's Academy,2010

MA1003 TRANSFORMS AND BOUNDARY VALUE PROBLEMS													
Course designed by		Department of Mathematics											
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k	
		x				x							
2.	Mapping of instructional objectives with student outcome	1-5				1-5							
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)			
		--		x		--				--			
4.	Approval	23rd meeting of academic council, May 2013											

EE1053	ELECTRIC CIRCUITS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	GE1001				

PURPOSE

To enrich the students to acquire knowledge about the basics of circuit analysis, network theorems, concepts of AC circuits, coupled, transient analysis & Synthesis of electrical networks

INSTRUCTIONAL OBJECTIVES

1.	To understand about the network elements, types of networks, analysis complex circuits using Mesh current & Nodal voltage method.
2.	To gain knowledge about the solution methods of AC and DC circuits.
3.	To get an insight into solution of RLC circuits, analysis of coupled circuits.
4.	To understand the concept of Graphs
5.	To gain knowledge about coupled circuits

UNIT I – ANALYSIS OF DC CIRCUITS (9 hours)

Introduction to DC circuits;, Mesh analysis; Presence of dependent sources; circuits with current sources; Node analysis; presence of dependent sources, circuits with voltage sources; network reduction; source transformation; star-delta transformation.

UNIT II – NETWORK THEOREMS (9 hours)

Super position theorem, Compensation theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Tellegen's theorem, Millman's theorem, Reciprocity theorem; Application of network theorems in solving DC circuits.

UNIT III – ANALYSIS OF AC CIRCUITS (9 hours)

Introduction to AC circuit; steady state; analysis of RL, RC and RLC circuits; Impedance; phasor diagrams; power and power factor; Series resonance; Parallel resonance; Mesh impedance matrix and node admittance matrix; solving AC circuits using mesh and node analysis;

UNIT IV – POWER MEASUREMENTS (9 hours)

Single phase power measurement by 3 volt meter and 3 ammeter method - Solution of three phase balanced circuits & unbalanced circuits – Three phase

power measurement using 2wattmeters.Application of network theorems in solving AC circuits.

UNIT V – GRAPHS& COUPLED CIRCUITS (9 hours)

Graph of a network; Trees, chords and branches, Tie-set and cut-set of a graph-Dual networks.Self Inductance – Mutual Inductance – Coefficient of coupling – dot rule – ideal transformer effective inductance of coupled coils in series & in parallel – Analysis of coupled circuits.

TEXT BOOK

1. Sudhakar, A. and Shyam Mohan S.P, "*Circuits and Networks"* Tata McGraw Hill Publishing Company Ltd., New Delhi, Fourth Edition, 2010

REFERENCES

1. Charles K. Alexander and Matthew N. Q. Sadiku, "*Fundamentals of Electric Circuits*", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2010
2. Richard C. Dorf and James A. Svoboda, "*Introduction to Electric Circuits*", John Wiley & Sons, Inc., Seventh Edition, 2006.
3. William H Hayt, J E Kemmerly and Steven M Durbin, " *Engineering Circuit Analysis*", McGraw Hill, Seventh Edition, 2007.
4. Jegatheesan R., " *Analysis of Electric Circuits*", Aassaan Learning Series, (India), 2002.
5. Edminister J.A., "*Theory and Problems of Electric Circuits"*, Schaum's Outline Series, McGraw Hill Book Company, Fifth Edition, 1995.

<table>
<tr><th colspan="13">EE1053 ELECTRIC CIRCUITS</th></tr>
<tr><th colspan="2">Course designed by</th><th colspan="11">Department of Electrical and Electronics Engineering</th></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcomes</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td>2.</td><td>Mapping of instructional objectives with student outcome</td><td>1,2, 3,4, 5</td><td>1,2, 3</td><td colspan="2"></td><td>1,2</td><td colspan="4"></td><td colspan="2"></td></tr>
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</table>

CS1003	DIGITAL COMPUTER FUNDAMENTALS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

This course is to develop a strong foundation in the field of digital electronics and to learn the fundamentals of Digital Computer and its components

INSTRUCTIONAL OBJECTIVES

1.	To identify various number systems and work with Boolean Algebra
2.	To understand various logic gates
3.	To simplify the Boolean expression using K-Map and Tabulation techniques
4.	To analyze various types of flip flops used for designing registers and counters and understand about the fundamental concepts of Hardware Description Language

UNIT I – NUMBER SYSTEMS AND CODES (8 hours)

Digital Computers and digital systems – Review of binary number systems – Number Base conversions – Complements – Signed Binary Numbers – Binary Arithmetic – Binary codes – Error Detection codes – Binary Logic – Logic Gates.

UNIT II–BOOLEAN ALGEBRA & SIMPLIFICATION (10 hours)

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

UNIT III–COMBINATIONAL LOGIC CIRCUITS (10 hours)

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

UNIT IV–SEQUENTIAL LOGIC CIRCUITS (10 hours)

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

UNIT V– HARDWARE DESCRIPTION LANGUAGE (7 hours)

Introduction to Hardware Description Language (HDL) – HDL Models of Combinational circuits and Sequential Circuits.

TEXT BOOKS

1. Morris M. Mano and Michael Ciletti D., "*Digital Design: With an Introduction to the Verilog HDL*", Pearson Education, 5/e, 2013. [UNIT 5 - Chapter 3 & 4]
2. Morris Mano M., "*Digital Logic and Computer Design*", Pearson Education, 1/e, 2010. [UNIT 1 - Chapter 1 , UNIT 2 – Chapter 2 & 3 , UNIT 3 – Chapter 4 & 5, UNIT 4 – Chapter 6 & 7]

REFERENCES

1. Raj Kamal, "*Digital Systems Principles and Design*", Pearson Education, First Edition, 2007.
2. Charles H.Roth, Jr. and Larry L. Kinney, "*Fundamentals of Logic Design*", CL Engineering, Seventh Edition, 2013.
3. Donald D.Givone, "*Digital Principles and Design*", Tata McGraw –Hill, Thirteenth Impression, 2003.
4. http://www.asic-world.com/digital/tutorial.html
5. http://www.electronics-tutorials.ws/

<table>
<tr><th colspan="14">CS1003 DIGITAL COMPUTER FUNDAMENTALS</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="12">Department of Computer Science and Engineering</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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CS1005	OBJECT ORIENTED PROGRAMMING	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite				
	CS1002				

PURPOSE

To understand the concepts of Object-Oriented Programming(OOP) and mastering OOP using C++ and JAVA

INSTRUCTIONAL OBJECTIVES

1.	To perform object oriented programming solution and develop solutions to problems demonstrating usage of control structure, modularity, classes, I/O and the scope of the class members
2.	To demonstrate adeptness of object oriented programming in developing solution to problems demonstrating usage of data abstraction, encapsulation and inheritance
3.	To demonstrate ability to implement one or more patterns involving dynamic binding and utilization of polymorphism in the solution of problems
4.	To learn syntax and features of exception handling
5.	To demonstrate the ability to implement solution to various I/O manipulation operations and the ability to create two-dimensional graphic components using applets

UNIT I – INTRODUCTION (8 hours)

Object-Oriented Paradigm – Features of Object Oriented Programming – C++ Fundamentals – data types – Operators and Expressions – Control flow – Arrays – Strings – Pointers and Functions.

UNIT II – PROGRAMMING IN C++ (10 hours)

Classes and Objects – Constructors and Destructors – Operator Overloading – Inheritance – Virtual Functions and Polymorphism – Exception Handling.

UNIT III – JAVA INTRODUCTION (9 hours)

An overview of Java – Data Types – Variables and Arrays – Operators – Control Statements – Classes – Objects – Methods – Inheritance.

UNIT IV – JAVA PROGRAMMING (9 hours)

Packages – Abstract classes – Interfaces and Inner classes – Exception handling.

UNIT V – MULTITHREADING (9 hours)

Introduction to Threads – Multithreading – String handling – Streams and I/O – Applets.

TEXT BOOKS

1. Deitel and Deitel, "*C++ How to Program*", Sixth Edition, Prentice Hall, 2007.(UNIT 1,2,3)
2. Herbert Schildt, "*Java The complete reference*", Eighth Edition, McGraw Hill Professional, 2011.(UNIT 4,5)

REFERENCES

1. Balagurusamy E., "*Object oriented programming with C++",* Fifth Edition, Third Reprint, Tata McGraw–Hill Education 2011.
2. Ira Pohl, "*Object Oriented Programming using C++*", Pearson Education, Second Edition, Reprint 2004.
3. Lippman S. B., Josee Lajoie, Barbara E. Moo, "*C++ Primer*", Fourth Edition, Pearson Education, 2005.
4. ISRD Group, "*Introduction to Object–oriented programming through Java*", Tata McGraw–Hill Publishing Company Ltd., 2007.

CS1005 OBJECT ORIENTED PROGRAMMING												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objectives with student outcome	1,2,3	1,2, 3,4									5
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
						x						
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1007	MICROPROCESSOR AND INTERFACING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

The purpose of this course is to impart knowledge of microprocessor architecture and programming, interfacing and coprocessors which gives foundation to advanced microprocessor architecture and microcontrollers.

INSTRUCTIONAL OBJECTIVES	
1.	To study the Architecture of 8085 microprocessors
2.	To study the Architecture of 8086 and 8088 microprocessors
3.	To learn the design aspects of I/O and Memory Interfacing circuits
4.	To study about communication and bus interfacing
5.	To study the Architecture of 8051 microcontroller

UNIT I – INTEL 8085 ARCHITECTURE (7 hours)

Introduction to 8085 - 8085 architecture - Pin Details - Addressing Modes - Instruction Set and Assembler Directives - Instruction Timing Diagram - Assembly Language Programming with 8085.

UNIT II – INTEL 8086/8088 ARCHITECTURE (10 hours)

Introduction to 8086/8088-8086/8088 Architecture - Pin Details - Addressing Modes - Instruction Set and Assembler Directives - Assembly Language Programming with 8086/8088-Basic Peripherals and their interfacing with 8086/8088 - Semiconductor Memory interfacing-Dynamic RAM Interfacing.

UNIT III – I/O and MEMORY INTERFACING USING 8085/8086 (11 hours)

Interrupt of the 8085 Microprocessor - Interrupt of 8086/8087 Microprocessor, Programmable Interrupt Controller 8259A Architecture - Command Words of 8259 - Operating modes, Interfacing I/O Ports - PIO 8255 Architecture - Modes of Operation, Programmable Interval Timer 8253 Architecture - Operating modes.

UNIT IV – COMMUNICATION AND BUS INTERFACING WITH 8085/8086 (9 hours)

Introduction - Serial Communication Interface 8251, DMA Controller 8237 - Architecture-Register organization - DMA Operation, Keyboard and Display I/O Interface 8279 - Architecture - Modes of Operation - Command Words of 8279 - CRT Controller 8275 - Analog to Digital Interfacing Architecture - Bus Interface - UART 8250.

UNIT V – MICROCONTROLLERS 8051 (8 hours)

Introduction - Architecture of 8051 Microcontroller - Memory organization - Pin diagram of 8051 Microcontroller - Addressing Modes - Instruction set - Timers/counters - serial Communication- assembly Language programs - Applications of Microcontrollers.

TEXT BOOK

1. Ray A K, K M Bhurchandi, "*Advanced Microprocessor & Peripherals",* Tata McGraw, Hill, Second Edition, 2012.

REFERENCES

1. Soumitra Kumar Mandal, "*Microprocessor & Microcontrollers",* Tata McGraw Hill, Second Edition, 2012.
2. Barry B. Brey, "The Intel *Microprocessor8086/8088, 80186*", Pearson Education, Eighth Edition, 2009.
3. Uma Rao, Andhe Pallavi, "*The 8051Microcontrollers*", Pearson Education, Second Impression, 2011.
4. Krishna Kant, "*Microprocessors & Microcontrollers*", PHI Learning Private Limited, Eighth Printing, 2011.
5. http://nptel.iitm.ac.in/courses/

CS1007 MICROPROCESSOR AND INTERFACING												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	I	j	k
		x	x									
2.	Mapping of instructional objectives with student outcome	1,2,5	3,4									
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering			Software Engineering			Network Engineering		
		x		x								
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1009	OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

This course aims to introduce the object oriented analysis and design. Also it aims to make use of the UML notations effectively for the design of object oriented systems.

INSTRUCTIONAL OBJECTIVES	
1.	To understand the Object Basics, Classes and Inheritance
2.	To make utilization of software objects to build systems that are more robust
3.	To familiarize the Object-Oriented Analysis and Design (OOAD) concepts for developing Object Oriented Projects
4.	To understand the quality and testing issues
5.	To use UML for requirements, designs and component interfaces

UNIT I – INTRODUCTION (8 hours)

Categories of Information systems – Traditional Paradigm Vs. Object Oriented Paradigm – Objects and Classes – Inheritance – Object relationship – Examples of UML class modeling –Unified Process – Iteration and incrementation within the Unified Process.

UNIT II – UML AND THE UNIFIED PROCESS (9 hours)

Overview of requirements – Initial understanding of the domain – Business Model – Requirements workflow – Osbert Oglesby case study – MSG Foundation case study – Revising the requirements – MSG Foundation Case Study – Continuing the requirements workflow – MSG Foundation Case Study - Refining the revised requirements – MSG Foundation Case Study.

UNIT III – OBJECT ORIENTED ANALYSIS (10 hours)

Extracting Entity Classes – Initial dynamic model – Extracting control classes-refining use cases – Incrementing the Class Diagram – Initial dynamic model – MSG Foundation case study – Revising the entity classes – Extracting – USE case realization – MSG Foundation case study – Incrementing the Class Diagram – More on use cases – Risk.

UNIT IV – OBJECT ORIENTED DESIGN WORKFLOW (10 hours)

Design workflow – Format of the Attributes – Allocation of Operations – Osbert Oglesby Case Study – Workflows of the Unified Process – Phases of the Unified Process – Class Diagrams – Use Case Diagrams – Interaction Diagrams – State Charts – Package Diagrams – Deployment Diagrams.

UNIT V – TESTING AND MANAGEMENT ISSUES (8 hours)

Quality Issues – Non Execution Based Testing – Execution Based Testing – Cost Benefit Analysis – Risk Analysis – Improving the Process – Metrics – CPM/PERT – Choice of Programming Language – Reuse Case Studies – Portability – Planning and Estimating Duration and Cost – Testing the Project Management

Plan – Maintenance and the Object Oriented Paradigm – CASE Tools for Maintenance.

TEXT BOOK

1. John Deacon, "*Object Oriented Analysis and Design*", Pearson Education, First Edition, 2009.

REFERENCES

1. Grady Booch, James Rumbaugh, Ivar Jacobson, "*The unified modeling Language user Guide*", Pearson Education, Third Edition, 2012.
2. Grady Booch, "*Object Oriented Analysis and Design with application"*, Pearson Education, Third Edition, 2012.
3. Coad P, Yourdon E., "*Object oriented analysis*", Yourdon Press, Second Edition, 1991.

CS1009 OBJECT ORIENTED ANALYSIS AND DESIGN												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objectives with student outcome	1,2	3,4									5
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
						x						
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1031	OBJECT ORIENTED PROGRAMMING LAB	L	T	P	C
	Total contact hours - 30	**0**	**0**	**2**	**1**
	Prerequisite				
	CS1002				

PURPOSE

This lab course will enable the students to implement the Object Oriented Programming concepts using C++ and Java.

INSTRUCTIONAL OBJECTIVES

1.	To develop solutions to problems demonstrating usage of control structure, modularity, classes, I/O and the scope of the class members

2.	To develop solutions to problems demonstrating usage of data abstraction, encapsulation and inheritance
3.	To learn and practice interfaces and packages
4.	To implement solutions to various I/O operations and String manipulations
5.	To learn and practice java applet programming

LIST OF EXPERIMENTS

PROGRAMMING IN C++

1. Design C++ classes with static members, methods with default arguments.
2. Implement complex number class with necessary operator overloading and type conversions such as integer to complex, double to complex, complex to double etc using C++.
3. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
4. Manage bank account using inheritance concept using C++
5. Design stack and queue classes with necessary exception handling using C++.
6. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI using C++.

PROGRAMMING IN JAVA:

1. Programs illustrating various data types in java.
2. Programs to implement method overloading in java.
3. Programs illustrating the implementation of various forms of inheritance (single, hierarchical, multilevel).
4. Programs to implement polymorphism and method overriding in java.
5. Programs implementing exception handling.
6. Programs to illustrate interfaces in java.
7. Programs to create package in java
8. Design of multithreaded programs in java.
9. Programs to manipulate strings.
10. Programs to draw various shapes using java applets.
11. Programs to handle various mouse events using java applets.

TEXT BOOK

1. John Deacon, "*Object Oriented Analysis and Design*", Pearson Education, First Edition, 2009.

REFERENCE

1. Object Oriented Programming Lab manual.

CS1031 OBJECT ORIENTED PROGRAMMING LAB												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objectives with student outcome	1	2,3,4									5
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									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering	Knowledge Engineering		
						x						
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1033	MICROPROCESSOR AND INTERFACING LAB	L	T	P	C
	Total contact hours - 30	0	0	2	1
	Prerequisite				
	Nil				

PURPOSE

This Lab Course will enable the students to implement assembly language programming using 8085 and 8086 Microprocessors.

INSTRUCTIONAL OBJECTIVES

1.	To perform the given set of operations like 8 bit addition, subtraction, Multiplication and division, conversion with 8085 microprocessor
2.	To perform the basic arithmetic, logical and system related operations using 8086 microprocessor
3.	To perform Peripherals and Interfacing experiments using 8085 and 8086 Microprocessors

LIST OF EXPERIMENTS

A. 8085 Programs

1. 8-bit Addition, Subtraction, Multiplication and Division
2. 16-bit Addition, Subtraction, Multiplication and Division
3. Move a data block without overlap
4. Largest number in a data array
5. Smallest number in a data array
6. BCD to Hexadecimal and vice-versa
7. BCD to Binary Conversion and vice-versa
8. Counters and Time Delay

B. 8086 Programs

1. Basic arithmetic and Logical operations
2. Code conversion, sorting and searching
3. Data transfer operations
4. Password checking
5. Print RAM size and system date

C. **Peripherals and Interfacing Experiments**

1. Traffic light control
2. Stepper motor control
3. Digital clock
4. Key board and Printer status
5. Serial interface and Parallel interface
6. Trouble shooting

TEXT BOOK

1. Ray A K, Bhurchandi K M, "*Advanced Microprocessor & Peripherals",* Tata McGraw, Hill, Second Edition, 2012.

REFERENCE

1. Microprocessor and Interfacing Laboratory Manual.

CS1033 MICROPROCESSOR AND INTERFACING LAB												
Course designed by		**Department of Computer Science and Engineering**										
	Student outcome	a	b	C	d	e	f	g	h	l	j	k
			x									x
	Mapping of instructional objectives with student outcome		1,2									3
	Category	General(G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
		x		x								
	Approval	23rd meeting of Academic Council, May 2013										

SEMESTER IV

LE1008	**GERMAN LANGUAGE PHASE II**	**L**	**T**	**P**	**C**
	Total Contact Hours- 30	**2**	**0**	**0**	**2**
	Prerequisite				
	LE1003 - German Language Phase I				

PURPOSE

Familiarity in German language will be helpful for the students in preparing their resumes in German. Proficiency in the language will be an added asset for the students to have an edge in the present day highly competitive and global job market.

INSTRUCTIONAL OBJECTIVES

1.	To enable the students to speak and understand about most of the activities in the day to day life.
2.	The students will be able to narrate their experiences in Past Tense.
3.	The students will be able to understand and communicate even with German Nationals.
4.	By the end of Phase – II the students will have a reasonable level of conversational skills.

UNIT I **(6 hours)**

Wichtige Sprachhandlungen: Zimmersuche, Möbel **Grammatik**: Verben mit trennbaren Vorsilben im Präsens und Perfekt. Verben mit trennbaren Vorsilben und Modalverben imPräsens. Verben mit untrennbaren Vorsilben im Perfekt. Unregelmäßige und gemischte Verben im Perfekt.

UNIT II **(6 hours)**

Wichtige Sprachhandlungen: Kleidung ,Farben , Materialien.

Grammatik : formelle Imperativsätze mit “Sie” informelle Imperativsätze Vorschläge mit “wir” – “sollen/wollenwir”—Soll ich? Modalpartikeln “doch” “mal” “doch mal.

UNIT III **(6 hours)**

Wichtige Sprachhandlungen : Sehenswürdigkeite (Prater, Brandenburger Tör,Kolossium, Eifeltürm)

Grammatik : Ortsangaben mit Akk. und Dativ “alle”,”man” Indefinitepronomen “etwas”, “nichts”,

UNIT IV **(6 hours)**

Wichtige Sprachhandlungen : Wegbeschreibung/ Einladung interkulturelle Erfahrung.

Grammatik : Verwendung von Präsens für zukünftigen Zeitpunkt.

UNIT V **(6 hours)**

Wichtige Sprachhandlungen: Essen und Trinken im Restaurant , Partyvorbereitung und Feier

Grammatik: Nomen aus Adjektiven nach "etwas"und "nichts" Nomen aus dem Infinitiv von Verben, zusammegesetzte Nomen und ihre Artikel. Adjektive im Nom. und Akk. nach unbestimmten Artikel, Negativartikel und Possessivartikel.

TEXT BOOK

1. Studio d A1. Deutsch als Fremdsprache with CD.(Kursbuch und Sprachtraining).

REFERENCES

1. German for Dummies
2. Schulz Griesbach

<table>
<tr><th colspan="13">LE01008 GERMAN LANGUAGE PHASE II</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of English and Foreign Languages</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td rowspan="2">3.</td><td rowspan="2">Category</td><td colspan="3">General (G)</td><td colspan="2">Basic Sciences (B)</td><td colspan="3">Engineering Sciences and Technical Arts (E)</td><td colspan="3">Professional Subjects (P)</td></tr>
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<tr><td>4.</td><td>Approval</td><td colspan="11">23rd meeting of Academic Council, May 2013</td></tr>
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LE1009	FRENCH LANGUAGE PHASE II	L	T	P	C
	Total Contact Hours- 30	2	0	0	2
	Prerequisite				
	LE1004- French Language Phase I				

PURPOSE

To enable the students communicate effectively with any French speaker and have a competitive edge in the international market.

INSTRUCTIONAL OBJECTIVES

1.	To enable students access information on the internet
2.	To receive and send e mails
3.	To assist students in gaining a certain level of proficiency to enable them to give the level 1 exam conducted by Alliance Française de Madras.
4.	To enhance their lexical and technical competence.

UNIT I **(6 hours)**

1. Grammar and Vocabulary: The second group verbs: Finir, rougir, grossir, grandir . "Les preposition de temps": à, en, le, de 7h à 8h, jusqu' à, vers.
2. Listening and Speaking – the semi- vowels: Voilà, pollutant. Writing –the days of the week. Months, technical subjects, time, "les spécialités scientifiques et l' année universitaire, paragraph writing about time table.
3. Reading -- Reading of the text and comprehension – answering questions

UNIT II **(6 hours)**

Grammar and Vocabulary – The adjectives, the nationality, feminine & masculine noun forms "les métiers scientifiques".
Listening and Speaking – Vowels: soirée, année, près de, très.
Writing – Countries name, nationality, "les métiers scientifiques", numbers from: 69 to infitive and some measures of unit.
Reading Comprehension – reading a text.

UNIT III **(6 hours)**

Grammar and Vocabulary – near future, The demonstrative adjectives, Express the aim by using the verb, Listening and Speaking –"La liaison interdite – en haut". Writing – some scientific terms, French expressions to accept an invitation. Sentence framing. Reading Comprehension – reading a text.

UNIT IV **(6 hours)**

Grammar and Vocabulary –the verbs: manger, boire , the partitive articles Listening and Speaking – "le 'e' caduc Writing- the food, the ingredients, fruits, vegetables, expression of quantity, paragraph writing about food habits. Reading – reading a text.

UNIT V **(6 hours)**

Grammar and Vocabulary – " les prepositions de lieu": au à la, à l', chez, the reflexives verbs, verbs to nouns. Listening and Speaking – "le 'e' sans accents ne se prononce pas. C'est un "e" caduc. Ex: quatre, octobre. " les sons (s) et (z)- salut , besoin. Writing –paragraph writing about one's everyday life, French culture. Reading Comprehension -- reading a text or a song.....

TEXT BOOK

1. Tech French.

REFERENCES

1. French for Dummies.
2. French made easy: Goyal publishers.
3. Panorama.

LE1009 FRENCH LANGUAGE PHASE II												
Course designed by		**Department of English and Foreign Languages**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
								x				
2.	Mapping of instructional objectives with student outcome							1-4				
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
		x		--			--			--		
4.	Approval	23rd meeting of Academic Council, May 2013										

LE 1010	JAPANESE LANGUAGE PHASE II	L	T	P	C
	Total Contact Hours- 30	2	0	0	2
	Prerequisite				
	LE1005- Japanese Language Phase I				

PURPOSE

To enable students to learn a little advanced grammar in order to improve their conversational ability in Japanese.

INSTRUCTIONAL OBJECTIVES

1.	To help students learn Katakana script (used to write foreign words)
2.	To improve their conversational skill.
3.	To enable students to know about Japan and Japanese culture.
4.	To improve their employability by companies who are associated with Japan.

UNIT I **(8 hours)**

Introduction to Verbs; Ikimasu, okimasu, nemasu, tabemasu etc.
Grammar – usage of particles de, o, to, ga(but) and exercises
Common daily expressions and profession.
Katakana script and related vocabulary.
Religious beliefs, Japanese housing and living style.
Conversation – audio

UNIT II **(8 hours)**

Grammar :Verbs –Past tense, negative - ~mashita, ~masen deshita..
i-ending and na-ending adjectives - introduction
Food and transport (vocabulary)
Japanese food, transport and Japanese tea ceremony.
Kanji Seven elements of nature (Days of the week)
Conversation – audio

UNIT III **(6 hours)**

Grammar - ~masen ka, mashou
Adjectives (present/past – affirmative and negative)
Conversation – audio

UNIT IV **(4 hours)**

Grammar – ~te form
Kanji – 4 directions
Parts of the body

Japanese political system and economy
Conversation – audio

UNIT V **(4 hours)**

Stationery, fruits and vegetables
Counters – general, people, floor and pairs

TEXT BOOK

1. First lessons in Japanese, ALC Japan

REFERENCES

1. Japanese for dummies. Wiley publishing co. Inc., USA.
2. Kana workbook, Japan foundation

LE1010 JAPANESE LANGUAGE PHASE II												
Course designed by		**Department of English and Foreign Languages**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
								x				
2.	Mapping of instructional objectives with student outcome							1 - 4				
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
		x		--		--			--			
4.	Approval	23rd meeting of Academic Council, May 2013										

LE1011	**KOREAN LANGUAGE PHASE II**	**L**	**T**	**P**	**C**
		2	**0**	**0**	**2**
	Total Contact Hours-30				
	Prerequisite				
	LE1006-Korean Language Phase I				

PURPOSE

To enable students achieve a basic exposure on Korea, Korean language and culture. To acquire basic conversational skill in the language.

INSTRUCTIONAL OBJECTIVES	
1.	To help students learn the scripts.
2.	To make the students acquire basic conversational skill.
3.	To enable students to know about Korean culture.
4.	To create an advantageous situation for the students to have better opportunity for employability by companies who have association with Korea.

UNIT I (**9 hours)**

Lesson 1 <Review of Vowels and Consonants>, Lesson2 < Various Usages of "To be">, Lesson3 < Informal form of "to be"> <Basic Conversation, Vocabularies and Listening>

UNIT II (**9 hours)**

Lesson 4 < Informal interrogative form of "to be">, Lesson 5 < To be, to have, to stay>, Lesson 5 < Advanced Interrogative practice>, Lesson 6 < Types of Negation>, <Basic Conversation, Vocabularies and Listening>

UNIT III (**9 hours)**

Lesson 7 < Honorific forms of noun and verb2>, Lesson8 < Formal Declarative2>, Lesson 9 < Korean Business Etiquette>, <Basic Conversation, Vocabularies and Listening>

UNIT IV (**3 hours)**

Lesson 10 <Field Korean as an Engineer1>, <Field Korean as an Engineer2> <Basic Conversation, Vocabularies and Listening>

TEXT BOOK

1. Korean through English 2 (Basic Korean Grammar and Conversation).

REFERENCES

1. Bharati Korean (Intermediate Korean Grammar)
2. Hand-outs
3. Various visual media such Movie CD, Audio CD, and music
4. Collection of vocabularies for engineering field.

LE1011 KOREAN LANGUAGE PHASE II												
Course designed by		Department of English and Foreign Languages										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
								x				
2.	Mapping of instructional objectives with student outcome							1-4				
3.	Category	General (G)			Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
		x			--		--			--		
4.	Approval	23rd meeting of Academic Council, May 2013										

LE1012	CHINESE LANGUAGE PHASE II	L	T	P	C
	Total Contact Hours-30	2	0	0	2
	Prerequisite				
	LE1007-Chinese Language Phase I				

PURPOSE

To enable students achieve a basic exposure on China, Chinese language and culture. To acquire basic conversational skill in the language.

INSTRUCTIONAL OBJECTIVES

1.	To help students learn the Chinese scripts.
2.	To make the students acquire basic conversational skill.
3.	To enable students to know about China and Chinese culture.
4.	To create an advantageous situation for the students to have better opportunity for employability by companies who have association with china.

UNIT I

A) Greetings
Questions and answers about names
Introducing oneself
Receiving a guest
Making corrections

New words: 你（you） 好（good, well）
工作（work, job）人员（personnel, staff member） 请问（May I ask…） 贵（expensive , valuable） 姓（one's family name is ）

B) Questions and answers about the number of people in a family
Expressing affirmation/negation
Questions and answers about the identity of a person same or not.

New words: 家（family，home） 有（have） 几（several）
爸爸 (father） 妈妈 (mother) 哥哥 (elderly brother）

UNIT II

A. About places
B. About numbers
C. if one knows a certain person
D. Expressing apology
E. Expressing affirmation/negation
F. Expressing thanks.

New Words:

客人（guest,visitor）这儿（here）中文（Chinese） 对（right, correct）
学生（student） 多（many, a lot）

Grammar: Sentences with a verbal predicate

UNIT III

Introducing people to each other

A. Exchanging amenities
B. Making/Negating conjectures
C. Questions and answers about nationality

Grammar: Sentences with an adjectival predicate

UNIT IV

A) About places to go
Indicating where to go and what to do
Referring to hearsay.
Saying good-bye

B) Making a request
Questions and answers about postcodes and telephone numbers
Reading dates postcodes and telephone numbers
Counting Renmibi

Grammar: Sentences with a subject-verb construction as its predicate
Sentences with a nominal predicate

UNIT V

A. Asking and answering if someone is free at a particular time
B. Making proposals
C. Questions about answers about time
D. Making an appointment
E. Telling the time
F. Making estimations

TEXT BOOK

1. A New Chinese Course 1- Beijing Language and Culture University Press.

REFERENCES

1. New Practical Chinese Reader Textbook (1) – Beijing Language and Culture University Press
2. 40 Lessons For Basic Chinese Course I – Shanghai Translation Press.
3. My Chinese Classroom - East China Normal University Press.

LE1012 CHINESE LANGUAGE PHASE II												
Course designed by		**Department of English and Foreign Languages**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
								x				
2.	Mapping of instructional objectives with student outcome							1 - 4				
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
		x		--		--				--		
4.	Approval	23rd meeting of Academic Council, May 2013										

PD1004	**APTITUDE-II**	**L**	**T**	**P**	**C**
	Total Contact Hours - 30	**1**	**0**	**1**	**1**
	Prerequisite				
	Nil				

PURPOSE

To enhance holistic development of students and improve their employability skills.

INSTRUCTIONAL OBJECTIVES

1.	To improve verbal aptitude, vocabulary enhancement and reasoning ability of the student.

UNIT I **(6 hours)**
Critical Reasoning – Essay Writing

UNIT II **(6 hours)**
Synonyms – Antonyms - Odd Word - Idioms & Phrases

UNIT III **(6 hours)**
Word Analogy - Sentence Completion

UNIT IV **(6 hours)**
Spotting Errors - Error Correction - Sentence Correction

UNIT V **(6 hours)**
Sentence Anagram - Paragraph Anagram - Reading Comprehension

ASSESSMENT
1. Objective type – Paper based /Online – Time based test

TEXT BOOK
1. Personality Development – Verbal Work Book, Career Development Centre, SRM Publications

REFERENCES

1. Green Sharon Weiner M.A & Wolf Ira K. *Barron's New GRE*, *19th Edition*. Barron's Educational Series, Inc, 2011.
2. Lewis Norman, "*Word Power Made Easy*", Published by W.R.Goyal Pub, 2011.
3. Thorpe Edgar and Thorpe Showich, "*Objective English*", Pearson Education 2012.
4. Murphy Raymond, "*Intermediate English Grammar* ", (Second Edition), Cambridge University Press, 2012.

PD1004 - APTITUDE-II												
Course designed by		**Career Development Centre**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
								X				
2.	Mapping of instructional objectives with student outcome							1				
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
		X										
4.	Approval	23rd meeting of Academic Council, May 2013										

	PROBABILITY AND QUEUING THEORY	L	T	P	C
MA1014	Total Contact Hours - 60	**4**	**0**	**0**	**4**
	(Common to CSE, SWE & IT)				

PURPOSE

To impart statistical techniques using probability and distributions

INSTRUCTIONAL OBJECTIVES

1.	Be thorough with probability concepts
2.	To acquire knowledge on probability distributions
3.	Get exposed to the testing of hypothesis using distributions
4.	Gain strong knowledge in principles of queuing theory
5.	Get exposed to discrete time Markov chain

UNIT I – RANDOM VARIABLES AND STATISTICAL AVERAGES (12 hours)

Random Variable – Characteristics of a random variable: Expectation, Variance,Moments; Moment generating function – Function of a random variable – Chebychev's inequality

UNIT II -THEORETICAL DISTRIBUTIONS (12 hours)

Discrete : Binomial, Poisson, Geometric; Continuous : Exponential ,Normal and Uniform Distributions.

UNIT III – TESTING OF HYPOTHESES (12 hours)

Large sample tests based on Normal Distribution – Small sample tests based on t, F distributions – Chi square tests for goodness of fit and independence of attributes.

UNIT IV – PRINCIPLES OF QUEUEING THEORY (12 hours)

Introduction to Markovian queueing models – Single server model with finite and infinite system capacity – Characteristics of the model; Applications of queueing theory to computer science and engineering.

UNIT V – MARKOV CHAINS (12 hours)

Introduction to Markov process – Markov chains – transition probabilities – Limiting distribution –Classification of states of a Markov chain.

TEXT BOOKS

1. Veerarajan T., *"Probability, Statistics and Random Processes",* Tata McGraw Hill, 3rd edition, 2008.
2. Trivedi K S, *"Probability and Statistics with reliability, Queueing and Computer Science Applications",* Prentice Hall of India, New Delhi, 2nd revised edition, 2002.

REFERENCES

1. Moorthy.M.B.K, Subramani.K & Santha.A, *"Probability and queueing theory",* Scitech publications,Vth edition,2013.
2. S.C. Gupta and V.K. Kapoor, "*Fundamentals of Mathematical Statistics",* 11th extensively revised edition, Sultan Chand & Sons, 2007.
3. Gross.D and Harris.C.M. *"Fundementals of Queuing theory",* John Wiley and Sons, 3rd edition, 1998.
4. Allen.A.O., *"Probability Statistics and Queuing theory with Computer science applications"*, Academic Press, 2nd edition, 1990.

MA1014 PROBABILITY AND QUEUEING THEORY												
Course designed by		**Department of Mathematics**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x				x						
2.	Mapping of instructional objectives with student outcome	1,2, 3,4, 5				1,2, 3,4, 5						
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
				x								
4.	Approval	23rd meeting of Academic Council, May 2013										

EC1006	ELECTRON DEVICES	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite				
	EC1001				

PURPOSE

The purpose of this course is to provide a basis for understanding the characteristics, operation and limitations of semiconductor and optoelectronic devices. This course brings together the semiconductor device physics, optoelectronic device principles and complete description of power supply circuit.

INSTRUCTIONAL OBJECTIVES

1.	To understand the physical construction, working and operational characteristics of Semiconductor devices.
2.	To understand the operation of power supply circuits built using filters, rectifiers and voltage regulators.
3.	To discuss the manufacturing process of monolithic ICs & the fabrication of components on monolithic IC.

UNIT I –SEMICONDUCTOR DIODES AND SPECIAL PURPOSE DIODES(12 hours)

Overview on Physics and Properties of Semiconductors: Intrinsic semiconductor – extrinsic semiconductor – Fermi level in an intrinsic semiconductor – conductivity of a metal, intrinsic semiconductor and extrinsic semiconductor – drift – diffusion – recombination – carrier life time.

Semiconductor diodes : Formation of PN junction – working principle – VI characteristics – PN diode currents – diode current equation – diode resistance – transition and diffusion capacitance – diode models – voltage breakdown in diodes.

Special purpose diodes : Zener diode – point-contact diode – backward diode – varactor diode – step-recovery diode – schottky diode, PNPN diode – RF diode.

UNIT II – BIPOLAR TRANSISTORS (6 hours)

Bipolar Transistors: Construction – working – transistor currents – transistor configurations and input-output characteristics – Early effect (base-width modulation) – Ebers Moll model – transistor as an amplifier – Transistor as a switch.

UNIT III – FIELD-EFFECT TRANSISTORS (6hours)

Field-Effect Transistors : construction, working and VI characteristics of JFET – comparison of BJT and JFET – MOSFET – enhancement MOSFET, depletion MOSFET, their working principle and VI characteristics, comparison of MOSFET with JFET, comparison of D MOSFET with E MOSFET, CMOS, MESFET, CCD.

UNIT IV – DC POWER SUPPLIES (12 hours)

Rectifiers and Filters : Block schematic of a typical DC power supply, single phase HWR, FWR, full-wave bridge rectifier, power supply filters (ripple factor and efficiency analysis), bleeder resistor, voltage dividers.

Voltage regulators: voltage regulation, zener diode shunt regulator, transistor series regulator, transistor shunt regulator, switching regulators, design of complete DC power supply circuit.

UNIT V–INTEGRATED CIRCUIT FABRICATION (9 hours)

Integrated circuit – advantages and drawback of ICs – scale of integration – classification of ICs – definition of linear IC and digital IC with examples – manufacturing process of monolithic ICs – fabrication of components (diode, capacitor, bipolar transistor, resistor and field – effect transistor) on monolithic IC – comparison of MOS ICs and bipolar ICs.

TEXT BOOKS

1. Robert L. Boylestad and Louis Nashelsky, *"Electronic Devices and Circuit Theory",* Pearson Education, 9th Edition, 2009.
2. Somanathan Nair .B., *"Electronic Devices and Applications",* PHI, 2006.

REFERENCES

1. Jacob Millman, Christos C Halkias, Satyabrata Jit, *"Electron Devices and Circuits",* Tata McGraw Hill, 2010.
2. David A Bell, *"Fundamentals of Electronic Devices and Circuits",* Oxford Press, 2009.
3. Theraja B L, Sedha R S, *"Principles of Electronic Devices and Circuits",* S.Chand, 2004.

EC1006 ELECTRON DEVICES												
Course designed by		Department of Electronics and Communication Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objectives with student outcome	1,2,3	1,2,3									1,2,3
3.	Category	General (G)			Basic Sciences (B)		Engineering Sciences &Technical Arts (E)			Professional Subjects (P)		
							x					
4.	Broad area	Communication			Signal Processing		Electronics			VLSI	Embedded	
							x					
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1004	DATA STRUCTURES AND ALGORITHM DESIGN	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

The purpose of this course is to impart knowledge on various data structures and analysis of algorithm concepts to the students.

INSTRUCTIONAL OBJECTIVES

1.	To study various data structure concepts like Stacks, Queues, Linked List, Trees and Files
2.	To overview the applications of data structures
3.	To be familiar with utilization of data structure techniques in problem solving
4.	To have a comprehensive knowledge of data structures and algorithm
5.	To carry out asymptotic analysis of algorithm

UNIT I - INTRODUCTION (10 hours)

Introduction – The Problem Solving – Top down design Strategy – Algorithms Vs Programs–Implementations of algorithms – Program Verification – The efficiency of algorithms – Algorithmic Notation – Asymptotic Notation – Mathematical Induction – Analysis of Algorithms – Recurrence Relations.

UNIT II – LINEAR DATA STRUCTURES (9 hours)

Lists – Arrays – Linked Representation – Singly Linked List – Doubly linked List – Cursor Based Linked list – Applications of lists – Stacks – Stack ADT – Array Implementation – Applications – Linked List Design – Queue ADT – Implementation – Applications.

UNIT III – TREES (8 hours)

Basic Tree Concepts – Binary Trees – Implementation –Tree Traversals – Applications – Binary Search Trees – AVL trees.

UNIT IV – GRAPHS (9 hours)

Basic Concepts – Traversal – Minimum Spanning Tree – Applications – Networks – Single Source Shortest Path Algorithm –Topological Sort.

UNIT V – BACK TRACKING (9 hours)

The General Method – 8 Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycle–Knapsack Problem – Branch and Bound Method – Traveling Salesman problem – P and NP Completeness.

TEXT BOOK

1. Reema Thareja, "*Data Structures Using C*", Oxford Higher Education , First Edition, 2011

REFERENCES

1. Mark Allen Weiss, "*Data Structures and Algorithm Analysis in C*", Second Edition, Pearson Education, 2007.
2. Sartaj Sahni, "*Data Structures, Algorithms and Applications in C++*", Mcgraw-Hill, Second Edition, 2005.
3. Sanjay Pahuja, "*A Practical Approach to Data Structures and Algorithms*", A New Age International, First Edition, 2010.

CS1004 DATA STRUCTURES AND ALGORITHM DESIGN												
Course Designed By		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	C	d	e	f	g	h	i	j	k
		x	x									
2.	Mapping of instructional objectives with student outcome	3,5	1,2,4									
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
		x										
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1006	**COMPUTER NETWORKS**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To introduce the concepts, terminologies and technologies used in data communication and computer networking.

INSTRUCTIONAL OBJECTIVES

1.	To understand the concepts of data communications
2.	To be familiar with the Transmission media and Tools
3.	To study the functions of OSI layers

4.	To learn about IEEE standards in computer networking
5.	To get familiarized with different protocols and network components

UNIT I – DATA COMMUNICATIONS (8 hours)

Data communication Components – Data representation and Data flow – Networks – Types of Connections – Topologies – Protocols and Standards – OSI model – Transmission Media – LAN –Wired LANs, Wireless LANs, Connecting LANs, Virtual LANs.

UNIT II – DATA LINK LAYER (10 hours)

Error Detection and Error Correction – Introduction–Block coding–Hamming Distance – CRC–Flow Control and Error control – Stop and Wait – Go back – N ARQ – Selective Repeat ARQ – Sliding Window – Piggybacking – Random Access – CSMA/CD,CDMA/CA.

UNIT III – NETWORK LAYER (10 hours)

Switching–Logical addressing – IPV4 – IPV6–Address mapping–ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.

UNIT IV – TRANSPORT LAYER (9 hours)

Process to Process Delivery – User Datagram Protocol – Transmission Control Protocol – SCTP – Congestion Control with Examples.

UNIT V – APPLICATION LAYER (8 hours)

Domain Name Space – DDNS – TELNET – EMAIL – File transfer WWW – HTTP – SNMP – Cryptography – Basic concepts.

TEXT BOOK

1. Behrouz A. Forouzan, "*Data communication and Networking"*, Tata McGraw–Hill, Fourth Edition, 2011.

REFERENCES

1. Larry L.Peterson, Peter S. Davie, "*Computer Networks*", Elsevier, Fifth Edition, 2012.
2. William Stallings, "*Data and Computer Communication*", Eighth Edition, Pearson Education, 2007.
3. James F. Kurose, Keith W. Ross, "*Computer Networking: A Top–Down Approach Featuring the Internet*", Pearson Education, 2005.

CS1006 COMPUTER NETWORKS												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									
2.	Mapping of instructional objectives with student outcome	1,2,5	3,4									
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
		x							x			
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1008	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1003				

PURPOSE

To study the basic structure of a digital computer and the organization of the Arithmetic and Logical unit, the Memory unit, Control unit and I/O unit.

INSTRUCTIONAL OBJECTIVES

1.	To understand the basic structure and operation of digital computer
2.	To study the design of arithmetic and logic unit and implementation of fixed-point and floating-point arithmetic operations
3.	To study the two types of control unit techniques and the concept of pipelining
4.	To study the hierarchical memory system including cache memories and virtual memory
5.	To study the different ways of communicating with I/O devices and standard I/O interfaces

UNIT I – BASIC STRUCTURE OF COMPUTERS (9 hours)

Functional units – Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations .

UNIT II – ARITHMETIC UNIT (9 hours)

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers – Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

UNIT III – BASIC PROCESSING UNIT (9 hours)

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration.

UNIT IV – MEMORY SYSTEM (9 hours)

Basic concepts – Semiconductor RAMs – ROMs – Speed – size and cost – Cache memories – Performance consideration – Virtual memory – Memory Management requirements – Secondary storage.

UNIT V – I/O ORGANIZATION (9 hours)

Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, and USB).

TEXT BOOK

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "*Computer Organization*", McGraw-Hill, Fifth Edition, Reprint 2012.

REFERENCES

1. Ghosh T. K., "*Computer Organization and Architecture*", Tata McGraw-Hill, Third Edition, 2011.
2. William Stallings, "*Computer Organization and Architecture – Designing for Performance*", Pearson Education, Seventh Edition, 2006.
3. Behrooz Parahami, "*Computer Architecture*", Oxford University Press, Eighth Impression, 2011.
4. David A. Patterson and John L. Hennessy, "*Computer Architecture-A Quantitative Approach*", Elsevier, a division of reed India Private Limited, Fifth edition, 2012.
5. John P. Hayes, "*Computer Architecture and Organization*", Tata McGraw Hill, Third Edition, 1998.

CS1008 COMPUTER ORGANIZATION AND ARCHITECTURE												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									
2.	Mapping of instructional objectives with student outcome	1,2	3,4,5									
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
		x		x								
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1010	COMPUTER SKILLS	L	T	P	C
	Total Contact Hours - 30	0	1	2	2

PURPOSE

To learn the latest technological developments in the field of Computer Science and Engineering

INSTRUCTIONAL OBJECTIVES

1.	Students have to undergo 30 hours of training in the latest technological developments in the form of tools, software packages as required in Computer Science and Engineering related areas so that they get exposed to recent developments in their chosen field.

Students have to undergo 30 hrs of training, in any of the recent tools/ software/ technologies in CSE related area, of their choice but with the approval of the department. At the end of the training student will complete a mini project & submit a report as per the prescribed format to the department.

Assessment process

This course is mandatory and a student has to earn the credit to become eligible for the award of degree. The student will be evaluated based on the following components.

Objective test	–	25 marks
Mini Group Project	–	50 marks
Project report	–	20 marks
Attendance	–	5 marks

Marks will be awarded out of 100 and appropriate grades are assigned as per the regulations.

CS1010 COMPUTER SKILLS												
Course designed by		Department of Computer Science and Engineering										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X									X
2.	Mapping of instructional objectives with student outcome	1	1									1
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences & Technical Arts (E)				Professional Subjects (P)		
										X		
4.	Approval	23rd meeting of Academic Council, May 2013										

CS1032	DATA STRUCTURES AND ALGORITHMS LAB	L	T	P	C
	Total Contact Hours - 30	0	0	2	1
	Prerequisite				
	CS1002, CS1005				

PURPOSE

This laboratory course gives a thorough understanding of the concepts of various Data Structures and its applications. It also gives a comprehensive understanding of the various algorithms.

INSTRUCTIONAL OBJECTIVES

1.	To implement Stack, Queue, Linked List, Binary Tree concepts
2.	To implement various Sorting and Searching Techniques
3.	To implement Tree Traversals
4.	To implement various Algorithm Design Techniques

LIST OF EXERCISES

1. Implementation of Stack & Queue
2. Singly Linked List
3. Doubly Linked list
4. Binary Tree Implementations and traversals.
5. Sorting Techniques: Insertion, Selection Sort
6. Sorting Techniques: Quick sort, Merge sort
7. Divide and Conquer Method - Binary Search - Max Min Problem
8. Greedy Method - Knapsack Problem
9. Traversal Technique - Depth First Search - Breadth First Search
10. Backtracking - 8-Queens Problem

TEXT BOOK

1. Subramanian V. S., "*Principles of Multimedia Database Systems*", Elsevier Publishers, Reprint 2011.

REFERENCE

1. Laboratory Manual

<table>
<tr><th colspan="14">CS1032 DATA STRUCTURES AND ALGORITHMS LAB</th></tr>
<tr><th colspan="2">Course designed by</th><th colspan="12">Department of Computer Science and Engineering</th></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td rowspan="2">4.</td><td rowspan="2">Broad Area</td><td colspan="2">Core Engineering</td><td colspan="2">Computer Hardware Engineering</td><td colspan="3">Software Engineering</td><td colspan="2">Network Engineering</td><td colspan="2">Knowledge Engineering</td></tr>
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<tr><td>5.</td><td>Approval</td><td colspan="12">23rd meeting of academic council, May 2013</td></tr>
</table>

CS1034	COMPUTER NETWORKS LAB	L	T	P	C
	Total Contact Hours - 30	0	0	2	1
	Prerequisite				
	CS1002, CS1005				

PURPOSE

This laboratory course deals with the implementation aspects of Networking and their applications.

INSTRUCTIONAL OBJECTIVES

1.	To develop TCP Socket Programming, UDP applications and to implement File Transfer Protocols
2.	To utilize RMI and Routing Algorithms

LIST OF EXPERIMENTS

1. Write a socket Program for Echo/Ping/Talk commands.
2. Create a socket (TCP) between two computers and enable file transfer between them.
3. Create a socket (UDP) between two computers and enable file transfer between them.
4. Write a program to implement Remote Command Execution. (Two M/Cs may be used)
5. Write a code simulating ARP /RARP protocols.
6. Create a socket for HTTP for web page upload and download.
7. Write a program for TCP module implementation.(TCP services)
8. Write a program for File Transfer in client-server architecture using following methods.
   (a) RS232C (b) TCP/IP
9. Write a program to implement RMI (Remote Method Invocation)
10. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
    i. Shortest path routing
    ii. Flooding
    iii. Distance vector
11. Implement client in C and server in Java and initiate communication between them.
12. Using OPNET
    a) Create a scenario with the following specifications.
    - No of subnets – 2
    - No. of nodes – 40
    - Traffic

FTP - 11 to 21
FTP - 30 to 40
UDP - 5 to 7

- Routing Protocol – AODV
- 802.16

- Show the throughput using different bandwidths i.e., 10 Mbps and 100 Mbps respectively.

b) Create a scenario as described below.

No of students – 2
SN -1 Nodes – 15
SN -2 Nodes - 10
Generate FTP Traffic & HTTP traffic between
Nodes 1 to 11 (FTP)
14 to 7 (HTTP / Gen FTP)

- Trace the packet within the Simulation time and display the Trace file.

TEXT BOOK

1. Behrouz A. Forouzam, "*TCP/IP Protocol Suite*", 4th Edition, Tata McGraw Hill, 2010.

REFERENCE

Laboratory Manual

CS1034 COMPUTER NETWORKS LAB												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objectives with student outcome	1,2	1,2									1,2
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
		x						x				
5.	Approval	23rd meeting of Academic Council, May 2013										

SEMESTER V

PD1005	APTITUDE-III	L	T	P	C
	Total Contact Hours - 30	1	0	1	1
	Prerequisite				
	Nil				

PURPOSE

To enhance holistic development of students and improve their employability skills.

INSTRUCTIONAL OBJECTIVES

1. Understand the importance of effective communication in the workplace.
2. Enhance presentation skills – Technical or general in nature.
3. Improve employability scope through Mock GD, Interview

UNIT I **(6 hours)**

Video Profile

UNIT II **(6 hours)**

Tech Talk / Area of Interest / Extempore / Company Profile

UNIT III **(6 hours)**

Curriculum Vitae

UNIT IV **(6 hours)**

Mock Interview

UNIT V **(6 hours)**

Group Discussion / Case Study

ASSESSMENT

1. Objective type – Paper based / Online – Time based test.
2. 50% marks based on test, 50 % based on Continuous Communication assessment.

REFERENCE

1. Bovee Courtland and Throill John, *Business Communication Essentials: A skills-Based Approach to Vital Business English*. Pearson Education Inc., 2011.

2. Dhanavel, S.P., *English & Communication Skills for Students of Science and Engineering*. Orient Black Swan, 2009.
3. Rizvi M. Ashraf *Effective Technical Communication*, Tata McGraw-Hill Publishing Company Limited, 2006.

PD1005 – APTITUDE-III												
Course designed by		Career Development Centre										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
								X		X	X	
2.	Mapping of instructional objectives with student outcome							1,2,3		1,2		2,3
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
		X										
4.	Approval	23rd meeting of Academic Council, May 2013										

MA1015	DISCRETE MATHEMATICS	L	T	P	C
	Total Contact Hours - 60	4	0	0	4
	(Common to CSE, SWE, ECE,TCE & EEE)				

PURPOSE

To impart analytical ability to describe, analyze and solving mathematical problems as applied to the respective branches of Engineering in a logical and systematic fashion.

INSTRUCTIONAL OBJECTIVES

1.	To understand Logic and mathematical reasoning and to count /enumerate objects in a systematic way. To understand Mathematical induction and recursion.
2.	To understand Set theory, relations and functions and to Read, understand and construct mathematical arguments.
3.	To understand Recurrence Relation, Generating functions and Algebraic Systems and their applications in coding theory - Group codes.
4.	To understand to apply graph theory to solve real-world problems like traveling salesman problem and networks and the maximum flow problem
5.	To understand Boolean algebra and its application to switching theory. To understand grammars, finite state machines and Turing Machines

UNIT I - MATHEMATICAL LOGIC (**12 Hours)**

Propositions and Logical operators - Truth tables and propositions generated by a set - Equivalence and Implication - Tautologies - Laws of logic - Proofs in Propositional calculus - Direct proofs - Conditional conclusions - Indirect proofs - Mathematical Induction - The existential and universal quantifiers - Predicate calculus including theory of inference.

UNIT II- SET THEORY (**12 Hours)**

Laws of Set theory - Partition of a set - The duality principle - Relations – Properties - Equivalence relation and partial order relation-poset-Graphs of relations - Hasse diagram - Matrices of relations - Closure operations on relations - Warshall's algorithm - Functions – Combinatorics - Pigeonhole Principle – Generalized Pigeon hole principle.

UNIT III - RECURRENCE RELATION & ALGEBRAIC SYSTEMS (**12 Hours)**

Recurrence relations - Solving a recurrence relation – Homogeneous and Non-homogeneous Recurrence relations - Formation of Recurrence relations obtained from solutions - Generating functions - Solution of a recurrence relation using generating functions - Groups – Properties - Cyclic groups and subgroups – Properties – Cosets – Lagrange's Theorem - Normal subgroups – Group Homomorphism.

UNIT IV- GRAPH THEORY (**12 Hours)**

Basic concepts - Basic Definitions – Some Special Graphs – Matrix Representation of Graphs -–- Paths and circuits - Eulerian and Hamiltonian Graphs – connected graphs - Trees - Spanning Trees - Rooted trees - Binary Trees - Kruskal's algorithm - Traversals of Binary trees.

UNIT V- BOOLEAN ALGEBRA & FORMAL (**12 Hours)**

Boolean algebra - Application of Boolean Algebra to switching theory. Languages - Recognition and generation - Phase structure grammars and languages – Finite state Machine - Recognition in regular languages.

TEXT BOOKS

1. Alan Doerr and Kenneth Levasseur, "*Applied Discrete Structures for Computer Science*", Galgotia Publications (P) Ltd, 1992.
2. Tremblay J. P. and Manohar R., "*Discrete Mathematical Structures with applications to Computer Science*", Tata Mc Graw Hill Publishing Co., 35th edition, 2008.

REFERENCES

1. V. Sundaresan, K.S. Ganapathy Subramanian and K. Ganesan, "*Discrete Mathematics*", New Revised Edition, A. R. Publications, 2001.
2. Kolman and Busby, "*Discrete Mathematical Structures for Computer Science*", Prentice Hall, 3rd edition, 1997.
3. Kenneth H.Rosen, "*Discrete Mathematics and its Application*", Fifth edition, Tata McGraw-Hill Publishing company PVT .Ltd., New Delhi, 2003.
4. Lipschutz Seymour, Marc Lars Lipson, "*Discrete Mathematics*", Mc Graw Hill Inc., 1992.
5. C.L. Liu, "*Elements of Discrete Mathematics*", 2nd Edition, McGraw Hill Publications, 1985.

MA1015 - DISCRETE MATHEMATICS												
Course designed by		Department of Mathematics										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x				x						
2.	Mapping of instructional objectives with student outcome	1-5				1-5						
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
		--		x		--			--			
4.	Approval	23rd meeting of academic council, May 2013										

EC1018	COMMUNICATION THEORY	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

The course considers analog communication systems and techniques. In this course we will introduce some of the basic mathematical concepts that will allow us to think in the two "domains" of communications, the time domain and the frequency domain. We will cover the basic types of analog modulation (AM, FM, and phase modulation) from both a mathematical description and from a block-diagram system approach.

INSTRUCTIONAL OBJECTIVES

1.	Analog modulation and demodulation techniques.
2.	Acquiring mathematical understanding of Analog Communication Systems.

3.	Understanding the trade-offs (in terms of bandwidth, power, and complexity requirements)
4.	Performance evaluation of communication systems in the presence of noise.
5.	Modern trends in communication systems and transmitter/receiver circuits.
6.	Design of practical communication system at the block diagram level under certain constraints and requirements.

UNIT I - AMPLITUDE MODULATION SYSTEMS (10 hours)

Need for modulation, Amplitude Modulation System, Single Tone & Multiple Tone Amplitude Modulation, Power Relation, Generation of Amplitude Modulation – Linear Modulation – Collector Modulation method Non-linear Modulation – Square law Modulator, Product Modulator, Switching Modulator - Demodulation of Amplitude Modulation – Envelop Detector, Coherent Detector, VSB, Performance comparison of various Amplitude Modulation System.

UNIT II - ANGLE MODULATION SYSTEMS (10 hours)

Frequency Modulation, Types of Frequency Modulation, Generation of NBFM, WBFM, Transmission BW of FM Signal, Phase Modulation. Relationship between PM & FM, Comparison, generation of FM Direct Method, indirect method, Demodulation of FM -Balanced slope detector, Foster Seeley Descriminator, Ratio Detector, Pre emphasis – De emphasis

UNIT III - RADIO RECEIVERS (6 hours)

Introduction – Functions & Classification of Radio Receivers, Tuned Radio Frequency (TRF) Receiver, Superheterodyne Receiver – Basic Elements, Receiver Characteristics, Frequency Mixers, AGC Characteristics.

UNIT IV - NOISE THEORY (9 hours)

Noise, Types of noise, White Noise, Addition of Noise due to several sources in series and parallel, Generalized Nyquist Theorem for Thermal Noise, Calculation of Thermal Noise for a Single Noise Source, RC Circuits & Multiple Noise sources. Equivalent Noise Bandwidth, Signal to Noise Ratio, Noise-Figure, Noise Temperature, Calculation of Noise Figure, Noise Figure Determination for Cascaded Stages of Amplifiers

UNIT V - PERFORMANCE OF COMMUNICATION SYSTEM (10 hours)

Receiver Model, Noise in DSB-SC Receivers, Noise in SSB-SC Receivers, Noise in AM receiver (Using Envelope Detection), Noise in FM Receivers, FM Threshold Effect, Threshold Improvement Through De-Emphasis, Noise in PM system.

TEXT BOOKS

1. John G. Proakis & Masoud Salehi, *"Communication System Engineering",* 2nd Edition, 2002.
2. Singh R.P. & Sapre S.D., *"Communication Systems: Analog & Digital",* 3rd Edition, Tata McGraw-Hill, 2012.

REFERENCES

1. Sanjay Sharma, "*Communication Systems, Analog & Digital*", S.K. Kataria & Sons, 5th Edition, 2009.
2. Dennis Reddy & John Coolen, *"Electronic Communications",* 4th Edition, Prentice Hall, 2008.

EC1018 COMMUNICATION THEORY												
Course Designed By		**Department of Electronics and Communication Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x			x						x
2.	Mapping of instructional objectives with student outcome	1,2	1,2			1,2						1,2,3
3.	Category	General (G)			Basic Sciences (B)		Engineering Sciences &Technical Arts (E)			Professional Subjects (P)		
										X		
4.	Broad Area	Communication			Signal Processing		Electronics			VLSI	Embedded	
		x										
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1011	**OPERATING SYSTEMS**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

Every computer professional should have a basic understanding of how an operating system controls the computing resources and provide services to the users. This course provides an introduction to the operating system functions, design and implementation.

INSTRUCTIONAL OBJECTIVES	
1.	To understand the structure and functions of OS
2.	To learn about Processes, Threads and Scheduling algorithms
3.	To understand the principles of concurrency and Deadlocks
4.	To learn various memory management schemes
5.	To study I/O management and File systems

UNIT I - INTRODUCTION (9 hours)

Computer System Overview-Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization.Operating system overview-objectives and functions, Evolution of Operating System.

UNIT II - PROCESSES (9 hours)

Process States, Process Description and Process Control.Processes and Threads, Types of Threads,Multicore and Multithreading, Windows 7 - Thread and SMP Management.

UNIT III - CONCURRENCY AND SCHEDULING (9 hours)

Principles of Concurrency - Mutual Exclusion, Semaphores, Monitors, Readers/Writers problem. Deadlocks – prevention- avoidance – detection, Scheduling- Types of Scheduling – Scheduling algorithms.

UNIT IV - MEMORY (9 hours)

Memory management requirements, Partitioning, Paging and Segmentation, Virtual memory - Hardware and control structures, operating system software, Linux memory management, Windows memory management.

UNIT V - INPUT/OUTPUT AND FILE SYSTEMS (9 hours)

I/O management and disk scheduling – I/O devices, organization of I/O functions; OS design issues, I/O buffering, disk scheduling, Disk cache. File management – Organization, Directories, File sharing, and Record blocking, secondary storage management.

TEXT BOOK

1. William Stallings, "*Operating Systems – internals and design principles*", Prentice Hall, 7thEdition, 2011.(Ch 1-9,11,12).

REFERENCES

1. Andrew S. Tannenbaum & Albert S. Woodhull, "*Operating System Design and Implementation*", Prentice Hall , 3rd Edition, 2006.
2. Andrew S. Tannenbaum, "*Modern Operating Systems",* Prentice Hall,3rd Edition,2007.
3. Gary J.Nutt, "*Operating Systems*", Pearson/Addison Wesley , 3rd Edition 2004.
4. Pramod Chandra P.Bhatt, "*An Introduction to Operating Systems Concepts and Practice",* Prentice Hall India,3rd Edition,2010.
5. Silberschatz, Peter Galvin, Greg gagne "*Operating System Principles*", Wiley India,7th Edition, 2006.

CS1011 OPERATING SYSTEMS												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X										
2.	Mapping of instructional objectives with student outcome	1,2, 3,4,5										
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
		x										
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1013	THEORY OF COMPUTATION	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1002				

PURPOSE

The purpose of the course is to understand all basic concepts in theoretical computer science

INSTRUCTIONAL OBJECTIVES

1.	To understand various Computing models like Finite State Machine, Pushdown Automata, and Turing Machine.
2.	To understand Decidability and Undecidability of various problems

UNIT I - FINITE AUTOMATA **(9 hours)**

Introduction- Basic Mathematical Notation and techniques- Finite State systems – Basic Definitions – Finite Automaton – DFA & NDFA – Finite Automaton with €-moves – Regular Languages- Regular Expression – Equivalence of NFA and DFA – Equivalence of NDFA's with and without €-moves – Equivalence of finite Automaton and regular expressions –Minimization of DFA- - Pumping Lemma for Regular sets – Problems based on Pumping Lemma.

UNIT II - GRAMMARS **(9 hours)**

Grammar Introduction– Types of Grammar - Context Free Grammars and Languages– Derivations and Languages – Ambiguity- Relationship between derivation and derivation trees – Simplification of CFG – Elimination of Useless symbols - Unit productions - Null productions – Greiback Normal form – Chomsky normal form – Problems related to CNF and GNF

UNIT III - PUSHDOWN AUTOMATA **(9 hours)**

Pushdown Automata- Definitions – Moves – Instantaneous descriptions – Deterministic pushdown automata – Equivalence of Pushdown automata and CFL - pumping lemma for CFL – problems based on pumping Lemma.

UNIT IV - TURING MACHINE **(9 hours)**

Turing Machines- Introduction – Formal definition of Turing machines – Instantaneous descriptions- Turing Machine as Acceptors – Turing Machine as Transducers Computable Languages and functions – Turing Machine constructions – Modifications of Turing Machines.

UNIT V - COMPUTATIONAL COMPLEXITY **(9 hours)**

Undecidability- Basic definitions- Decidable and undecidable problems - Properties of Recursive and Recursively enumerable languages – Introduction to Computational Complexity: Definitions-Time and Space complexity of TMs – complexity classes – introduction to NP-Hardness and NP-Completeness.

TEXT BOOK

1. Hopcroft J.E., Motwani R. and Ullman J.D, *"Introduction to Automata Theory, Languages and Computations"*, Second Edition, Pearson Education, 2008.

REFERENCES

1. John.C.Martin, *"Introduction to Languages and the Theory of Computation*" McGraw-Hill Education, 01-May-2010.
2. Michael Sipser, "*Introduction to the Theory of Computation"* Cengage Learning, 2012.
3. Peter Linz , "*An introduction to formal languages and automata*", Jones & Bartlett Learning, 2001.

CS1013 THEORY OF COMPUTATION												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x										
2.	Mapping of instructional objectives with student outcome	1,2										
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering	Knowledge Engineering		
		x										
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1015	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

To study the concepts of Relational Database design and query languages.

INSTRUCTIONAL OBJECTIVES

1.	To provide a general introduction to relational model
2.	To learn about ER diagrams
3.	To learn about Query Processing and Transaction Processing

UNIT I - INTRODUCTION (9 hours)

The Evolution of Database Systems- Overview of a Database Management System-Outline of Database-System Studies-The Entity.

RELATIONSHIP DATA MODEL: Elements of the E/R Model-Design Principles-The Modeling of Constraints-Weak Entity Sets

UNIT II - THE RELATIONAL DATA MODEL & ALGEBRA (9 hours)

Basics of the Relational Model-From E/R Diagrams to Relational Designs-Converting Subclass Structures to Relations Functional Dependencies-Rules About Functional Dependencies-Design of Relational Database Schemas - Multivalued Dependencies.

RELATIONAL ALGEBRA: Relational Operations-Extended Operators of Relational Algebra- Constraints on Relations

UNIT III - SQL (9 hours)

Simple Queries in SQL-Sub queries-Full-Relation Operations-Database Modifications-Defining a Relation Schema-View Definitions- Constraints and Triggers: Keys and Foreign Keys-Constraints on Attributes and Tuples-Modification of Constraints-Schema-Level Constraints and Triggers -Java Database Connectivity- Security and User Authorization in SQL

UNIT IV - INDEX STRUCTURE, QUERY PROCESSING (9 hours)

Index Structures:Indexes on Sequential Files-Secondary Indexes-B-Trees-Hash Tables-Bitmap Indexes.

QUERY EXECUTION: Physical-Query-Plan Operators-One-Pass , two-pass & index based Algorithms, Buffer Management, Parallel Algorithms-Estimating the Cost of Operations-Cost-Based Plan Selection -Order for Joins-Physical-Query-Plan

UNIT V - FAILURE RECOVERY AND CONCURRENCY CONTROL (9 hours)

Issues and Models for Resilient Operation -Undo/Redo Logging-Protecting against Media Failures-

CONCURRENCY CONTROL: Serial and Serializable Schedules-Conflict-Serializability-Enforcing Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TRANSACTION MANAGEMENT: Serializability and Recoverability-View Serializability-Resolving Deadlocks-Distributed Databases: Commit and Lock

TEXT BOOK

1. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, "*Database Systems: The Complete Book*", Pearson Education, Second Edition, 2008.

REFERENCES

1. Silberschatz, H. Korth and Sudarshan S., "*Database System Concepts*", 6th Edition, McGraw-Hill International, 2010.
2. Elmasri R. and Shamakant B. Navathe, "*Fundamentals of Database Systems*", 6th Edition, AddisionWesley , 2011.
3. http://www.cs.helsinki.fi/u/laine/tikape/k03/material03.html
4. http://infolab.stanford.edu/~ullman/dscb.html
5. http://cs.nyu.edu/courses/spring06/G22.2433-001/

CS1015 DATABASE MANAGEMENT SYSTEMS												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x		x								x
2.	Mapping of instructional objectives with student outcome	1		2								3
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)					Professional Subjects (P)
												x
4.	Broad Area	Core Engineering		Computer Hardware Engineering			Software Engineering		Network Engineering			Knowledge Engineering
												x
5.	Approval	23rd meeting of Academic Council, May 2013										

	INDUSTRIAL TRAINING I (Training to be undergone after IV semester)	**L**	**T**	**P**	**C**
CS1047	2 week practical training in industry	**0**	**0**	**1**	**1**
	Prerequisite				
	Nil				

PURPOSE

To provide hands-on experience in various domains such as hardware, software, networking, maintenance and testing

INSTRUCTIONAL OBJECTIVES

1.	Students have to undergo two – week practical training in Computer Science and Engineering related industries/ Training Centers/ Corporate Offices so that they become aware of the practical application of theoretical concepts studied in the class rooms.

Students have to undergo two-week practical training in Computer Science and Engineering related industries/ Training Centers/ Corporate Offices of their choice but with the approval of the department. At the end of the training student will submit a report as per the prescribed format to the department.

Assessment process

This course is mandatory and the student has to pass the course to become eligible for the award of degree. The student shall make a presentation before a committee constituted by the department which will assess the student based on the report submitted and the presentation made. Marks will be awarded out of 100 and appropriate grades assigned as per the regulations.

CS1047 INDUSTRIAL TRAINING I												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
			x	x	x							x
2.	Mapping of instructional objectives with student outcome		1	1	1							1
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
		--		--		--			--		--	
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1035	**OPERATING SYSTEMS LAB**	**L**	**T**	**P**	**C**
	Total Contact hours - 30	**0**	**0**	**2**	**1**
	Prerequisite				
	CS1002, CS1032				

PURPOSE

This laboratory course gives a complete understanding of the operating systems principles and its Implementations

INSTRUCTIONAL OBJECTIVES

1.	To implement Scheduling algorithms
2.	To implement deadlock algorithms and page replacement algorithms
3.	To simulate memory management schemes, Threads and synchronization

LIST OF EXPERIMENTS

1. Simulate the following CPU scheduling algorithms
   a. Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies
   a. Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques
   a. Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate an Algorithm for Dead Lock Detection
7. Simulate all page replacement algorithms
   a. FIFO b) LRU c) LFU
8. Simulate Shared memory and IPC
9. Simulate Paging Technique of memory management.
10. Implement Threading & Synchronization Applications

TEXT BOOKS

1. Wale Soyinka, "*Linux Administration A Beginners Guide"*, 5th edition, Tata McGraw-Hill, 2009. Ch1-9,13,16-24,26-28).
2. Mc Kinnon, Mc Kinnon, "*Installing and Administrating Linux*", 2nd edition, Wiley, 2004. (Ch12,13)

REFERENCE

Laboratory Manual

CS1035 OPERATING SYSTEMS LAB												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									
2.	Mapping of instructional objectives with student outcome	1	1,2,3									
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Core Engineering		Computer Hardware Engineering			Software Engineering		Net work Engineering		Knowledge Engineering	
		x										
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1037	DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	C
	Total Contact hours - 30	0	0	2	1
	Prerequisite				
	Nil				

PURPOSE

This laboratory course gives a thorough understanding of the concepts of database design model and it gives a comprehensive understanding of using a query language.

INSTRUCTIONAL OBJECTIVES

1.	To Design a database system
2.	To study the usage of DDL and DML commands
3.	To learn about file backup and recovery

LIST OF EXPERIMENTS

1. Data Definition Language (DDL) commands in RDBMS
2. Data Manipulation Language (DML) and Data Control Language (DCL)
3. High level language extensions with cursors
4. High level language extension with Triggers
5. Procedures and Functions
6. Embedded SQL
7. Database design using E-R model and Normalization
8. Design and implementation of payroll processing system
9. Design and implementation of Banking system
10. Design and implementation of Library Information System
11. Design and implementation of Student Information System
12. Automatic Backup of Files and Recovery of Files

TEXT BOOK

1. Shawkat Ali A B M, Saleh A. Wasimi*, "Data Mining: Methods and Techniques*", Third Indian Reprint, Cengage Learning, 2010.

REFERENCE

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<table>
<tr><th colspan="14">CS1037 DATABASE MANAGEMENT SYSTEMS LAB</th></tr>
<tr><th colspan="2">Course designed by</th><td colspan="12">Department of Computer Science and Engineering</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td>5.</td><td>Approval</td><td colspan="12">23rd meeting of Academic Council, May 2013</td></tr>
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SEMESTER VI

PD1006	APTITUDE IV	L	T	P	C
	Total Contact Hours - 30	1	0	1	1
	Prerequisite				
	Nil				

PURPOSE

To enhance holistic development of students and improve their employability skills.

INSTRUCTIONAL OBJECTIVES

1.	To improve aptitude, problem solving skills and reasoning ability of the student.
2.	To collectively solve problems in teams & group.

UNIT I - ARITHMETIC-II **(6 hours)**

Ratios & Proportions, Averages, Mixtures & Solutions

UNIT I - ARITHMETIC–III **(6 hours)**

Time, Speed & Distance, Time & Work

UNIT III - ALGEBRA–II **(6 hours)**

Quadratic Equations, Linear equations & inequalities

UNIT IV – GEOMETRY **(6 hours)**

2D Geometry, Trigonometry, Mensuration

UNIT V – MODERN MATHEMATICS–II **(6 hours)**

Sets & Functions, Sequences & Series, Data Interpretation, Data Sufficiency

ASSESSMENT

1. Objective type – Paper based / Online – Time based test

REFERENCES

1. Agarwal.R.S *, "Quantitative Aptitude for Competitive Examinations",* S Chand Limited, 2011.
2. Abhijitguha, *"Quantitative Aptitude for Competitive Examinations",* TataMcgraw Hill, 3rd Edition.
3. *Edgar Thrope, "Test Of Reasoning For Competitive Examinations", Tata Mcgraw Hill, 4th Edition.*
4 *"Other material related to quantitative aptitude"*

PD1006 APTITUTE IV												
Course designed by		Career Development Centre										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x			x							
2.	Mapping of instructional objectives with student outcome	1			1							
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects(P)		
		x										
4.	Approval	23rd meeting of Academic Council, May 2013										

MA1006	STATISTICAL AND NUMERICAL METHODS	L	T	P	C
	Total Contact Hours - 60	4	0	0	4
	Prerequisite				
	Nil				

PURPOSE

To develop a thorough understanding of the methods of probability and statistics which are used to model engineering problems.

INSTRUCTIONAL OBJECTIVES

1.	To gain knowledge in measures of central tendency and dispersion
2.	To appropriately choose, define and/or derive probability distributions such as the Binomial, Poisson and normal distribution to solve engineering problems.
3.	To learn how to formulate and test the hypotheses about means, proportions and standard deviation to draw conclusions based on the results of statistical tests in large sample.
4.	To get exposed to finite differences and interpolation
5.	To be thorough with the numerical Differentiation and integration

UNIT I - TESTING OF HYPOTHESIS (12 hours)

Introduction - Large sample tests based on normal distribution - Test for single mean, difference between means - proportion, difference between proportion - standard deviation, difference between standard deviation -Chi-square test for goodness of fit - Independence of attributes.

UNIT II - ANALYSIS OF VARIANCE (12 hours)

Small sample tests based on t and F distribution - Test for, single mean, difference between means, Paired t-test, test for equality of variances. ANOVA-one -way classification, Two-way classification.

UNIT III - SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS (12 hours)

Newton-Raphson method- Gauss Elimination method – Pivoting - Gauss-Jordanmethods – Iterative methods of Gauss-Jacobi and Gauss-Seidel - Matrix Inversion by Gauss Elimination and Gauss Jordan method - Eigenvalues of a matrix by Power method .

UNIT IV - FINITE DIFFERENCES AND INTERPOLATION (12 hours)

First and Higher order differences – Forward differences and backward differences and Central Differences – Differences of a polynomial – Properties of operators – Factorial polynomials – Shifting operator E – Relations between the operators. Interpolation – Newton-Gregory Forward and Backward Interpolation formulae - Divided differences – Newton's Divided difference formula – Lagrange's Interpolation formula – Inverse interpolation.

UNIT V - NUMERICAL DIFFERENTIATION AND INTEGRATION (12 hours)

Numerical Differentiation and Integration: Newton's forward and backward differences formulae to compute first and higher order derivatives – The Trapezoidal rule – Simpson's one third rule and three eighth rule.

TEXT BOOKS

1. S.C.Gupta & V.K.Kapoor, *"Fundamentals of Mathematical Statistics"*, Sultan Chand and Sons, New Delhi, 11th edition, 2007.
2. B.S. Grewal, *"Numerical Methods"*, Khanna Publishers, 42nd edition, 2012.

REFERENCES

1. P. Sivarama Krishna Das & C.Vijayakumari, *"A text book of statistics and Numerical methods",* Viji's academy, 2010.
2. Dr. M.K. Venkataraman, *"Numerical Methods in Science and Engineering"*, National Publishing Co., 2005.
3. S.S. Sastry, *"Introductory Methods of Numerical Analysis"*, 4th edition, 2005.
4. E. Balagurusamy, *"Computer Oriented Statistical and Numerical Methods",* Tata McGraw Hill., 2000.
5. P.Kandasamy etal., *"Numerical Methods"*, S. Chand & Co., New Delhi, 2003.

MA1006 - STATISTICAL AND NUMERICAL METHODS												
Course designed by		Department of Mathematics										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x				x						
2.	Mapping of instructional objectives with student outcome	1-5				1-5						
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
				x								
4.	Approval	23rd meeting of Academic Council, May 2013										

IC1053	CONTROL SYSTEMS ENGINEERING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

To understand the fundamental need for control system and to derive its transfer function

INSTRUCTIONAL OBJECTIVES

1.	To understand the methods of representation of systems and deriving their transfer function model
2.	To give basic knowledge is obtaining the open loop and closed loop frequency responses of systems
3.	Applications of control systems

UNIT I - SYSTEMS AND THEIR REPRESENTATION (9 hours)

Control systems- Basic elements in control systems – Open and closed loop systems – Electrical analogy of mechanical and thermal systems – Transfer function –Block diagram reduction techniques – Signal flow graphs.

UNIT II - TIME RESPONSE (9 hours)

Time response – Time domain specifications – Types of test input – I and II order system response – Error coefficients – Generalized error series – Steady state error – P, PI, PID modes of feedback control.

UNIT III - FREQUENCY RESPONSE (9 hours)

Frequency response of the system – Correlation between time and frequency response – Gain and Phase margin – Bode plot - Polar plot

UNIT IV - STABILITY OF CONTROL SYSTEM **(9 hours)**

Characteristics equation – Location of roots in S plane for stability – Routh Hurwitz criterion – Root locus construction – Effect of pole, zero addition

UNIT V - APPLICATIONS **(9 hours)**

Transfer functions of Synchros – AC and DC servomotors – Potentiometers – Encoders- case studies

TEXT BOOK

1. Ogata K., "*Modern Control Engineering"*, 5th edition, PHI, 2010.

REFERENCES

1. Nagrath I.J. and Gopal M., "*Control Systems Engineering"*, New Age International Publishers, 5thedition, 2011.
2. Gopal M., "*Control Systems, Principles & Design"*, 4th edition, Tata McGraw Hill, New Delhi, 2012.
3. Bandyopadhyay M.N., "*Control Engineering Theory and Practice"*, PHI, 2009.

IC1053 CONTROL SYSTEMS ENGINEERING												
Course designed by		Department of Instrumentation and Control Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x		x	x	x						x
2.	Mapping of instructional objectives with student outcome	1		1	2	2						3
3.	Category	General (G)			Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Instrumentation			Control		Electronics			Electrical		
		x			x							
5.	Approval	23rd meeting of academic council held on May 2013										

CS1012	SOFTWARE ENGINEERING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

This course is intended to provide the students with an overall view over Software Engineering discipline and with insight into the processes of software development.

INSTRUCTIONAL OBJECTIVES	
1.	To learn about generic models of software development process.
2.	To understand fundamental concepts of requirements engineering and Analysis Modelling.
3.	To understand the different design techniques and their implementation.
4.	To learn various testing and maintenance measures

UNIT I - SOFTWARE PROCESS MODELS (9 Hours)

The Evolving role of Software – Software – The changing Nature of Software – Legacy software –– A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment – Personal and Team Process Models – Product and Process – Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – the Unified Process.

UNIT II - REQUIREMENT ENGINEERING (9 Hours)

Software Engineering Practice – communication Practice – Planning practice Modeling practice– Construction Practice –Deployment. Requirements Engineering - Requirements Engineering tasks – Initiating the requirements Engineering Process- Eliciting Requirements – Developing Use cases – Building the Analysis Models – Elements of the Analysis Model – Analysis pattern – Negotiating Requirements – Validating Requirements.

UNIT III - ANALYSIS MODELLING (9 Hours)

Requirements Analysis – Analysis Modeling approaches – data modeling concepts – Object oriented Analysis – Scenario based modeling – Flow oriented Modeling – Class based modeling – creating a behaviour model.

UNIT IV - DESIGN & IMPLEMENTATION (9 Hours)

Design Engineering -Architectural Design – Detailed Design - Design process - Design Quality-Design model-User interface Design – Implementation – issues in implementation

UNIT V - TESTING & MAINTENANCE (9 Hours)

Testing strategies- Testing Tactics - strategies Issues for conventional and object oriented software-Verification and Validation- validation testing –system testing – Art of debugging.

Software evolution -Critical Systems Validation – Metrics for Process, Project and Product-Quality Management - Process Improvement –Risk Management- Configuration Management – Software Cost Estimation

TEXT BOOK

1. Hill International edition, 7th edition, 2009.

REFERENCES

1. Ian Sommerville, "*Software Engineering*", 8th Edition, Pearson Education, 2008.
2. Richard Fairley, "*Software Engineering Concepts*", McGraw Hill, 2004.
3. Stephan Schach, "*Software Engineering*", Tata McGraw Hill, 2007.
4. Pfleeger and Lawrence , "*Software Engineering : Theory and Practice*", Pearson Education, 2nd, 2001

CS1012 SOFTWARE ENGINEERING												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x		x								
2.	Mapping of instructional objectives with student outcome	1,2,3		1,3,4								
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
						x						
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1014	SYSTEM SOFTWARE AND COMPILER DESIGN	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1002,CS1013				

PURPOSE

To learn the Basics of System software and the complete design aspects of a Compiler.

INSTRUCTIONAL OBJECTIVES	
1.	To study the features and design aspects of assemblers, Macro, loaders and linkers
2.	To learn the design principles of a Compiler
3.	To learn the various parsing techniques and different levels of translation
4.	To learn how to optimize and effectively generate machine codes

UNIT I - ASSEMBLERS & MACROS (7 Hours)

Overview of Language processors – Assemblers: Design of two pass assemblers - single pass assemblers

MACRO: Macro definition- macro call – macro expansion- nested macro- advanced macro facilities- Design of Macroprocessor.

UNIT II - LINKERS & LOADERS (7 Hours)

Relocation and linking concepts – Design of linker – self relocating programs – linking in MS-DOS – overlays

DYNAMIC LINKING : Loaders – Absolute loaders- relocating loaders

UNIT III - COMPILERS : GRAMMARS & AUTOMATA (8 Hours)

Languages – Grammars – Types of grammars – Context free grammar - regular expression - Recognizing of patterns - finite automation (deterministic & non deterministic) Conversion of NDFA to DFA - Conversion of regular expression of NDFA – Thompson's construction- minimization of NDFA - Derivation - parse tree - ambiguity – Lexical analysis- handles - token specification - design of lexical analysis (LEX) - Automatic generation of lexical analyzer - input buffering - A language for specifying lexical analyzers - implementation of lexical analyzer

UNIT IV - SYNTAX ANALYSIS – PARSING (11 Hours)

Definition - role of parsers - top down parsing - bottom-up parsing - Left recursion - left factoring - Handle pruning , Shift reduce parsing - operator precedence parsing – FIRST- FOLLOW- LEADING- TRAILING- Predictive parsing - recursive descent parsing. LR parsing – LR (0) items - SLR parsing – Canonical LR - LALR parsing - generation of LALR - Ambiguous grammars - error recovery

UNIT V - SYNTAX DIRECTED TRANSLATION & CODE OPTIMIZATION (12Hours)

Intermediate Languages - prefix - postfix - Quadruple - triple - indirect triples – syntax tree- Evaluation of expression - three-address code- Synthesized attributes – Inherited attributes – Conversion of Assignment statements- Boolean expressions –Backpatching - Declaration - CASE statements

CODE OPTIMIZATION: Local optimization- Loop Optimization techniques – DAG – Dominators- Flow graphs – Storage allocations- Peephole optimization – Issues in Code Generation.

TEXT BOOK

1. Alfred V Aho , Jeffery D Ullman , Ravi Sethi, " *Compilers , Principles techniques and tools* ", Pearson Education 2011

REFERENCES

1. Dhamdhere D.M., "*Systems Programming*", Tata McGraw Hill Education Pvt. Ltd., 2011.
2. Srimanta Pal, "*Systems Programming*", Oxford University Press, 2011.
3. Raghavan V., "*Principles of Compiler Design*", Tata McGraw Hill Education Pvt. Ltd., 2010.
4. David Galles, "*Modern Compiler Design*", Pearson Education, Reprint 2012.
5. Dasaradh Ramaiah. K., "*Introduction to Automata and Compiler Design*", PHI, 2011.

CS1014 SYSTEM SOFTWARE AND COMPILER DESIGN													
Course designed by		Department of Computer Science and Engineering											
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k	
		x		x									
2.	Mapping of instructional objectives with student outcome	1,2		3,4									
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)			
										x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering			
		x											
5.	Approval	23rd meeting of Academic Council, May 2013											

CS1049	MINOR PROJECT	L	T	P	C
	Total Contact Hours - 30	0	0	4	2
	Prerequisite				

PURPOSE

To carry out a design project in one of the specializations of the program with substantial multidisciplinary component.

INSTRUCTIONAL OBJECTIVES	
1.	To guide the students in such a way so that they carry out a work on a topic as a forerunner to the full fledged project work to be taken subsequently in VIII semester. The project work shall consist of substantial multidisciplinary component

The students will carry out a project in one of the specializations of program under study with substantial multidisciplinary component

Student groups will be formed and a faculty member will be allocated to guide them. Assessment will be based on internal reviews. Based on the reviews marks will be allotted out of 100.

CE1049 MINOR PROJECT												
Course designed by		Department of Computer Science and Engineering										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X	X	X	X	X	X	X	X	X
2.	Mapping of instructional objectives with student outcome	1	1	1	1	1	1	1	1	1	1	1
3.	Approval	23rd meeting of Academic Council, May 2013										

CS1036	SYSTEM SOFTWARE AND COMPILER DESIGN LAB	L	T	P	C
	Total Contact Hours - 30	0	0	2	1
	Prerequisite				
	CS1002, CS1032				

PURPOSE

The purpose of this course is to design the different stages of a Compiler and other system software.

INSTRUCTIONAL OBJECTIVES

1.	To design system software like assembler and macro processor.
2.	To design different phases of a Compiler.
3.	To implement the different parsing techniques of compiler.

LAB EXERCISES

1. Implementation of a text editor
2. Implementation of an Assembler
3. Implementation of Macro processor
4. Converting a regular expression to NFA
5. Conversion of an NFA to DFA
6. Computation of FIRST and FOLLOW sets

7. Computation of Leading and Trailing Sets
8. Construction of Predictive Parsing Table
9. Implementation of Shift Reduce Parsing
10. Computation of LR(0) items
11. Construction of DAG
12. Intermediate code generation

TEXT BOOK

1. Alfred V Aho , Jeffery D Ullman , Ravi Sethi, " *Compilers , Principles techniques and tools* ", Pearson Education 2011

REFERENCE

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<tr><td>5</td><td>Approval</td><td colspan="11">23rd meeting of Academic Council, May 2013</td></tr>
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SEMESTER VII

MB1016	MANAGEMENT FOR ENGINEERS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

This course brings together the technological problem-solving savvy of engineering and the organizational, administrative, and planning abilities of management in order to oversee complex enterprises from conception to completion.

INSTRUCTIONAL OBJECTIVES

1.	Understanding Management Concepts
2.	Exploring various functional domains in management
3.	Understanding of professional and ethical responsibility as Engineers

UNIT I - MANAGEMENT (9 hours)

Meaning of Management, Definitions of Management, Characteristics of Management, Management Vs. Administration. Management- Art, Science and Profession. Importance of Management. Development of Management Thoughts. Principles of Management.

UNIT II - HUMAN RESOURCE MANAGEMENT (9 hours)

The Management Functions, Inter-Relationship of Managerial Functions, Significance of Staffing, Personnel Management, Functions of Personnel Management, Manpower Planning, Process of Manpower Planning, Recruitment, Selection, Training Methods, Communication, Performance Appraisal, Employee Retention, Social Responsibility and Ethics

UNIT III - PRODUCTION AND OPERATIONS MANAGEMENT (9hours)

Production and Operations Management Definition, Objectives, Functions and Scope, Production Planning and Control; Its Significance, Stages In Production Planning and Control. Brief Introduction to the Concepts of Material Management, Inventory Control; Its Importance and Various Methods.

UNIT IV - MARKETING MANAGEMENT (9 hours)

Definition of Marketing, Marketing Concept, Objectives and Functions of Marketing. Marketing Research - Meaning; Definition; Objectives; Importance;

Limitations; Process. Advertising - Meaning of Advertising, Objectives, Functions, Criticism.

UNIT V - FINANCIAL MANAGEMENT (9 hours)

Introduction of Financial Management, Objectives of Financial Management, Functions and Importance of Financial Management. Brief Introduction to the Concept of Capital Structure and Various Sources of Finance.

TEXT BOOKS

1. Ricky W. Griffin, *"Fundamentals of Management"*, Cengage Learning, 7th edition (UNIT I)
2. Aswathappa, *"Human Resource Management"*, Tata McGraw-Hill Education, 6th Edition (UNIT II)
3. Panneerselvam, *"Production and Operations Management"*, PHI Learning (UNIT III)
4. Ramaswamy, *"Marketing Management: Global Perspective Indian Context"*, Macmillan Publications (UNIT IV)
5. Khan and Jain, *"Financial Management"* Tata McGraw-Hill Education.f (UNIT V)

<table>
<tr><th colspan="14">MB1016 MANAGEMENT FOR ENGINEERS</th></tr>
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<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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CS1017	**ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

The purpose of this course is to impart concepts of Artificial Intelligence and Expert System.

INSTRUCTIONAL OBJECTIVES

1.	To study the concepts of Artificial Intelligence.
2.	To learn the methods of solving problems using Artificial Intelligence.
3.	To introduce the concepts of Expert Systems and machine learning.

UNIT I - INTRODUCTION TO AI AND PRODUCTION SYSTEMS (9 hours)

Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system- Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction - Related algorithms, Measure of performance and analysis of search algorithms.

UNIT II-REPRESENTATION OF KNOWLEDGE (9 hours)

Game playing - Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.

UNIT III-KNOWLEDGE INFERENCE (9 hours)

Knowledge representation -Production based system, Frame based system. Inference - Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster - Shafer theory.

UNIT IV-PLANNING AND MACHINE LEARNING (9 hours)

Basic plan generation systems - Strips -Advanced plan generation systems - K strips -Strategic explanations -Why, Why not and how explanations. Learning-Machine learning, adaptive
Learning.

UNIT V-EXPERT SYSTEMS **(9 hours)**

Expert systems - Architecture of expert systems, Roles of expert systems - Knowledge Acquisition –Meta knowledge, Heuristics. Typical expert systems - MYCIN, DART, XOON, Expert systems shells.

TEXT BOOKS

1. Kevin Night, Elaine Rich, Nair B., "*Artificial Intelligence (SIE)*",McGraw Hill-2008. (Unit-1,2,4,5)
2. Dan W. Patterson, "*Introduction to AI and ES*", Pearson Education, 2007. (Unit-III)

REFERENCES

1. Peter Jackson, "*Introduction to Expert Systems*", 3rd Edition, Pearson Education, 2007.
2. Stuart Russel, Peter Norvig "*AI – A Modern Approach*", 2nd Edition, Pearson Education 2007.

<table>
<tr><td colspan="2">CS1017</td><td colspan="11">ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS</td></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Computer Science and Engineering</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td>5.</td><td>Approval</td><td colspan="11">23rd meeting of Academic Council, May 2013</td></tr>
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CS1019	WEB TECHNOLOGY	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

The course focuses on the fundamentals of CGI, SCRIPTING LANGUAGES and Web Applications.

INSTRUCTIONAL OBJECTIVES	
1.	To learn the basic web concepts and Internet protocols.
2.	To understand CGI Concepts & CGI Programming.
3.	To familiarize with Scripting Languages.
4.	To study DHTML, XML, SERVELETS AND JSP.

UNIT I - INTRODUCTION (9 hours)

Internet Principles – Basic Web Concepts – Client/Server model – retrieving data from Internet – HTM and Scripting Languages – Standard Generalized Mark –up languages – Next Generation – Internet –Protocols and Applications.

UNIT II - COMMON GATEWAY INTERFACE PROGRAMMING (9 hours)

HTML forms – CGI Concepts – HTML tags Emulation – Server – Browser Communication – E-mail generation – CGI client Side applets – CGI server applets – authorization and security.

UNIT III - SCRIPTING LANGUAGES (9 hours)

Dynamic HTML-Cascading style sheets-Object model and Event model- Filters and Transitions-Active X Controls-Multimedia-Client side script - VB Script programming – Forms – Scripting Object.

UNIT IV - SERVER SIDE PROGRAMMING (9 hours)

XML – Server side includes – communication – DTD – Vocabularies – DOM methods – Firewalls– Proxy Servers.

UNIT V - SERVELETS AND JSP (9 hours)

JSP Technology Introduction-JSP and Servelets- Running JSP Applications Basic JSP- JavaBeans Classes and JSP-Tag Libraries and Files- Support for the Model-View- Controller Paradigm- Case Study- Related Technologies.

TEXT BOOKS

1. Deitel H.M. and Deitel P.J., "*Internet and World Wide Web How to program",* Pearson International, 2012, 4th Edition. (Ch-1,4,5,6,12,14,26,27)
2. Gopalan N.P. and Akilandeswari J., "*Web Technology",* Prentice Hall of India, 2011.(Ch- 1 to 11)
3. Paul Dietel and Harvey Deitel,"*Java How to Program*", Prentice Hall of India, 8th Edition.(Ch-29)

REFERENCES

1. Mahesh P. Matha, "*Core Java A Comprehensive study*", Prentice Hall of India, 2011.
2. Uttam K.Roy, "*Web Technologies"*, Oxford University Press, 2011.

CS1019 WEB TECHNOLOGY												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x		x								
2.	Mapping of instructional objectives with student outcome	1,2, 3,4		4								
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
									x			
5.	Approval	23rd meeting of Academic Council, May 2013										

	INDUSTRIAL TRAINING II (Training to be undergone after VI semester)	**L**	**T**	**P**	**C**
CS1048	2 week practical training in industry	**0**	**0**	**1**	**1**
	Prerequisite				
	Nil				

PURPOSE

To provide hands-on experience in various domains such as hardware, software, networking, maintenance and testing

INSTRUCTIONAL OBJECTIVES

1.	Students have to undergo two – week practical training in Computer Science and Engineering related industries/ Training Centers/ Corporate Offices so that they become aware of the practical application of theoretical concepts studied in the class rooms.

Students have to undergo two-week practical training in Computer Science and Engineering related industries/ Training Centers/ Corporate Offices of their choice but with the approval of the department. At the end of the training student will submit a report as per the prescribed format to the department.

Assessment process

This course is mandatory and the student has to pass the course to become eligible for the award of degree. The student shall make a presentation before a committee constituted by the department which will assess the student based on the report submitted and the presentation made. Marks will be awarded out of 100 and appropriate grades assigned as per the regulations.

CS1048 INDUSTRIAL TRAINING II												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
			x	x	x							x
2.	Mapping of instructional objectives with student outcome		1	1	1							1
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
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5.	Approval	23rd meeting of Academic Council, May 2013										

CS1039	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS LAB	0	0	2	1
	Total Contact hours - 30				
	Prerequisite				
	Nil				

PURPOSE

To learn and implement various techniques of Artificial Intelligence and Expert system.

INSTRUCTIONAL OBJECTIVES

1.	To implement various AI search procedures.
2.	To implement various knowledge representation techniques.
3.	To develop an Expert system for medical diagnosis.

LIST OF EXPERIMENTS

1. Implement Breadth First Search (for 8 puzzle problem or Water Jug problem or any AI search problem)
2. Implement Depth First Search (for 8 puzzle problem or Water Jug problem or any AI search problem)
3. Implement Best First Search (for 8 puzzle problem or Water Jug problem or any AI search problem)
4. Implement Single Player Game (Using Heuristic Function)
5. Implement Two Player Game (Using Heuristic Function)
6. Implement A* Algorithm
7. Implement Propositional calculus related problem
8. Implement First order propositional calculus related problem
9. Implement Certainty Factor problem
10. Implement Syntax Checking of English sentences-English Grammar
11. Develop an Expert system for Medical diagnosis.
12. Develop any Rule based system for an application of your choice.

TEXT BOOKS

1. Kevin Night, Elaine Rich, Nair B., "*Artificial Intelligence (SIE)*", McGraw Hill-2008. (Unit-1,2,4,5)
2. Dan W. Patterson, "*Introduction to AI and ES*", Pearson Education, 2007. (Unit-III)

REFERENCE

Laboratory Manual

<table>
<tr><th colspan="14">CS1039 ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS LAB</th></tr>
<tr><th colspan="2">Course designed by</th><th colspan="12">Department of Computer Science and Engineering</th></tr>
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CS1041	WEB TECHNOLOGY LAB	L	T	P	C
	Total Contact hours - 30	0	0	2	1
	Prerequisite				
	Nil				

PURPOSE
The purpose of this lab is to impart knowledge on various web technologies.

INSTRUCTIONAL OBJECTIVES	
1.	To develop web pages.
2.	To program Client side scripting languages
3.	To implement Java servlets in web technology

LIST OF EXPERIMENTS

1. Write programs in Java to demonstrate the use of following components:
   i. Text fields, buttons, Scrollbar, Choice, List and Check box.

2. Write Java programs to demonstrate the use of various Layouts like Flow Layout,
   i. Border Layout, Grid Layout and card layout.
   ii.

3. Write programs in Java to create applets incorporating the following features:
   i. Create a color palette with matrix of buttons
   ii. Set background and foreground of the control text area by selecting a color from color palette.
   iii. In order to select Foreground or background use check box control as radio buttons

4. Write programs in Java to do the following.
   i. Set the URL of another server.
   ii. Download the homepage of the server.
   iii. Display the contents of homepage with date, content type, and Expiration date. Last modified and length of the home page.

5. Write programs in Java using sockets to implement the following:
   i. HTTP request
   ii. FTP
   iii. SMTP
   iv. POP3

6. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.

7. Write programs in Java using Servlets:
   i. To invoke servlets from HTML forms
   ii. To invoke servlets from Applets

8. Write programs in Java to create three-tier applications using servlets for conducting on-line examination for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.

9. Create a web page with the following using HTML
   i. To embed a map in a web page
   ii. To fix the hot spots in that map
   iii. Show all the related information when the hot spots are clicked.

10. Create a web page with the following.
   i. Cascading style sheets.
   ii. Embedded style sheets.
   iii. Inline style sheets. Use our college information for the web pages.

TEXT BOOKS

1. Deitel H.M. and Deitel P.J., "*Internet and World Wide Web How to program",* Pearson International, 2012, 4th Edition.
2. Gopalan N.P. and Akilandeswari J., *"Web Technology",* Prentice Hall of India, 2011Paul Dietel and Harvey Deitel,"*Java How to Program*", Prentice Hall of India, 8th Edition

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SEMESTER VIII

CS1050	MAJOR PROJECT / PRACTICE SCHOOL	L	T	P	C
	Total Contact Hours - 360	0	0	24	12
	Prerequisite				

PURPOSE

To simulate real life situations related to the program and impart adequate training so that confidence to face and tackle any problem in the field is developed in the college itself.

INSTRUCTIONAL OBJECTIVES

1. To guide the students such a way that the they carry out a comprehensive work on the chosen topic which will stand them in good stead as they face real life situations. The project work so chosen by the student shall culminate in gaining of major design experience in the related area of specialization.

MAJOR PROJECT

Each project will cover all the aspects (to the extent possible) of real life application of concepts studied under the program. . Alternately, a few research problems also may be identified for investigation. The project shall be driven by realistic constraints like that related to economic, environmental, social, political, ethical, health & safety, manufacturability and sustainability. The outcomes to be attained by students by doing the project work shall be spelt out clearly. A project report is to be submitted on the topic which will be evaluated during the final review. Assessment procedure will be as spelt out in the regulations.

PRACTICE SCHOOL

Alternately, a student is encouraged to take an industrial project with reputed organizations or firms chosen by the institute. In such cases the student will stay with the firm and carry out the project. The project will be guided by the faculty member and the concerned officer in the industry. All the requirements spelt out under 'MAJOR PROJECT' above, shall be incorporated under this work also. However reviews will be conducted in the institute which the student shall attend.

CS1050 MAJOR PROJECT												
Course designed by		Department of Computer Science and Engineering										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X	X	X	X	X	X	X	X	X
2.	Mapping of instructional objectives with student outcome	1	1	1	1	1	1	1	1	1	1	1
3.	Approval	23rd meeting of Academic Council, May 2013										

DEPARTMENTAL ELECTIVES
GROUP – I
SEMESTER IV

CS1101	**DIGITAL IMAGE PROCESSING**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	CS1001, MA1003				

PURPOSE

The purpose of this course is to impart knowledge on various Digital Image Processing Techniques and their Applications.

INSTRUCTIONAL OBJECTIVES

1.	To understand Digital Image Processing fundamentals.
2.	To learn Image Transformation, Enhancement, Restoration and Compression Techniques.
3.	To implement various techniques for Segmentation of Images.
4.	To learn the Image Reconstruction operations.
5.	To implement Image Processing Techniques for suitable applications using MATLAB.

UNIT I – DIGITAL IMAGE FUNDAMENTALS (8 hours)

Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels

UNIT II – IMAGE ENHANCEMENT (10 hours)

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering–Smoothing and Sharpening Spatial Filtering – **Frequency Domain:** Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters

UNIT III – IMAGE RESTORATION (9 hours)

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

UNIT IV – IMAGE COMPRESSION AND SEGMENTATION (10 hours)

Compression: Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding – Bit-Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Wavelet Coding – Compression Standards – JPEG2000

Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation

UNIT V – CASE STUDIES USING MATLAB (8 hours)

Introduction to Image Processing Toolbox – Practice of Image Processing Toolbox– Case studies–Various Image Processing Techniques

TEXT BOOK

1. Rafael C. Gonzales, Richard E. Woods, "*Digital Image Processing*", Pearson Education, Third Edition, 2010.

REFERENCES

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, "*Digital Image Processing Using MATLAB*", Tata McGraw Hill Pvt. Ltd., Third Edition, 2011.
2. Anil Jain K. "*Fundamentals of Digital Image Processing*", PHI Learning Pvt. Ltd., 2011.
3. Jayaraman S., Esaki Rajan S., T.Veera Kumar, "*Digital Image Processing*", Tata McGraw Hill Pvt. Ltd., Second Reprint, 2010.
4. Bhabatosh Chanda, Dwejesh Dutta Majumder, "*Digital Image Processing and analysis*", PHI Learning Pvt. Ltd., Second Edition, 2011.
5. Malay K. Pakhira, "*Digital Image Processing and Pattern Recognition*", PHI Learning Pvt. Ltd., First Edition, 2011.
6. Annadurai S., Shanmugalakshmi R., "*Fundamentals of Digital Image Processing*", Pearson Education, First Edition, 2007.
7. *http://eeweb.poly.edu/~onur/lectures/lectures.html*
8. *http://www.caen.uiowa.edu/~dip/LECTURE/lecture.html*

CS1101 DIGITAL IMAGE PROCESSING												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									**x**
2.	Mapping of instructional objectives with student outcome	1,4	2,3									**5**
3.	Category			Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering	Knowledge Engineering		
										x		
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1102	DIGITAL SIGNAL PROCESSING	L	T	P	C
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	CS1001				

PURPOSE

The purpose of this course is to introduce the concepts of Digital signal processing and DSP Processor and to simulate using MATLAB.

INSTRUCTIONAL OBJECTIVES

1.	To understand the structures of Discrete time signals and systems
2.	To learn the Frequency response characteristics and to design FIR and IIR filters
3.	To study Finite word length effect in Digital Filters
4.	To study the fundamentals of DSP Processor- TMS320C5X

UNIT I – DISCRETE TIME SIGNALS AND SYSTEMS AND Z- TRANSFORM (9 hours)

Discrete time signal- Discrete systems- convolution- Difference equations – **The Z Transform** – The Bilateral Z Transform- Properties of the Z Transform – Inversion of Z Transform – System representation in the Z domain- Solutions of difference equations.

UNIT II – FOURIER ANALYSIS AND FOURIER TRANSFORM (9 hours)

Discrete Time Fourier Transform(DTFT) – Properties of DTFT – The frequency domain representation of LTI systems- Sampling and Reconstruction of Analog

signals- **Discrete Fourier Transform** – The discrete Fourier series- sampling and reconstruction in the Z domain – Discrete Fourier Transform- Properties of Discrete Fourier transform- Linear convolution using the DFT- Fast Fourier Transform.

UNIT III–DESIGN OF IIR AND FIR FILTERS (9 hours)

Digital Filter Structures – Basic elements – IIR Filter structures- FIR filter structures- Lattice Filter structures – **FIR filter design** – Properties of Linear – phase FIR filters- Window design technique – Frequency sampling design technique- Optimal equi ripple design technique. **IIR Filter design** – Characteristic of Prototype analog signals- Analog to Digital filter transformation- Lowpass filter design using MATLAB- Frequency –band transformation – Comparison of FIR vs IIR Filters.

UNIT IV–FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS (9 hours)

Fixed point arithmetic -effect of quantization of the input data due to Finite word length. Product round off - need for scaling - Zero input limit cycle oscillations - Limit cycle oscillations due to overflow of adders - Table look up implementation to avoid multiplications.

UNIT V – DSP PROCESSOR FUNDAMENTALS (9 hours)

Architecture and features: Features of DSP processors - DSP processor packaging(Embodiments) - Fixed point Vs floating point DSP processor data paths - Memory architecture of a DSP processor (Von Neumann - Harvard) - Addressing modes - pipelining - TMS320 family of DSPs (architecture of C5x).

TEXT BOOK

1. John. G. Proakis and Dimitris C. Manolakis, "*Digital Signal Processing Principles, Algorithms and Applications*," Pearson Education, Third edition 2006 (UNIT 1,2,3,4)
2. Venkataramani B., M.Bhaskar, "*Digital Signal Processors, Architecture, Programming and Application*", First Edition ,Tata McGraw Hill, New Delhi, 2008. (UNIT 5)

REFERENCES

1. Sanjit Mitra, "*Digital Signal Processing* - "*A Computer based approach*", Second Edition, Tata Mcgraw Hill, Third Edition New Delhi, 2009
2. Hayes M.H., "*Digital Signal Processing*", Schaum's Outlines, TATA Mc-Graw Hill, Tata McGraw Hill, Second Edition New Delhi, 2007.

CS1102 DIGITAL SIGNAL PROCESSING												
Course designed by		**Department of Computer Science and Engineering**										
1	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2	Mapping of instructional objectives with student outcome	1	2,3,4									2
3	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
				x		x						
5	Approval	23rd meeting of Academic Council, May 2013										

CS1103	VISUALIZATION TECHNIQUES	L	T	P	C
	Total Contact hours - 45	3	0	0	3
	Prerequisite				
	NIL				

PURPOSE

This course aims at understanding Information and Scientific visualization techniques and gives a clear picture of various abstraction mechanisms

INSTRUCTIONAL OBJECTIVES

1.	To learn about different Visualization Techniques
2.	To study the Interaction techniques in information visualization fields
3.	To understand Various abstraction mechanisms
4.	To create interactive visual interfaces

UNIT I – FOUNDATIONS FOR DATA VISUALIZATION (9 hours)

Introduction to Visualization – Visualization stages – Experimental Semiotics based on Perception – Gibson's Affordance theory – A Model of Perceptual Processing – Costs and Benefits of Visualization – Types of Data.

UNIT II – COMPUTER VISUALIZATION (9 hours)

Non-Computer Visualization – Computer Visualization: Exploring Complex Information Spaces –Fisheye Views – Applications – Comprehensible Fisheye views – Fisheye views for 3D data – Non Linear Magnification – Comparing Visualization of Information Spaces – Abstraction in computer Graphics – Abstraction in user interfaces.

UNIT III – MULTIDIMENSIONAL VISUALIZATION (9 hours)

1D, 2D, 3D – Multiple Dimensions – Trees – Web Works – Data Mapping: Document Visualization – Workspaces.

UNIT IV – TEXTUAL METHODS OF ABSTRACTION (9 hours)

From Graphics to Pure Text – Figure Captions in Visual Interfaces – Interactive 3D illustrations with images and text – Related work – Consistency of rendered – images and their textual labels – Architecture – Zoom techniques for illustration purpose – Interactive handling of images and text.

UNIT V – ABSTRACTION IN TIME AND INTERACTIVE SYSTEMS (9 hours)

Animating non Photo realistic Computer Graphics – Interaction Facilities and High Level Support for Animation Design – Zoom Navigation in User Interfaces – Interactive Medical Illustrations – Rendering Gestural Expressions – Animating design for Simulation – Tactile Maps for Blind People – Synthetic holography – Abstraction Versus Realism– Integrating Spatial and Non Spatial Data.

TEXT BOOKS

1. Colin Ware *"Information Visualization Perception for Design",* 3 rd edition, Morgan Kaufman 2012. (UNIT 1)
2. Stuart.K.Card, Jock.D.Mackinlay and Ben Shneiderman, *"Readings in Information Visualization Using Vision to think"*, Morgan Kaufmann Publishers, 1999. (UNIT 3)
3. Thomas Strothotte, *"Computer Visualization–Graphics Abstraction and Interactivity",* Springer Verlag Berlin Heiderberg 1998. (UNIT 2,4,5)

REFERNCES

1. Chaomei Chan, *"Information Visualization",* Beyond the horizon, 2nd edition, Springer Verlag, 2004.
2. Pauline Wills, *"Visualisation: A Beginner's Guide*", Hodder and Stoughlon, 1999.
3. Benedikt. M, "*Cyberspace: Firot Steps",* MIT Press, 1991.
4. http://www.ornl.gov/info/ornlreview/v30n3-4/visual.htm
5. http://www.silvalifesystem.com/articles/visualization-techniques/
6. www.ulb.tu-darmstadt.de/tocs/5943970X.pdf
7. http://turing.cs.washington.edu/papers/nips08.pdf
8. http://www.barnesandnoble.com/w/computational-visualization-thomas-strothotte/1111486638

<table>
<tr><td colspan="14">CS1103 VISUALIZATION TECHNIQUES</td></tr>
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SEMESTER V

CS1104	NEURAL NETWORKS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE	
To study Artificial Neural Networks and its Applications in Computer Field	
INSTRUCTIONAL OBJECTIVES	
1.	To understand the basics of ANN and comparison with Human brain
2.	To study about various methods of representing information in ANN
3.	To learn various architectures of building an ANN and its applications
4.	To understand the Pattern classification and Pattern Association techniques

UNIT I - INTRODUCTION (9 hours)

Definition of ANN-Biological Neural Networks-Applications of ANN-Typical Architectures-Setting the weights-Common Activation functions-Development of Neural Networks-McCulloch-Pitts Neuron

UNIT II-SIMPLE NEURAL NETS FOR PATTERN CLASSIFICATION (9 hours)

General discussion - Hebb net – Perceptron- Adaline - Backpropagation neural net- Architecture- Delta Learning Rule Algorithm-Applications

UNIT III - PATTERN ASSOCIATION (9 hours)

Training Algorithm for Pattern Association-Heteroassociative memory neural network applications-Autoassociative net-Iterative Autoassociative net-Bidirectional Associative Memory-Applications

UNIT IV - NEURAL NETS BASED ON COMPETITION (9 hours)

Fixed Weights Competitve Nets- Kohonen's Self-Organizing Map –Applications-Learning Vector Quantization-Applications-Counter Propagation Network-Applications.

UNIT V - ADAPTIVE RESONANCE THEORY AND NEOCOGNITRON (9 hours)

Motivation – Basic Architecture- Basic Operation-ART1-ART2-Architecture-Algorithm-applications-Analysis Probabilistic Neural Net-Cascade Correlation-Neocognitron: Architecture—Algorithm-Applications.

TEXT BOOK

1. LaureneV. Fausett, *"Fundamentals of Neural Networks-Architectures, Algorithms and Applications",* Pearson Education, 2011.

REFERENCES

1. James. A. Freeman and David.M.Skapura, "*Neural Networks Algorithms, Applications and Programming Techniques* ",Pearson Education, Sixth Reprint, 2011.
2. Simon Haykin, "*Neural Networks and Learning Methods",* PHI Learning Pvt. Ltd., 2011.
3. James A. Anderson, *"An Introduction to Neural Networks",* PHI Learning Pvt. Ltd., 2011.
4. Martin T. Hagan, Howard B. Demuth, Mark Beale, *"Neural Network Design",* Cengage Learning, Fourth Indian Reprint, 2010.
5. Bart Kosko, *"Neural Networks and Fuzzy Systems-A Dynamical Approach to Machine Intelligence",* PHI Learning Pvt. Ltd., 2010.
6. http://www.cs.stir.ac.uk/~lss/NNIntro/InvSlides.html
7. http://www.willamette.edu/~gorr/classes/cs449/intro.html
8. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-867-machine-learning
9. http://ocw.mit.edu/courses/sloan-school-of-management/15-062-data-mining-spring-2003/lecture-notes/NeuralNet2002.pdf

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<tr><th colspan="13">CS1104 NEURAL NETWORKS</th></tr>
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<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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CS1105	FUZZY LOGIC	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

This course presents a detailed knowledge of Fuzzy logic principles and applications.

INSTRUCTIONAL OBJECTIVES

1.	To understand the concepts of Crisp & Fuzzy sets, Fuzzy Relation
2.	To understand the principles of Uncertainty and its measures
3.	To study the applications of Fuzzy Logic

UNIT I - CRISP SETS AND FUZZY SETS (9 hours)

Crisp sets: overview – Notion of Fuzzy sets- Basic concepts- Classical Logic- Fuzzy Logic – Operations on Fuzzy sets- Fuzzy complement- Fuzzy Union – Fuzzy Intersection- Combinations of operations- General Aggregation operations

UNIT II - FUZZY RELATIONS (9 hours)

Crisp and Fuzzy relations- Binary relations – Binary relations on a single set – Equivalence and similarity relations- compatibility or tolerance relations – orderings – morphisms – Fuzzy relation equations.

UNIT III - FUZZY MEASURES (9 hours)

Fuzzy measures- Belief and Plausibility measures- Probability measures – Possibility and Necessity measures- Relationship among classes of Fuzzy measures.

UNIT IV - UNCERTAINTY AND INFORMATION (9hours)

Types of Uncertainty – Measures of Fuzziness – Classical measures of Uncertainty – Measures of Dissonance – Measures of confusion – Measures of Non-specificity – Uncertainty and information – Information and complexity – principles of uncertainty and information.

UNIT V - APPLICATIONS (9 hours)

Applications in Natural, life and social sciences- Engineering – Medicine – Management and Decision making – computer Science- Systems Science – other applications

TEXT BOOK

1. George J. Klir& Tina Folger A., "*Fuzzy sets Uncertainty & Information",* PHI Learning Pvt.Ltd,2010

REFERENCES

1 Timothy J.Ross, *''Fuzzy Logic with Engineering applications*",John Wiley and Sons, 2010

2. Jang J.S.R. Sun C.T., Mizutani E.,"*Neuro fuzzy and Soft Computing*", PHI Learning Pvt. Ltd., 2012

CS1105 FUZZY LOGIC												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x		x								x
2.	Mapping of instructional objectives with student outcome	1,2,3		4								4
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
										x		
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1106	COLOR IMAGE PROCESSING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

To study the significance of vector-valued color image processing and to know about the various color image processing technologies

INSTRUCTIONAL OBJECTIVES

1.	To learn the fundamentals and requirements for color image processing
2.	To learn the techniques for color images such as edge detection, image enhancement and segmentation
3.	To learn the three-dimensional scene analysis using color information
4.	To study color-based tracking with PTZ cameras
5.	To do a case study on applications of color image processing

UNIT I -INTRODUCTION (8 hours)

Terminology in Color Image Processing-Color Image Analysis in Practical Use-Eye and Color .

Color Spaces and Color distances: Standard Color System-Physics and Techniques-Based Color Spaces-Uniform Color spaces-Perception-Based Color Spaces-Color difference formulas and Color Ordering Systems.

UNIT II - COLOR IMAGE ENHANCEMENT AND EDGE DETECTION (9 hours)

Color Image Formation-Color Image Enhancement: False colors and Pseudocolors-Enhancement of Real Color Images-Noise Removal in Color images-Contrast Enhancement in Color images.- **Edge detection in color images:** Vector-Valued Techniques-Results of Color Image Operators-Classification of Edges-Color Harris Operator

UNIT III-COLOR IMAGE SEGMENTATION AND COLOR-BASED TRACKING (10 hours)

Color Image Segmentation: Pixel-Based Segmentation-Area-Based Segmentation-Edge-Based Segmentation and Physics Based Segmentation, Comparison of Segmentation Processes

Color-Based Tracking: Methods for Tracking-Technical aspects of Tracking-Color Active Shape Models

UNIT IV - SECURE COLOR IMAGING AND COLOR FEATURE DETECTION (9 hours)

***ecure Color Imaging*:** Introduction- Visual Secret Sharing of Color Images-Perfect Reconstruction-Based Image Secret Sharing- Cost-Effective Private-Key Solution

Color Feature Detection: Introduction- Color Invariance- Combining Derivatives-Fusion of Color Derivatives- Boosting Color Saliency- Classification of Color Structures

UNIT V-COLOR IMAGE PROCESSING APPLICATIONS (9 hours)

Case Studies*:* Face Detection Using Skin Locus and Refining Stages-Automated Identification of Diabetic Retinal Exudates in Digital Color Images- Real time Color Imaging Systems- Color Based Video Shot Boundary Detection- Use of Color Features in Automatic Video Surveillance Systems

TEXT BOOKS

1. Andreas Koschan, MongiAbidi, *"Digital Color Image Processing",* John Wiley & Sons, INC. Publication, First Edition, 2008. (Chapters: 1,2,3,5,6,7,11)

2. RastislavLukac and Konstantinos Plataniotis N., *"Color Image Processing: Methods and Applications",* CRC Press, Taylor and Francis Group, Second Edition, 2008. (Chapters: 8,9,12,14,15,23,24)

REFERENCES

1. Stephen J. Sangwine, Robin E. N. Horne, "*The Color Image Processing Handbook",* Chapman and Hall, First Edition, 1998.
2. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, *"Digital Image Processing Using MATLAB",* Tata McGraw Hill Pvt. Ltd., Third Edition, 2011.
3. Rafael C. Gonzales, Richard E. Woods, *"Digital Image Processing", Pearson Education",* Third Edition, 2010.
4. http://ssip2003.info.uvt.ro/lectures/hanbury/colour_image_processing.ppt
5. http://elearning.najah.edu/OldData/pdfs

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<tr><th colspan="14">CS1106 COLOR IMAGE PROCESSING</th></tr>
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GROUP I - SIXTH SEMESTER ELECTIVES

CS1107	**KNOWLEDGE BASED DECISION SUPPORT SYSTEMS**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE	
The purpose of this course is to impart knowledge on decision support systems and implementation	
INSTRUCTIONAL OBJECTIVES	
1.	To familiarize decision support systems and their characteristics
2.	To learn the technologies related to decision support systems
3.	To study about Intelligent DSS and applications of DSS

UNIT I - DECISION MAKING AND COMPUTERIZED SUPPORT (9 hours)

Management Support Systems: An Overview - Decision Making, Systems, Modeling, and Support.

UNIT II - DECISION SUPPORT SYSTEMS (9 hours)

Decision Support Systems: An Overview - Modeling and Analysis - Business Intelligence: Data Warehousing, Data Acquisition, Data Mining, Business Analysis, and Visualization - Decision Support System Development.

UNIT III - COLLABORATION, COMMUNICATION, ENTERPRISE DECISION SUPPORT SYSTEMS, AND KNOWLEDGE MANAGEMENT (9 hours)

Collaborative Computing Technologies: Group Support Systems -Enterprise Information Systems - knowledge Management.

UNIT IV-INTELLIGENT DECISION SUPPORT SYSTEMS (9 hours)

Artificial Intelligence and Expert Systems: Knowledge-Based System - Knowledge Acquisition, Representation, and Reasoning - Advanced Intelligent Systems - Intelligent Systems over the Internet.

UNIT V - IMPLEMENTING IN THE E-BUSINESS ERA (9 hours)

Electronic Commerce - Integration, Impacts, and the Future of the Management-Support Systems.

TEXT BOOK

1. Efraim Turban, Jay Aronson E., Ting-Peng Liang, "*Decision Support Systems and Intelligent Systems*", 7th Edition, Pearson Education, 2006.

REFERENCES

1. George M .Marakas , "*Decision Support Systems in the 21st century*",2nd Edition, PHI, 2009.
2. Janakiraman V.S., Sarukesi K., " *Decision Support Systems*", PHI, 2009.

CS1107 KNOWLEDGE BASED DECISION SUPPORT SYSTEMS												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X		X								X
2.	Mapping of instructional objectives with student outcome	1,2,3		3								3
3.	Category	General (G)		Basic Sciences(B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
										x		
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1108	SPEECH RECOGNITION	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

The purpose of this course is to provide a comprehensive knowledge in the domain of speech recognition.

INSTRUCTIONAL OBJECTIVES

1.	To understand techniques used for building speech recognition systems
2.	To understand the components, issues and approaches for constructing spoken dialogue systems
3.	To learn the syntax and semantics of speech recognition.
4.	To have an awareness on the current state-of-the-art in speech recognition

UNIT I - INTRODUCTION (9 hours)

Introduction-Regular Expressions and automata-Words and transducers-N-grams-Part of speech tagging-Hidden Markov and Entropy models.

UNIT II - SPEECH RECOGNITION (9 hours)

Speech-Phonetics-Speech synthesis-Automatic speech recognition-Speech recognition advanced topics-Computational Phonology

UNIT III - SPEECH PARSING (9 hours)

Formal grammar of English-Syntactic parsing-Statistical parsing-Features and Unification-Language and complexity

UNIT IV - SEMANTICS OF SPEECH RECOGNITION (9 hours)

Semantics and Pragmatics-The representation of meaning-Computational semantics-Lexical semantics- Computational lexical semantics-Computational discourse

UNIT V - INFORMATION EXTRACTION (9 hours)

Information extraction-Question answering summarization-Dialogue and conversational agents-Machine translation

TEXT BOOK

1. Daniel Jurafsky and James Martin "*Speech and Language Processing*", 2nd edition, Prentice- Hall, 2008.

REFERENCES

1. Xuedong Huang, Alex Acero and Hsiao-Wuen Hon, "*Spoken Language Processing*", Prentice- Hall, May 2001.
2. Paul Taylor*,"Text-to-Speech Synthesis",* Cambridge University Press, February 2009.

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CS1109	BIOMETRICS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

To study various Biometric systems, performance and the issues related to the security.

INSTRUCTIONAL OBJECTIVES

1.	To understand fundamentals of biometrics
2.	To gain a broader knowledge and understand the different Biometric techniques
3.	To learn about biometrics for network security

UNIT I - BIOMETRICS FUNDAMENTALS (9 hours)

Introduction – Benefits of biometric security – Verification and identification – Basic working of biometric matching – Accuracy – False match rate – False non-match rate – Failure to enroll rate – Derived metrics – Layered biometric solutions.

UNIT II - LEADING BIOMETRIC TECHNOLOGIES I (9 hours)

Finger scan – Features – Components – Operation (Steps) – Competing finger Scan technologies – Strength and weakness. Types of algorithms used for interpretation. Facial Scan - Features – Components – Operation (Steps) – Competing facial Scan technologies – Strength and weakness.

UNIT III - LEADING BIOMETRIC TECHNOLOGIES –II (9 hours)

Iris Scan - Features – Components – Operation (Steps) – Competing iris Scan technologies – Strength and weakness. Voice Scan - Features – Components – Operation (Steps) – Competing voice Scan (facial) technologies – Strength and weakness.

UNIT IV - ESOTERIC BIOMETRICS (9 hours)

Esoteric Biometrics – Vein Pattern-Facial Thermography-DNA-Sweat pores – Hand grip-Fingernail bed-Body odour-Ear-Gait-Skin Luminescence-Brain Wave pattern-Footprint and Foot dynamics-Multimodal Biometrics -The future.

UNIT V - BIOMETRICS FOR NETWORK SECURITY (9 hours)

Biometrics Application –Privacy risks of Biometrics-Biometric standards – (BioAPI , BAPI) .Biometrics for Network Security- Statistical measures of Biometrics-Biometric Transactions.

TEXT BOOK

1. Samir Nanavati, Michael Thieme, Raj Nanavati "*Biometrics – Identity Verification in a Networked World*", WILEY- Dream Tech Edition 2009.(UNIT 1,2,3,4,)
2. Paul Reid "*Biometrics for Network Security*", Pearson Education.2009. (UNIT – V)

REFERENCES

1. John D. Woodward, Jr. Wiley Dreamtech *Biometrics- The Ultimate Reference*-, Reprint 2009.

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SEMESTER VII

CS1110	**NATURE INSPIRED COMPUTING TECHNIQUES**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course provides a way to understand the concepts of Nature Inspired Computing Techniques and Algorithms

INSTRUCTIONAL OBJECTIVES

1. To understand the fundamentals of nature inspired techniques which influence computing
2. To study the Swarm Intelligence and Immuno computing techniques
3. To familiarize the DNA Computing and Quantum Computing techniques

UNIT I – INTRODUCTION **(8 hours)**

From Nature to Nature Computing - Philosophy- Three Branches - A Brief Overview - Conceptualization: Natural Phenomena, Models and Metaphores- General Concepts- Individuals, Entities and agents - Parallelism and Distributivity- Interactivity- Adaptation- Feedback-Self-Organization-Complexity, Emergence and Reductionism- Bottom-up Vs Top-Down- Determination, Chaos and Fractals.

UNIT II - COMPUTING INSPIRED BY NATURE **(9 hours)**

Evolutionary Computing : Problem solving - Hill Climbing and Simulated Annealing- Evolutionary Biology- Darwin's Dangerous Idea- Genetics Principles- Classical Example- Standard Evolutionary Algorithm - Genetic Algorithms- Reproduction-Crossover -Mutation- Applications - Evolution Strategies- Evolutionary Programming- Genetic Programming

UNIT III - SWARM INTELLIGENCE **(9 hours)**

Introduction - Ant Colonies- Ant Foraging Behaviour - Ant Colony Optimization- S-ACO and scope of ACO algorithms- Clustering Dead bodies and Larval Sorting- Ant Colony Algorithm (ACA) - Swarm Robotics- Foraging for food - Clustering of objects - Collective Prey retrieval- Scope of Swarm Robotics- Social Adaptation of Knowledge- Particle Swarm- Particle Swarm Optimization (PSO)

UNIT IV - IMMUNOCOMPUTING (9 Hours)

Introduction- Immune System- Physiology and main components - Pattern Recognition and Binding- Adaptive Immune Respomse- Self/Nonself discrimination - Immune Network Theory- Danger Theory- Artificial Immune Systems- Representation- Evaluation Interaction- Immune Algorithms- Bone Marrow Models- Negative Selection Algorithms- Binary and Real Valued negative selection algorithms- Clonal Selection and Affinity Maturation- Forest's Algorithm- CLONALG - Artificial Immune Networks- Continuous and Discrete Immune Networks.

UNIT V - COMPUTING WITH NEW NATURAL MATERIALS (10 Hours)

DNA Computing: Motivation- DNA Molecule- Manipulating DNA - Filtering Models- Adleman's experiment- Lipton's Solution to SAT Problem- Test tube programming language- Formal Models- Sticker Systems- Splicing Systems- Insertion/Deletion Systems - PAM Model- Universal DNA Computers- Scope of DNA Computing- From Classical to DNA Computing

Quantum Computing: Motivation- Basic Concepts from Quatum Theory - From Classical to Quantum Mechanics- Wave- Particle Duality- Uncertainty Principle- Principles from Quantum Mechanics: DIRAC Notation- Quantum Superposition- Tensor Products- Entanglement- Evolution-Measurement- No-Cloning theorem- Quatum Information: Bits and Qubits - Multiple bits and Qubits- Gates - Quantum Circuits- Quatum Parallelism- Quantum Algorithms

TEXT BOOK

1. Leandro Nunes de Castro, " *Fundamentals of Natural Computing, Basic Concepts, Algorithms and Applications*", Chapman & Hall/ CRC, Taylor and Francis Group, 2007

REFERENCES

1. Floreano D. and Mattiussi C., "*Bio-Inspired Artificial Intelligence: Theories, Methods, and Technologies*", MIT Press, Cambridge, MA, 2008.
2. Albert Y.Zomaya, "*Handbook of Nature-Inspired and Innovative Computing*", Springer, 2006.
3. Marco Dorrigo, Thomas Stutzle," *Ant Colony Optimization*", PHI,2005

CS1110 NATURE INSPIRED COMPUTING TECHNIQUES												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	J	k
		x		**x**								
2.	Mapping of instructional objectives with student outcome	1,2,3										
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
										x		
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1111	**GENETIC ALGORITHMS & MACHINE LEARNING**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course gives a sufficient understanding of the concepts of Genetic algorithm and helps to identify the potential utilization of the GA.

INSTRUCTIONAL OBJECTIVES

1.	To be familiar with the basic concept of GA and machine learning
2.	To learn and analyze the mathematical foundations for Genetic algorithm
3.	To study the various GA operators and their utilization
4.	To study and develop applications based on Genetic Algorithms
5.	To understand the genetic based machine learning and applications

UNIT I - INTRODUCTION TO GENETIC ALGORITHM AND MACHINE LEARNING **(9 hours)**

Robustness of Traditional Optimization and Search methods – Goals of optimization-GA versus Traditional methods – Simple GA; Machine learning-explanation-machine learning Vs artificial intelligence-supervised and unsupervised machine learning-examples of machine learning.

UNIT II - MATHEMATICAL FOUNDATIONS OF GENETIC ALGORITHM (9 hours)

The fundamental theorem - Schema processing at work. – The 2-armed & k-armed Bandit problem. –The building Block Hypothesis. – Minimal deceptive problem.

UNIT III - GA OPERATORS (9 hours)

Data structures – Reproduction- Roulette-wheel Selection – Boltzmann Selection – Tournament

Selection-Rank Selection – Steady –state selection –Crossover &mutation – Mapping objective functions to fitness forum. – Fitness scaling.

UNIT IV - APPLICATIONS OF GA (9 hours)

The rise of GA – GA application of Historical Interaction. – Dejung & Function optimization –

Current applications of GA - Advanced operators & techniques in genetic search: Dominance,

Diploidy & abeyance.

UNIT V - APPLICATIONS OF GENETICS-BASED MACHINE LEARNING (9 hours)

The Rise of GBML – Learning classifier system--Development of CS-1, the first classifier system. – Smitch's Poker player –GBML for sub problems of learning--Other Early GBML efforts –Current Applications.

TEXT BOOK

1. David E. Gold Berg, *"Genetic Algorithms in Search, Optimization & Machine Learning"*, Pearson Education, 2013.

REFERENCES

1. Rajasekaran S., Vijayalakshmi Pai G.A., *" Neural Networks, Fuzzy Logic and Genetic Algorithms "*, PHI, 2003.
2. Kalyanmoy Deb, *"Optimization for Engineering Design, algorithms and examples"*, PHI 1995.
3. http://www.cs.bris.ac.uk/~kovacs/publications/gbml-survey/
4. http://books.google.co.in/books?id=HDg7wCP_bmUC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false
5. http://www.sigevo.org/gecco-2012/organizers-tracks.html#gbml
6. http://www.slideshare.net/prmahalingam/gbml/download

CS1111 GENETIC ALGORITHMS & MACHINE LEARNING												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x										x
2.	Mapping of instructional objectives with student outcome	1,2, 3,4										5
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
						x				x		
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1112	ROBOTICS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

To study the concepts relevant in designing robots controlled by microcontrollers.

INSTRUCTIONAL OBJECTIVES

1.	To study microcontroller operations for robotics.
2.	To study how different interfaces are actually implemented in a microcontroller.
3.	To learn how Microchip PIC micro PIC16F627 can be erased and reprogrammed
4.	To learn how different sensors, outputs, and peripherals can be wired to a microcontroller to work cooperatively and create a high-level control program.
5.	To design robots in a real time environment.

UNIT I - MICROCONTROLLER IN ROBOTS (9 Hours)

Support components - Memory and device programming – Interrupts - Built in peripherals - Interfacing the controller to robots.

UNIT II - SOFTWARE DEVELOPMENT (9 Hours)

Source files, object files, libraries, linkers and hex files – Assemblers – Interpreters – Compilers - Simulators and Emulators - Integrated development environments.

UNIT III - THE MICROCHIP PIC micro (R) MICROCONTROLLER (7 Hours)

Different PIC micro MCU devices and features - Application development tools - Basic circuit requirements - The PIC16F627 - EL *cheapo* PIC micro programmer circuit.

UNIT IV - THE MICROCONTROLLER CONNECTIONS (11 Hours)

Hardware interface sequencing- Robot C programming template – Protyping with the PIC micro microcontroller – Intercomputer communications- RS232 - HyperTerminal RS 232 terminal emulator- RS 232 interface example between PC and PIC micro MCU – Bidirectional synchronous interfaces – Output devices – LEDS – PWM power level control – Sensors – Whiskers for physical object detection – iR collision detection sensors- IR remote controls- Ultrasonic distance measurement- Light level sensors- Sound sensors- Odometry for motor control and navigation – Radio control servos.

UNIT V - BRINGING ROBOTS TO LIFE (9 Hours)

Real time operating system (RTOS) – Example application running in an RTOS – State machines – Randomly moving a robot application with IR remote control - Behavioral programming - Neural networks and Artificial intelligence.

TEXT BOOK

1. Myke Predko, *"Programming Robot Controllers"* – McGrawHill, 1st edition, 2003.

REFERENCES

1. Michael slater, "*Microprocessor – based design: A comprehensive Guide to Effective Hardware Design"*, Prentice Hall, 1989.
2. Myke Predko, *"Programming and customizing the 8051- micro-controller"*, Tata McGraw-Hill, New Delhi, 2000.
3. Kenneth J. Ayala, "*The 8051 micro-controller architecture, programming and applications",* Penram International publishers, Mumbai, 1996.
4. Murphy Robin R,*" Introduction to AI Robotics"*, MIT Press, 2000.
5. Siegwart R and Nourbakhsh I.R, "*Introduction to Autonomous mobile Robots"*, Prentice Hall India, 2005.

6. Roland Siegwart, Illah R. Nourbakhsh, *"Introduction to Autonomous mobile Robots"*, MIT Press, 2005.
7. http://www.ifi.unizh.ch/groups/ailab/links/robotic.html
8. http://www.robotics.com/robots.html
9. http://prime.jsc.nasa.gov/ROV/olinks.html
10. http://www.idi.ntnu.no/grupper/ai/eval/lego_links.html

CS1112 ROBOTICS												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	B	c	d	e	f	g	h	i	j	k
		x		x								
2.	Mapping of instructional objectives with student outcome	1,2,4		3,4,5								
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
		--		x		x		--		--		
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1113	HUMAN INTERFACE SYSTEM DESIGN	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

This course provides a basic understanding of human interface design and principles.

INSTRUCTIONAL OBJECTIVES

1.	To study the fundamentals for interface systems design
2.	To understand about interaction devices and windows strategies
3.	To learn about managing virtual environments

UNIT I - INTRODUCTION (9 Hours)

Usability of Interactive systems: Usability Goals and Measures – Usability Motivations – Universal Usability – Guidelines, Principles, and Theories: Guidelines – Principles – Theories.

UNIT II - DEVELOPMENT PROCESS (9 Hours)

Managing Design Process: Introduction – Organizational Design to Support Usability – Four Pillars of Design – Development Methodologies – Ethnographic Observation – Participatory Design – Scenario Development – Evaluating Interface Design: Expert Reviews – Usability Testing and Laboratories – Survey Instruments – Acceptance Test – Evaluation During Active Use – Controlled Psychologically Oriented Experiments.

UNIT III - MANIPULATION AND VIRTUAL ENVIRONMENTS (9 Hours)

Introduction-Examples of Direct Manipulation Systems –Discussion of Direct Manipulation-3D Interfaces – Teleoperation – Virtual Augmented Reality – Menu Selection, Form Fill-in, and Dialog Boxes: Task-Related Menu organization – Single Menus – Combinations of Multiple Menus – Form Fill-in, Dialog Boxes, and Alternatives – Command and Natural Languages: Command –Organization Functionality, Strategies, and Structure – Naming and Abbreviations – Natural Language in Computing.

UNIT IV - INTERACTION DEVICES (9 Hours)

Introduction – Keyboards and Keypads – Pointing Devices – Speech and Auditory Interfaces – Small and Large Displays – Collaboration and Social Media Participation: Goals of Collaboration and Participation – Asynchronous Distributed Interfaces – Synchronous Distributed Interfaces – Face to Face Interfaces - Balancing Function and Fashion: Error Messages – Nonanthropomorphic Design – Display Design –Web Page Design – Window Design – Color.

UNIT V - USER DOCUMENTATION AND INFORMATION SEARCH (9 Hours)

Introduction- Online Versus Paper Documentation – Reading from Paper Versus from Displays – Shaping the Content of the Documentation – Accessing the Documentation – Online Tutorials and Animated Demonstrations – Online Communities for User Assistance – The Development Process- Information Search: Searching in Textual Documents and Database Querying – Multimedia Document Searches – Advanced Filtering and Search Interfaces – Information Visualization: Data Type by Task Taxonomy – Challenges for Information Visualization.

TEXT BOOK

1. Ben Shneiderman , Plaisant, Cohen, Jacobs , "*Designing the User Interface"*, 5th Edition, Addison-Wesley, 2011.

REFERENCES

1. Barfied, Lon , *"The User Interface : Concepts and Design*", Addison – Wesley,2004.
2. Wilbert O. Galiz , *"The Essential guide to User Interface Design"*, Wiley Dreamtech, 2010.
3. Alan Cooper, *" The Essentials of User Interface Design",* Wiley India Pvt. Ltd, 2010.
4. Alan Dix et al, " *Human - Computer Interaction* ", Prentice Hall, 1993.

CS1113 HUMAN INTERFACE SYSTEM DESIGN													
Course designed by		Department of Computer Science and Engineering											
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k	
		x		x									
2.	Mapping of instructional objectives with student outcome	1		1,2,3									
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)			
										x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering			
				--		x		--		--			
5.	Approval	23rd meeting of Academic Council, May 2013											

CS1114	PATTERN RECOGNITION TECHNIQUES	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	MA1006				

PURPOSE

To study the Pattern Recognition techniques and its applications.

INSTRUCTIONAL OBJECTIVES

1.	To learn the basics of Pattern Classifier
2.	To learn Feature extraction, Classification and Recognition techniques
3.	To learn recent advances in pattern classification

UNIT I - PATTERN RECOGNITION OVERVIEW (7 hours)

Pattern recognition, Classification and Description- Patterns and feature Extraction with Examples—Training and Learning in PR systems- Pattern

recognition Approaches - Statistical pattern recognition – Syntactic pattern recognition – Neural pattern recognition – other approaches to PR

UNIT II - STATISTICAL PATTERN RECOGNITION (11 hours)

Introduction to statistical Pattern Recognition - supervised Learning using Parametric and Non Parametric Approaches. Linear Discriminant Functions Introduction—Discrete and binary Classification problems—Techniques to directly Obtain Linear Classifiers

UNIT III - SYNTACTIC PATTERN RECOGNITION (9 hours)

Overview of Syntactic Pattern Recognition— Syntactic recognition via parsing and otherGrammars–Graphical Approaches to syntactic pattern recognition—learning via grammatical Inference.

UNIT IV - NEURAL PATTERN RECOGNITION (9 hours)

Introduction to Neural networks—Feedforward Networks and training by Back Propagation—Content Addressable Memory Approaches and Unsupervised Learning in Neural PR.

UNIT V - APPLICATIONS AND CASE STUDIES (9 hours)

Web Applications – Audio and Video Analysis – Medical Applications – Image processing –Financial Applications - Related case studies

TEXT BOOK

1. Robert Schalkoff, *"pattern Recognition: statistical, structural and neural approaches*", JohnWiley & sons , Inc, 2007.

REFERENCES

1. Chen C H, *"Handbook of pattern recognition and computer vision"*, 4th edition world scientific co, Pvt. Ltd., 2010
2. Christoper M Bishop, "*Neural Network for pattern recognition"*, Oxford university press, 2008
3. Earl Gose, Richard Johnsonbaugh, Steve Jost, *"Pattern Recognition and Image Analysis"*, Prentice Hall of India, Pvt Ltd, 1996.
4. R.O. Duda, P.E. Hart & D.G Stork, *"Pattern Classification 2nd Edition"*, J.Wiley Inc, 2001.
5. Geoff Dougherty, *"Pattern Recognition and classification: An introduction"*, Springer 2013.

CS1114 PATTERN RECOGNITION TECHNIQUES													
Course designed by		Department of Computer Science and Engineering											
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k	
		x											
2.	Mapping of instructional objectives with student outcome	1,2,3											
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)			
										x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering			
		--		--		--		--		x			
5.	Approval	23rd meeting of Academic Council, May 2013											

CS1115	CELLULAR AUTOMATA	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1013				

PURPOSE

This course provides a comprehensive understanding of Cellular Automata theory and its applications

INSTRUCTIONAL OBJECTIVES

1.	To understand how surprisingly simple rules can lead to phenomenally complex and beautiful behaviors.
2.	To understand universal computation from a mathematical point of view, and how very simple cellular automata rules can reproduce computers as powerful as any desktop or super computer.
3.	To understand the close theoretical relationship between computer science and other disciplines, particularly mathematics and physics.
4.	To understand applications of theoretical computer science to physical and social sciences, particularly sociology, biology (including medical applications), and physics (including fluid flow).

UNIT I - INTRODUCTION **(9 hours)**

Introduction- Short History - CA & Computation - Why Study CA? - CA as Powerful Computation Engines - CA as Discrete Dynamical System Simulators - Mathematical Preliminaries -Set Theory - Information Theory - Graph Theory -

Groups, Rings and Fields - Abstract Automata -One-dimensional CA -Two-dimensional CA

UNIT II - PHENOMENOLOGICAL STUDIES OF CELLULAR AUTOMATA (9 hours)

Phenomenological Studies of Generic CA- One-dimensional Systems -Space-Time Patterns -Behavioral Classes -Difference Patterns Blocking Transformations- General Properties of Elementary CA -Local Properties -Global Properties - A Small Sampling of Rules - The k=2, r = l rule R22: - The k=2, r-1 rule R30: Just-Critical-Like Behavior-Particle-Like Behavior - Reversible Rules - Parameter zing the Space of CA Rules

UNIT III - CELLULAR AUTOMATA AND LANGUAGE THEORY (9 hours)

Cellular Automata and Language Theory- Formal Language Theory: A Primer - Regular Languages/ Finite Automata - Context-Free Languages/ Push-Down Automata - CA Rule + Finite State Transition Graph - Regular Language Complexity - Entropy- Power Spectra of Regular Languages - Numerical Estimates - Li's Algorithm for Generating Power Spectra - Reversible Computation - Universal Logic Gates - The Billiard Ball Model.

UNIT IV - PROBABILISTIC CELLULAR AUTOMATA (9 hours)

Probabilistic CA - Critical Phenomena: A Heuristic Discussion - Boltzman Distribution - Free Energy - Stochastic Dynamics - Monte Carlo Dynamics - Critical Exponents - Ising Model-General-One Dimensional Ising Model

UNIT V - QUANTUM CELLULAR AUTOMATA (9 hours)

Quantum Cellular Automata - General Properties - A Conservation Law –k=2 systems=3 systems-General properties- Reaction-Diffusion Systems - The Belousov-Zhabotinskii Reaction - Greenberg-Hastings Model - Hodgepodge Rule - Applications to Immunology - Random Boolean Networks - Overview of the Dynamics of (N , K) Nets.

TEXT BOOKS

1. Andrew Ilachinski **"***Cellular Automata A Discrete Universe*" - World scientific publishing company private limited, 2001. (Unit 1,2,3).
2. Andrew Adamatzky *"Game of Life Cellular Automata"*- Springer; 1st Edition, 2010. (Unit 4,5)

CS1115 CELLULAR AUTOMATA												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x										
2.	Mapping of instructional objectives with student outcome	1,2, 3,4										
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
				--		x		--		--		
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1116	VISUAL PROGRAMMING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1005				

PURPOSE

This course gives a strong foundation to the Visual Programming concepts

INSTRUCTIONAL OBJECTIVES

1.	To Understand the Basics of Windows Programming
2.	To develop applications using Visual Basic, Visual C++ and Visual JAVA Programming
3.	To develop applications using Visual C# Programming

UNIT I - INTRODUCTION TO WINDOWS PROGRAMMING (8 hours)

Introduction to Windows environment – A simple windows program – Windows and Messages –The Window procedure – Message processing – Text output – Painting and repainting – Introduction to GDI and Device context – Basic drawing – Working with Menus and Mouse -Child Window controls

UNIT II - VISUAL BASIC PROGRAMMING (10 hours)

Visual Basic Applications – Creating and using Controls – Menus and Dialogs– Programming fundamentals – Objects and instances – Debugging – Responding to mouse events– Creating graphics for application – Displaying and printing information– File system controls - Processing files – Accessing databases with the data controls and grid control.

UNIT III - VISUAL C++ PROGRAMMING (9 hours)

Visual C++ components – Developing simple applications – Microsoft Foundation classes – Controls – Message Handling - Document-view architecture – Dialog based applications – Mouse and keyboard events.

UNIT IV - VISUAL JAVA PROGRAMMING (9 hours)

Java basics – Java classes – Object references – Inheritance – Exception handling - File I/O – Applets and HTML – Animation techniques – Animating images.

UNIT V - VISUAL C# PROGRAMMING (9 hours)

Introduction to .NET Framework - Overview of C# - Programming fundamentals – Defining Classes – Defining Class Members – Collections, Comparisons and Conversions – Generics – Delegates and events .

TEXT BOOKS

1. Charles Petzold, "*Windows Programming*", Microsoft Press, 1998. (Unit – I) (Chapters 1- 5, 7, 9, 10)
2. Michael Halvorson, "*Microsoft Visual Basic 2010 Step by Step",* Microsoft Press, 2010. (Unit – II) (Chapters 1- 10, 13,15 – 19)
3. David J.Kruglinski, George Shepherd, Scot Wingo, *"Programming Microsoft Visual C++"*, Microsoft Press ,2006(Unit – III) (Chapters 1-7, 12 -13,17-18)
4. Deitel H.M.and Deitel P.J., "*Java how to program",* Prentice Hall, Eighth Edition (Unit – IV) (Chapters 2-3, 8- 9,11)
5. Jamie Jaworski, "*Java Unleashed*", SAMS Techmedia Publication, 1999. (Unit – IV) (Chapter 22)
6. Karli Watson, Christian Nagel,Jacob Hammer Pedersen,Jon Reid, Morgan Skinner, *"Beginning Viual C# 2010",* Wiley India Pvt.Ltd., 2010. (Unit-V) (Chapters 1-7, 9-13)

REFERENCES

1. Evangelous Petroutsos, "*Mastering Microsoft Visual Basic 2010*", Wiley India Pvt.Ltd., 2010.
2. Ivor Horton, "*Beginning Visual C++ 2010*", Wiley India Pvt.Ltd., 2010.
3. Kate Gregory '*Using Visual C++",* Prentice Hall of India Pvt., Ltd., 1999.
4. Gary Cornell, "*Visual Basic 6 from the Ground Up*", Tata McGraw Hill, 2005.
5. Deitel H.M.and Deitel P.J., "*Java how to program with an Introduction to Visual*. *J++"*, Prentice Hall, 1998.

6. John Sharp, "*Microsoft Visual C# 2010 step by step*", Microsoft Press, 2011.
7. Balagurusamy E, "*Programming in C#* ", Tata McGraw Hill, 2010 .

CS1116 VISUAL PROGRAMMING												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objectives with student outcome	2,3	1,2,3									2,3
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
		--		--		x		--		--		
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1117	VIRTUAL REALITY	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

This course provides a detailed understanding of the concepts of Virtual Reality and its application.

INSTRUCTIONAL OBJECTIVES

1.	To understand geometric modeling and Virtual environment.
2.	To study about Virtual Hardwares and Softwares
3.	To develop Virtual Reality applications

UNIT I - INTRODUCTION TO VIRTUAL REALITY (9 hours)

Virtual Reality & Virtual Environment : Introduction – Computer graphics – Real time computer graphics –Flight Simulation – Virtual environments –requirement – benefits of virtual reality- Historical development of VR : Introduction – Scientific Landmark -3D Computer Graphics :Introduction – The Virtual world space – positioning the virtual observer – the perspective projection – human vision – stereo perspective projection – 3D clipping – Colour theory – Simple 3D modeling

– Illumination models – Reflection models – Shading algorithms- Radiosity – Hidden Surface Removal – Realism-Stereographic image.

UNIT II - GEOMETRIC MODELLING (9 hours)

Geometric Modeling: Introduction – From 2D to 3D – 3D space curves – 3D boundary representation - Geometrical Transformations: Introduction – Frames of reference – Modeling transformations – Instances –Picking – Flying – Scaling the VE – Collision detection - A Generic VR system: Introduction – The virtual environment – the Computer environment – VR Technology – Model of interaction – VR Systems.

UNIT III - VIRTUAL ENVIRONMENT (9 hours)

Animating the Virtual Environment: Introduction – The dynamics of numbers – Linear and Non-linear interpolation - The animation of objects – linear and non-linear translation - shape & object inbetweening – free from deformation – particle system- Physical Simulation : Introduction – Objects falling in a gravitational field – Rotating wheels – Elastic collisions – projectiles – simple pendulum – springs – Flight dynamics of an aircraft.

UNIT IV-VR HARDWARES & SOFTWARES (9 hours)

Human factors : Introduction – the eye - the ear- the somatic senses - VR Hardware : Introduction – sensor hardware – Head-coupled displays –Acoustic hardware – Integrated VR systems-VR Software: Introduction –Modeling virtual world –Physical simulation- VR toolkits – Introduction to VRML.

UNIT V - VR APPLICATION (9 hours)

Virtual Reality Applications: Introduction – Engineering – Entertainment – Science – Training – The Future: Introduction – Virtual environments – modes of interaction.

TEXT BOOK

1. John Vince, "*Virtual Reality Systems* ", Pearson Education Asia, 2007.

REFERENCES

1. Adams, "*Visualizations of Virtual Reality*", Tata McGraw Hill, 2000.
2. Grigore C. Burdea, Philippe Coiffet , "*Virtual Reality Technology*", Wiley Interscience, 2nd Edition, 2006.
3. William R. Sherman, Alan B. Craig, "*Understanding Virtual Reality: Interface, Application, and Design*", Morgan Kaufmann, 2008.
4. www.vresources.org.
5. www.vrac.iastate.edu.
6. www.w3.org/MarkUp/VRML.

<table>
<tr><th colspan="14">CS1117 VIRTUAL REALITY</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="12">Department of Computer Science and Engineering</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td>2.</td><td>Mapping of instructional objectives with student outcome</td><td>1,2,3</td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">3.</td><td rowspan="2">Category</td><td colspan="2">General (G)</td><td colspan="2">Basic Sciences (B)</td><td colspan="4">Engineering Sciences and Technical Arts (E)</td><td colspan="3">Professional Subjects (P)</td></tr>
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<tr><td rowspan="2">4.</td><td rowspan="2">Broad Area</td><td colspan="2">Core Engineering</td><td colspan="2">Computer Hardware Engineering</td><td colspan="2">Software Engineering</td><td colspan="2">Network Engineering</td><td colspan="3">Knowledge Engineering</td></tr>
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<tr><td>5.</td><td>Approval</td><td colspan="12">23rd meeting of Academic Council, May 2013</td></tr>
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GROUP – II
SEMESTER IV

CS1118	NETWORK SECURITY	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

To introduce various encryption and authentication techniques for network security.

INSTRUCTIONAL OBJECTIVES

1.	To understand the number theory used for network security
2.	To understand the design concept of cryptography and authentication
3.	To understand the design concepts of internet security
4.	To develop experiments on algorithm used for security

UNIT I – CONVENTIONAL AND MODERN ENCRYPTION (10 hours)

Model of network security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher Principles-DES – Strength of DES – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC4 - Differential and linear cryptanalysis – Placement of encryption function – traffic confidentiality.

UNIT II – PUBLIC KEY ENCRYPTION (10 hours)

Number Theory – Prime number – Modular arithmetic – Euclid's algorithm - Fermet's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm – Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography.

UNIT III – AUTHENTICATION (8 hours)

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS.

UNIT IV – SECURITY PRACTICE (9 hours)

Authentication applications – Kerberos – X.509 Authentication services - E-mail security – IP security - Web security

UNIT V – SYSTEM SECURITY **(8 hours)**

Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

TEXT BOOK

1. William Stallings, "*Cryptography & Network Security*", Pearson Education, Fourth Edition 2010.

REFERENCES

1. Charlie Kaufman, Radia Perlman, Mike Speciner, "*Network Security, Private communication in public world*", PHI Second Edition, 2002.
2. Bruce Schneier, Neils Ferguson, "*Practical Cryptography*", Wiley Dreamtech India Pvt Ltd, First Edition, 2003.
3. Douglas R Simson "*Cryptography – Theory and practice*", CRC Press, First Edition, 1995.
4. www.williamstallings.com/Security2e.html
5. www.ocw.mit.edu/OcwWeb/Electrical-Engineering-and-Computer-Science/6857Fall2003/Course Home /index.html

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<tr><th colspan="14">CS1118 NETWORK SECURITY</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="12">Department of Computer Science and Engineering</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td>2.</td><td>Mapping of instructional objectives with student outcome</td><td>1,2, 3,4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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<tr><td rowspan="2">4.</td><td rowspan="2">Broad Area</td><td colspan="2">Core Engineering</td><td colspan="2">Computer Hardware Engineering</td><td colspan="2">Software Engineering</td><td colspan="2">Network Engineering</td><td colspan="3">Knowledge Engineering</td></tr>
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<tr><td>5.</td><td>Approval</td><td colspan="12">23rd meeting of Academic Council, May 2013</td></tr>
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CS1119	OPTICAL NETWORKS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	NIL				

PURPOSE

To introduce the concepts of Optical Networks and the algorithms related to connectivity. This course also aims to describe packet switching and queuing terminologies and technologies used in optical fiber communication.

INSTRUCTIONAL OBJECTIVES

1.	To understand the concepts of optical communications
2.	To be familiar with packet switching and queuing terminologies Tools
3.	To study the functions wavelength routing networks
4.	To learn about packet switching and access networks
5.	To get familiarized with network design and management

UNIT I - OPTICAL SYSTEM COMPONENTS (9 hours)

Light propagation in optical fibers – Loss & bandwidth, System limitations, Non-Linear effects; Solitons: Optical Network Components – Couplers, Isolators & Circulators, Multiplexers & Filters, Optical Amplifiers, Switches, Wavelength Converters.

UNIT II - OPTICAL NETWORK ARCHITECTURES (9 hours)

Introduction to Optical Networks; SONET / SDH, Metropolitan-Area Networks, Layered Architecture ; Broadcast and Select Networks – Topologies for Broadcast Networks, Media-Access Control Protocols, Test beds for Broadcast & Select WDM; Wavelength Routing Architecture.

UNIT III - WAVELENGTH ROUTING NETWORKS (9 hours)

The optical layer, Node Designs, Optical layer cost tradeoff, Routing and wavelength assignment, Virtual topology design, Wavelength Routing Test beds, Architectural variations.

UNIT IV - PACKET SWITCHING AND ACCESS NETWORKS

(9 hours)

Photonic Packet Switching – OTDM, Multiplexing and De multiplexing, Synchronizations, Broadcast OTDM networks, Switch-based networks; Access Networks – Network Architecture overview, Future Access Networks, Optical Access Network Architectures; and OTDM networks.

UNIT V- NETWORK DESIGN AND MANAGEMENT (9 hours)

Transmission System Engineering – System model, Power penalty - transmitter, receiver, Optical amplifiers, crosstalk, dispersion; Wavelength stabilization ; Overall design considerations; Control and Management – Network management functions, Configuration management, Performance management, Fault management, Optical safety, Service interface.

TEXT BOOK

1. Rajiv Ramaswami and Kumar N. Sivarajan, *"Optical Networks: A Practical Perspective",* Elsevier Publications, Third Edition, 2009.

REFERENCES

1. Ulysees Black, *"Optical networks",* Pearson education, First Edition, 2007.
2. Guptha S.C., *"Optical Fiber Communication and its Applications",* PHI Learning Pvt. Ltd., Second Edition, 2012.
3 Siva Ram Moorthy and Mohan Gurusamy, *"WDM Optical Networks: Concept, Design and Algorithms",* Prentice Hall of India, First Edition, 2002.
5. Green P.E., Jr., *"Fiber Optic Networks",* Prentice Hall, First Edition, 1993.
6. Biswajit Mukherjee, *"Optical communication networks"*–Tata McGraw Hill, First Edition, 1998.

CS1119 OPTICAL NETWORKS													
Course designed by		Department of Computer Science and Engineering											
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k	
		x											
2.	Mapping of instructional objectives with student outcome	1,2, 3,4,5											
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)				
									x				
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering		
									x				
5.	Approval	23rd meeting of Academic Council, May 2013											

CS1120	TCP/IP PRINCIPLES AND ARCHITECTURE	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1006				

PURPOSE

To learn the principles of TCP / IP and its Architecture

INSTRUCTIONAL OBJECTIVES

1.	To understand the basic concepts of TCP/IP Architecture
2.	To learn Network Layer and its applications
3.	To study UDP and TCP applications
4.	To understand Transport Layer Reliability

UNIT I - INTRODUCTION AND UNDERLYING TECHNOLOGIES (9 hours)

Protocols and standards – OSI model – TCP / IP protocol suite – addressing – IP versions – IPv4 and IPv6 - underlying technologies – Case study – developing simple LAN setup using ns-2 simulator

UNIT II - IP ADDRESSES, ROUTING, ARP AND RARP (9 hours)

Introduction - Classful addressing - classless addressing –special addresses - NAT –- ARP – RARP – ICMP –IGMP – Case study – Analyzing the trace file using awk and plot graph using xgraph

UNIT III - IP, UNICAST AND MULTICAST ROUTING PROTOCOLS (9 hours)

IP datagram – Fragmentation – options – checksum – IP Package - Delivery & forwarding of packets - Unicast routing – intra and inter domain routing – distance vector routing (RIP) – link state routing (OSPF) – path vector routing (BGP) – Multicasting and Multicast routing protocols - Case study – Developing a topology using more than two router and analyze the routing

UNIT IV - TCP AND UDP (9 hours)

Introduction to Transport Layer – Services – Protocols. UDP – user datagram – UDP services – UDP package – UDP applications. TCP – segment - flow control – error control – congestion control – state transition diagram – TCP package. SCTP – services – features – Case study – Develop a network, attach various type TCP variant and analyze the trace file

UNIT V - APPLICATION LAYER **(9 hours)**

Introduction - DHCP - TELNET – DNS - FTP - TFTP – SMTP - POP – IMAP – MIME – SNMP – Case study – prepare a client server program using TCP and UDP to transfer a file from one machine to another machine

TEXT BOOK

1. Behrouz A. Forouzam, "*TCP/IP Protocol Suite*", 4th Edition, Tata McGraw Hill, 2010.

REFERENCES

1. Douglas E. Comer, David L. Stevens, "*Internetworking with TCP/IP Volume – II, III*" PHI Learning Private Limited, 3rd Edition, 2009.
2. Richard Stevens W., "*TCP/IP Illustrated, The Protocol-Volume I, II, II"*, Addison-Wesley Pub Co., 2nd Edition, 2011.
3. Dougles E. Comer, "*Internetworking with TCP/IP–Principles, Protocols & Architecture*", Pearson education, 4th Edition, 2000.
4. http://www.rhyshaden.com/ipadd.html
5. http://ckp.made-it.com/ieee8023.html
6. http://en.wikipedia.org/wiki/IEEE_802

CS1120 TCP/IP PRINCIPLES AND ARCHITECTURE												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
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2.	Mapping of instructional objectives with student outcome	1,2, 3,4										
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
								x				
5.	Approval	23rd meeting of Academic Council, May 2013										

SEMESTER V

CS1121	CLOUD COMPUTING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1006				

PURPOSE

This course gives an introduction to cloud computing and its techniques, issues, and its services that will lead to design and development of a simple cloud service.

INSTRUCTIONAL OBJECTIVES

1.	To analyze the components of cloud computing and its business perspective.
2.	To evaluate the various cloud development tools.
3.	To collaborate with real time cloud services.
4.	To analyze the case studies to derive the best practice model to apply when developing and deploying cloud based applications.

UNIT I - CLOUD INTRODUCTION (9 hours)

Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , usage scenarios and Applications , Business models around Cloud – Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus - Open Nebula, CloudSim.

UNIT II - CLOUD SERVICES AND FILE SYSTEM (9 hours)

Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services. Service providers- Google App Engine, Amazon EC2, Microsoft Azure, Sales force. Introduction to MapReduce, GFS, HDFS, Hadoop Framework.

UNIT III - COLLABORATING WITH CLOUD (9 hours)

Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management – Collaborating on Word Processing ,Databases – Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis.

UNIT IV - VIRTUALIZATION FOR CLOUD (9 hours)

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

UNIT V - SECURITY, STANDARDS, AND APPLICATIONS (9 hours)

Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

TEXT BOOKS

1. Bloor R., Kanfman M., Halper F. Judith Hurwitz "*Cloud Computing for Dummies"* (Wiley India Edition),2010 (UNIT-I)
2. John Rittinghouse & James Ransome, "*Cloud Computing Implementation Management and Strategy"*, CRC Press, 2010.(UNIT-II)
3. Antohy T Velte ,Cloud Computing : "*A Practical Approach*", McGraw Hill,2009(UNIT-II- 3 ,11)
4. Michael Miller, Cloud Computing: "*Web-Based Applications That Change the Way You Work and Collaborate Online"*, Que Publishing, August 2008.(UNIT-III)
5. James E Smith, Ravi Nair, "*Virtual Machines*", Morgan Kaufmann Publishers, 2006.(UNIT-IV)
6. http://cloud-standards.org/wiki/index.php?title=Main_Page(UNIT - V)

REFERENCES

1. Haley Beard, "*Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing"*, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008
2. *webpages.iust.ac.ir/hsalimi/.../89.../Cloud%20Common%20standards.ppt*opennebula.org,
3. *www.cloudbus.org/cloudsim/*, http://www.eucalyptus.com/
4. hadoop.apache.org
5. http://hadoop.apache.org/docs/stable/hdfs_design.html
6. http://static.googleusercontent.com/external_content/untrusted_dlcp/research.google.com/en//archive/mapreduce-osdi04.pdf

CS1121 CLOUD COMPUTING												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x		x								x
2.	Mapping of instructional objectives with student outcome	1,2,3		3,4								2
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
									x			
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1122	WIRELESS NETWORKS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1006				

PURPOSE

This course deals with the fundamental concepts of wireless communication systems and networks.

INSTRUCTIONAL OBJECTIVES

1.	To learn the basics of wireless communication and how communication takes place in wireless networks.
2.	To study about cellular communication.
3.	To learn GSM and CDMA technologies
4.	To understand the emerging wireless technologies.

UNIT I - INTRODUCTION TO WIRELESS NETWORKS (9 hours)

Elements of a wireless communication system – signal and noise - the radio – frequency spectrum –Analog modulation schemes -Amplitude modulation – frequency and phase modulation – sampling – pulse code modulation – delta modulation – data compression.

UNIT II - DIGITAL MODULATION AND RADIO PROPAGATION (9 hours)

Digital communication- sampling –pulse code modulation – delta modulation - Frequency shift keying – Phase shift keying – Multiplexing and Multiple access – spread spectrum systems - radio propagation.

UNIT III - PRINCIPLES OF CELLULAR COMMUNICATION AND MULTIPLE ACCESS TECHNIQUES (9 hours)

Cellular terminology - Cell structure and Cluster – Frequency reuse concept – Cluster size and system capacity – method of locating co channel cells – frequency reuse distance – frequency division multiple access – time division multiple access – space division multiple access – code division multiple access.

UNIT IV - GSM AND CDMA DIGITAL CELLULAR STANDARDS (9 hours)

GSM network architecture –GSM signaling protocol architecture – Identifiers in GSM – GSM channels –GSM handoff procedures – Edge technology – wireless local loop – DECT system – GPRS

UNIT V - EMERGING WIRELESS TECHNOLOGIES (9 hours)

IEEE 802.11 system architecture – mobile ad hoc networks – Mobile IP and mobility management – Mobile TCP - wireless sensor networks – RFID technology – Blue tooth – Wi –Fi standards – Wimax standards. – Femtocell network – Push -to –talk technology for SMS.

TEXT BOOKS

1. Roy Blake, *"Wireless communication technology"* CENGAGE Learning , sixth Indian reprint 2010. (Chapter 1,2,3,4,7,14)
2. Singal T.L. , *"Wireless communication"* Tata Mc Graw Hill Education private limited , 2011.**(** chapter 4,8,11,13,14)
3. Dharma Prakash Agrawal , Qing –An Zeng , *" Introduction to wireless and mobile systems"* CENGAGE Learning, first edition 2012.(chapter 16)

REFERENCES

1. Upena Dalal*, "Wireless communication"* Oxford University press, first edition 2009.
2. Kaveh Pahlavan & Prashant Krishnamurthy, *"Wireless Networks"* PHI Learning Private Limited.

CS1122 WIRELESS NETWORKS												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x										
2.	Mapping of instructional objectives with student outcome	1,2, 3,4										

3.	Category	General (G)	Basic Sciences (B)	Engineering Sciences and Technical Arts (E)		Professional Subjects (P)
						x
4.	Broad Area	Core Engineering	Computer Hardware Engineering	Software Engineering	Network Engineering	Knowledge Engineering
					x	
5.	Approval	23rd meeting of Academic Council, May 2013				

	INTERNET SECURITY AND COMPUTER FORENSICS	L	T	P	C
CS1123	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1006				

PURPOSE

This course provides a way to understand Internet Security and different types of Cyber forensic technologies and enable the student to have a foundation in this emerging area.

INSTRUCTIONAL OBJECTIVES

1.	To study the Importance of Firewalls and their types
2.	To analyze and validate computer forensics data.
3.	To study various threats associated with security and information warfare.
4.	To study the tools and tactics associated with cyber forensics.

UNIT I - NETWORK LAYER SECURITY &TRANSPORT LAYER SECURITY (9 hours)

IPSec Protocol - IP Authentication Header - IP ESP - Key Management Protocol for IPSec .

Transport layer Security: SSL protocol, Cryptographic Computations - TLS Protocol.

UNIT II - E-MAIL SECURITY & FIREWALLS (9 hours)

PGP - S/MIME - Internet Firewalls for Trusted System: Roles of Firewalls - Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions.

UNIT III - INTRODUCTION TO COMPUTER FORENSICS (9 hours)

Computer Forensics Fundamentals – Types of Computer Forensics – Forensics Technology and Systems - Understanding Computer Investigation – Data Acquisition

UNIT IV - EVIDENCE COLLECTION AND FORENSICS TOOLS (9 hours)

Processing Crime and Incident Scenes – Working with Windows and DOS Systems.

Current Computer Forensics Tools: Software/ Hardware Tools.

UNIT V - ANALYSIS AND VALIDATION (9 hours)

Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics

TEXT BOOK

1. Man Young Rhee, *"Internet Security: Cryptographic Principles", "Algorithms and Protocols"*, Wiley Publications, 2003.

REFERENCES

1. Nelson, Phillips, Enfinger, Steuart, "*Computer Forensics and Investigations*", Cengage Learning, India Edition, 2008.
2. John R.Vacca, "*Computer Forensics*", Firewall Media, 2005.
3. Richard E.Smith, "*Internet Cryptography*", Pearson Education, 3rd Edition, 2008.
4. Marjie T.Britz, "*Computer Forensics and Cyber Crime*": An Introduction", Pearson Education, 1st Edition, 2012.

<table>
<tr><td colspan="13">CS1123 INTERNET SECURITY AND COMPUTER FORENSICS</td></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Computer Science and Engineering</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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SEMESTER VI

CS1124	DISTRIBUTED COMPUTING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

To provide knowledge on principles and practice underlying in the design of distributed systems.

INSTRUCTIONAL OBJECTIVES

1.	To layout foundations of Distributed Systems.
2.	To introduce the idea of middleware and related issues
3.	To understand in detail the system level and support required for distributed system
4.	To understand the issues involved in studying data and design of distributed algorithms

UNIT I - INTRODUCTION (9hours)

Introduction – Examples of Distributed Systems–Trends in Distributed Systems – Focus on resource sharing – Challenges.

Case study: World Wide Web.

UNIT II - COMMUNICATION IN DISTRIBUTED SYSTEM (9hours)

System Model – Inter process Communication - the API for internet protocols – External data representation and Multicast communication.

Network virtualization: Overlay networks.

Case study: MPI

UNIT III - REMOTE METHOD INVOCATION AND OBJECTS (9hours)

Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation.

Case study: Java RMI - Group communication - Publish-subscribe systems - Message queues - Shared memory approaches -Distributed objects - Case study: CORBA -from objects to components

UNIT IV - PEER TO PEER SERVICES AND FILE SYSTEM (9hours)

Peer-to-peer Systems – Introduction - Napster and its legacy - Peer-to-peer – Middleware - Routing overlays.

Overlay case studies: Pastry, Tapestry- Distributed File Systems –Introduction - File service architecture – Andrew File system.

UNIT V - SYNCHRONIZATION AND REPLICATION (9hours)

Introduction - Clocks, events and process states - Synchronizing physical clocks - Logical time and logical clocks - Global states – Coordination and Agreement – Introduction - Distributed mutual exclusion – Elections – Transactions and Concurrency Control– Transactions -Nested transactions – Locks - Optimistic concurrency control - Timestamp ordering -Distributed deadlocks – Replication – Case study - Coda

TEXT BOOK

1. George Coulouris, Jean Dollimore, Tim Kindberg, *"Distributed Systems Concepts and Design"* Fifth edition – 2011- Addison Wesley.

REFERENCES

1. Tanenbaum A.S., Van Steen M., *" Distributed Systems: Principles and Paradigms*" , Pearson Education ,2007.
2. Liu M.L., *"Distributed Computing, Principles and Applications",* Pearson and education,2004.

CS1124 DISTRIBUTED COMPUTING												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	H	i	j	k
		x	x									
2.	Mapping of instructional objectives with student outcome	1,2,3	1,2, 3-4									
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
								x				
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1125	WIRELESS SENSOR NETWORKS	L	T	P	C
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				
PURPOSE					
To study the fundamentals of sensor networks and the several issues in the OSI layer.					

INSTRUCTIONAL OBJECTIVES	
1.	To understand basic sensor network concepts
2.	To know physical layer issues, medium Access control Protocols
3.	To comprehend network layer characteristics and protocols
4.	To understand transport layer issues and protocols.
5.	To understand the network management and Middleware services

UNIT I - INTRODUCTION (8 hours)

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

UNIT II - PHYSICAL LAYER AND MEDIUM ACCESS LAYER (9 hours)

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

UNIT III - NETWORK LAYER AND TRANSPORT LAYER (9 hours)

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

UNIT IV – NETWORK MANAGEMENT (11 hours)

Power Management **-** Local Power Management Aspects - Processor Subsystem - Communication Subsystem - Active Memory - Power Subsystem- Dynamic Power Management - Dynamic Operation Modes - Time Synchronization - Clocks and the Synchronization Problem - Time Synchronization in Wireless Sensor Networks - Reasons for Time Synchronization - Challenges for Time Synchronization - Basics of Time Synchronization - Synchronization Messages - Non determinism of Communication Latency -Time Synchronization Protocols - Lightweight Tree-Based Synchronization - Timing-sync Protocol for Sensor Networks Localization -Ranging Techniques -Time of Arrival - Time Difference of Arrival - Angle of Arrival - Received Signal Strength - Range-Based Localization - Triangulation -Range-Free Localization - Ad Hoc Positioning System (APS) .

UNIT V-MIDDLEWARE FOR WIRELESS SENSOR NETWORKS (8 hours)

Introduction -WSN Middleware Principles - Middleware Architecture - Data-Related Functions, Architectures – Case study - MiLAN (Middleware Linking Applications and Networks) - IrisNet (Internet-Scale Resource-Intensive Sensor Networks Services).

TEXT BOOK

1. Dr.Xerenium, Shen, Dr. Yi Pan , "*Fundamentals of Wireless Sensor Networks, Theory and Practice",* Wiley Series on wireless Communication and Mobile Computing, 1st Edition, 2010.

REFERENCES

1. Kazem Sohraby, Daniel Manoli, "*Wireless Sensor networks- Technology, Protocols and Applications"*, Wiley Inter Science Publications, 2007.
2. Bhaskar Krishnamachari , *"Networking Wireless Sensors"*, Cambridge university press, 2005.
3. Raghavendra C.S, Krishna Sivalingam M., Taieb znati, "*Wireless Sensor Networks*", Springer Science, 2004.

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<tr><th colspan="13">CS1125 WIRELESS SENSOR NETWORKS</th></tr>
<tr><th colspan="2">Course designed by</th><th colspan="11">Department of Computer Science and Engineering</th></tr>
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<tr><td>5</td><td>Approval</td><td colspan="11">23rd meeting of Academic Council, May 2013</td></tr>
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CS1126	ETHICAL HACKING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

The purpose of this course is to learn how to scan, test, hack and secure the systems.

INSTRUCTIONAL OBJECTIVES

1.	To understand how intruders escalate privileges.
2.	To understand Intrusion Detection, Policy Creation, Social Engineering, Buffer Overflows and different types of Attacks and their protection mechanisms
3.	To learn about ethical laws and tests

UNIT I - ETHICAL HACKING (9 hours)

Types of Data Stolen From the Organizations, Elements of Information Security, Authenticity and Non-Repudiation, Security Challenges, Effects of Hacking, Hacker – Types of Hacker, Ethical Hacker, Hacktivism - Role of Security and Penetration Tester, Penetration Testing Methodology, Networking & Computer Attacks – Malicious Software (Malware), Protection Against Malware, Intruder Attacks on Networks and Computers, Addressing Physical Security – Key Loggers and Back Doors.

UNIT II - FOOT PRINTING AND SOCIAL ENGINEERING (9 hours)

Web Tools for Foot Printing, Conducting Competitive Intelligence, Google Hacking, Scanning, Enumeration, Trojans & Backdoors, Virus & Worms, Proxy & Packet Filtering, Denial of Service, Sniffer, Social Engineering – shoulder surfing, Dumpster Diving, Piggybacking.

UNIT III - DATA SECURITY (9 hours)

Physical Security – Attacks and Protection, Steganography – Methods, Attacks and Measures, Cryptography – Methods and Types of Attacks, Wireless Hacking, Windows Hacking, Linux Hacking.

UNIT IV-NETWORK PROTECTION SYSTEM & HACKING WEB SERVERS (9 hours)

Routers, Firewall & Honeypots, IDS & IPS, Web Filtering, Vulnerability, Penetration Testing, Session Hijacking, Web Server, SQL Injection, Cross Site Scripting, Exploit Writing, Buffer Overflow, Reverse Engineering, Email Hacking, Incident Handling & Response, Bluetooth Hacking, Mobiles Phone Hacking.

UNIT V - ETHICAL HACKING LAWS AND TESTS (9 hours)

An introduction to the particular legal, professional and ethical issues likely to face the domain of ethical hacking, ethical responsibilities, professional integrity and making appropriate use of the tools and techniques associated with ethical hacking – Social Engineering, Host Reconnaissance, Session Hijacking, Hacking - Web Server, Database, Password Cracking, Network and Wireless, Trojan, Backdoor, UNIX, LINUX, Microsoft, NOVEL Server, Buffer Overflow, Denial of Service Attack, Methodical Penetration Testing.

TEXT BOOK

1. Michael T. Simpson, Kent Backman, James E. "Corley, *Hands-On Ethical Hacking and Network Defense"*, Second Edition, CENGAGE Learning, 2010.

REFERENCES

1. Steven DeFino, Barry Kaufman, Nick Valenteen, "*Official Certified Ethical Hacker Review Guide"*, CENGAGE Learning, 2009-11-01.
2. Patrick Engebretson, "*The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy*", Syngress Basics Series – Elsevier, August 4, 2011.
3. Whitaker & Newman, " *Penetration Testing and Network Defense"* , Cisco Press, Indianapolis, IN, 2006.

CS1126 ETHICAL HACKING												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	H	i	j	k
		x	x				X					
2.	Mapping of instructional objectives with student outcome	1,2,3	3,4,5				3					
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
								x				
5.	Approval	23rd meeting of Academic Council, May 2013										

SEMESTER VII

CS1127	APPLIED CRYPTOGRAPHY	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1118				

PURPOSE	
To learn the mathematical representation of cryptography algorithms	
INSTRUCTIONAL OBJECTIVES	
1.	To understand the mathematical background for cryptography
2.	To understand the taxonomy of cryptography primitives
3.	To understand the Symmetric key encryption system, public key encryption system
4.	To implement cryptographic algorithms

UNIT I - INTRODUCTION **(9 hours)**

Cryptography goals – Taxonomy of cryptography primitives – Background on functions – Basic terminology – Definition and examples – Block ciphers, stream cipher, substitution ciphers, transposition ciphers – Composition of ciphers – Digital signature – Construction of digital signature – Public key cryptography – Hash functions – Protocol and mechanism – Key establishment and management – Pseudo random numbers – Classes of attack.

UNIT II - NUMBER THEORY **(9 hours)**

Probability theory – Information theory – Complexity theory – Number theory – Abstract algebra – Finite fields – Primality test – Prime number generation – Irreducible polynomial.

UNIT III - RANDOM GENERATORS **(9 hours)**

Pseudo random bits and sequences – Random bit generation – Pseudorandom bit generation – statistical tests – Stream Cipher.

UNIT IV - ENCRYPTION ALGORITHMS **(9 hours)**

Block cipher – DES – FEAL – IDEA – SAFAR – Public key encryption – RSA – Rabin – Elgamal –Mc Eliece – Knapsack.

UNIT V - HASH ALGORITHMS **(9 hours)**

Hash function and data integrity – Classification and framework – Basic constructions and general results – Unkeyed hash functions – Keyed hash

functions – data integrity and message authentication – Advanced attacks and hash function.

TEXT BOOK

1. A.Menezes, P.Van Oorschot and S. Vanstone, "*Hand book of Applied Cryptography*" CRC Press, Fifth Printing, 2001.

REFERENCES

1. Charlie Kaufman, Radia Perlman, Mike Speciner, " *Network Security, Private communication in public world*" PHI 2nd edition 2002.
2. Bruce Schneier, Neils Ferguson, "*Practical Cryptography*", Wiley Dreamtech India Pvt Ltd, 2003 3. Douglas R Simson "*Cryptography – Theory and practice*", CRC Press 1995.
3. Stallings, "*Cryptography & Network Security*", Pearson Education, 4th Edition 2006.

<table>
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<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Computer Science and Engineering</td></tr>
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<tr><td>5.</td><td>Approval</td><td colspan="11">23rd meeting of Academic Council, May 2013</td></tr>
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CS1128	HIGH SPEED NETWORKS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1006				

PURPOSE

This course gives an overview of High speed computer networks and TCP/IP protocols. It also discusses the security and network management aspects.

INSTRUCTIONAL OBJECTIVES	
1.	To learn High speed networks, Traffic and congestion management
2.	To understand resource allocation and service management approaches
3.	To study wireless network operations and functions
4.	To learn network management and its protocols

UNIT I - HIGH SPEED NETWORKS (9 hours)

Introduction-frame relay networks –ATM protocol architecture-ATM logical connection –ATM cells-ATM service categories -AAL- high speed LANS: the emergence of high speed LANS-Ethernets-fiber channel-wireless LANS

UNIT II - CONGESTION AND TRAFFIC MANAGEMENT (9 hours)

Congestion control in data networks and internets-link level flow and error control-TCP traffic -congestion control in ATM networks.- Interior routing protocols.

UNIT III - QOS IN IP NETWORKS (9 hours)

Integrated service architecture-queuing discipline -random early detection-differentiated services protocol for QOS support- RSVP- multiportal Label switching - real time transport protocol- IP version six.

UNIT IV - PRINCIPLES OF WIRELESS NETWORK OPERATION (9 hours)

Local broad band and Ad hoc networks. Introduction to wireless LANS-IEEE 802.11 WLAN-WATM-HIPERLAN-Ad hoc networking and WPAN.

UNIT V - NETWORK MANAGEMENT AND APPLICATION (9 hours)

Network management- choosing a configuration method-MIB-SNMP-XML-CORBA-COPS-VPNS-mobile IP-voice over IP.

TEXT BOOK

1. Williams Stallings, "*High Speed networks And Internet Performance And Quality Of Service",* Pearson Second Edition, 2002.(UNIT I & II
2. Kaven Pahlavan And Prashant Krishnamoorthy, *"Principles Of Wireless Network",* Prentice Hall Of India, 2010.(UNIT III &IV)
3. Adrian Farrel,*" The Internet And Its Protocols",* Elsevier Publications, 2011.(UNIT V)

REFERENCES

1. Behrouz A. Forouzan, *"Data Communication And Computer Networking"*, 4th, 2011.
2. Larry L. Peterson and Bruce S.Davie, *"Computer Networks"*, Third edition, Elsevier Publications, 2003
3. www.utdallas.edu/~metin/SUNet
4. www.rivier.edu/faculty/vricbov
5. http://williamstalling.com/NSNe2e.html.

CS1128 HIGH SPEED NETWORKS													
Course designed by		Department of Computer Science and Engineering											
1.	Student outcome	a	b	c	d	e	f	g	H	i	j	k	
		x											
2.	Mapping of instructional objectives with student outcome	1,2, 3,4											
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)			
										x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering			
								x					
5.	Approval	23rd meeting of Academic Council, May 2013											

CS1129	NETWORK MEASUREMENTS AND TESTING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1006				

PURPOSE

This course provides an understanding of the testing and measurement techniques of communication network.

INSTRUCTIONAL OBJECTIVES

1.	To understand the cellular network measurements and testing techniques
2.	To understand the network test instruments
3.	To understand the network management and performance monitoring

UNIT I – INTRODUCTION TO NETWORK TEST AND MEASUREMENTS (9 hours)

Introduction to telecommunication network measurements – Testing in the life cycle of the network - Private network performance testing.

UNIT II – CELLULAR NETWORK MEASUREMENTS AND TESTING (9 hours)

Introduction to cellular radio network - Cellular measurement strategies - Cellular measurement description - Cellular network life cycle testing.

UNIT III - BASIC TELECOMMUNICATION TECHNOLOGIES (9 hours)

Transmission media characteristics and measurement - Fiber optic network elements Timing and delay jitter - Protocol analysis.

UNIT IV - NETWORK TEST INSTRUMENTS (9 hours)

Analog measurement instrumentation - Bit error rate measurement and error performance analysis - Protocol analyzers - Optical testers - Distributed network monitoring - SDH and sonnet analyzers - Signaling system 7 testing.

UNIT V - NETWORK MANAGEMENT (9 hours)

Local area network management and performance monitoring - SS7 signaling monitoring system.

TEXT BOOK

1. Coombs Clyde, F, "*Communication Network: Test and Measurement Hand Book*", McGraw Hill Publication 2004.

REFERENCES

1. William Stallings, "*Wireless Communication and Networks*", Second Edition, Prentice Hall of India Publication, 2006.
2. J.F. Hayes, "*Modeling and Analysis of Computer Communication Networks*", Plenum Press, New York, 1994.

CS1129 NETWORK MEASUREMENTS AND TESTING												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	H	i	j	k
		x										
2.	Mapping of instructional objectives with student outcome	1,2,3	3									
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
								x				
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1130	TRUST COMPUTING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

This course provides comprehensive overview of trust architecture and its applications

INSTRUCTIONAL OBJECTIVES

1.	To study the concepts of trust categories
2.	To learn trust architecture and formalization of security properties
3.	To understand trusted Computing and its administration

UNIT I - INTRODUCTION (9 hours)

Introduction – Trust and Computing – Instantiations – Design and Applications – Progression – Motivating scenarios – Attacks. Design goals of the trusted platform modules. Introduction to simulators – Implementation of attacks.

UNIT II - ARCHITECTURE, VALIDATION AND APPLICATION CASE STUDIES(9 hours)

Foundations – Design challenges – Platform Architecture – Security architecture – erasing secrets – sources – software threats – code integrity and code loading. Outbound Authentication – Problem – Theory – Design and Implementation - Validation – Process – strategy – Formalizing security properties – Formal verification – other validation tasks – reflection. Application case studies – Basic building blocks – Hardened web servers – Right's management for Big Brother's computer – Private Information – Other projects. TCPA/TCG. Simulation studies of existing trust models in NS2 / OPNET.

UNIT III - PROGRAMMING INTERFACES TO TCG (9 hours)

Experimenting with TCPA/TCG – Desired properties- Lifetime mismatch – Architecture – Implementation – Applications. Writing a TPM device driver- Low-level software – Trusted boot – TCG software stack – Using TPM keys. Implementation using simulator tools.

UNIT IV - TSS CORE SERVICE AND SECURE STORAGE (9 hours)

TSS core service – Public key cryptography standard – Architecture – Trusted computing and secure storage – Linking to encryption algorithms – encrypting files and locking data to specific PCs-content protection – secure printing and faxing.

Simulation analysis of symmetric and public key cryptographic standards - performance evaluation of these trust models.

UNIT V - TRUSTED COMPUTING AND SECURE IDENTIFICATION (9 hours)

Trusted Computing and secure identification – Administration of trusted devices – Secure /backup maintenance – assignment of key certificates-secure time reporting-key recovery – TPM tools- Ancillary hardware.

TEXT BOOK

1. Sean W.Smith, *"Trusted Computing Platforms: Design and Applications"*, Springer Science and Business media, 2005.

REFERENCES

1. Challener D., Yoder K., Catherman R., Safford D., Van Doorn L. *"A Practical Guide to Trusted Computing",* IBM press, 2008.
2. Xujan Zhou, Yue Xu, , Yuefeng Li, Audun Jøsang, and Clive Cox. *"The state-of-the-art in personalized recommender systems for social networking. Artificial Intelligence Review"*, Issue C, pp. 1-14, Springer, 2011.
3. John Linn, *"Trust Models and management in Public Key Infrastructres",* November 2000.

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<tr><th colspan="14">CS1130 TRUST COMPUTING</th></tr>
<tr><th colspan="2">Course designed by</th><th colspan="12">Department of Computer Science and Engineering</th></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>J</td><td>k</td></tr>
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CS1131	PERVASIVE COMPUTING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

This course provides a way to understand the wireless and pervasive applications in network.

INSTRUCTIONAL OBJECTIVES

1.	To provide the student with knowledge and skills about a new trend in computing.
2.	To study about creating a ubiquitous environment.
3.	To learn WAP and voice technology.

UNIT I - INTRODUCTION (9 hours)

Pervasive Computing: Past, Present and Future - Pervasive Computing Market – m-Business – Application examples: Retail, Airline check-in and booking – Health care – Car information system – E-mail access via WAP and voice.

UNIT II - DEVICE TECHNOLOGY (9 hours)

Hardware – Human Machine Interfaces – Biometrics – Operating Systems – Java for Pervasive devices.

UNIT III - DEVICE CONNECTIVITY & WEB APPLICATION CONCEPTS (9 hours)

Protocols – Security – Device Management - Web Application Concepts: WWW architecture – Protocols – Transcoding - Client Authentication via Internet.

UNIT IV - WAP & VOICE TECHNOLOGY (9 hours)

WAP and Beyond: Components of the WAP architecture – WAP infrastructure – WAP security issues – WML – WAP push – Products – i-Mode - Voice Technology: Basics of Speech recognition- Voice Standards – Speech applications – Speech and Pervasive Computing.

UNIT V - PDA & PERVASIVE WEB APPLICATION ARCHITECTURE (9 hours)

Device Categories – PDA operation Systems – Device Characteristics – Software Components - Standards – Mobile Applications - PDA Browsers - Pervasive Web Application architecture: Background – Development of Pervasive Computing web applications - Pervasive application architecture.

TEXT BOOK

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, "*Pervasive Computing, Technology and Architecture of Mobile Internet Applications"*, Pearson Education, 2012.

REFERENCES

1. Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, *"Fundamentals of Mobile and Pervasive Computing"*, McGraw Hill edition, 2006.
2. Uwe Hansmann, L. Merk, Nicklous M., Stober T., Hansmann U., "*Pervasive Computing (Springer Professional Computing)"*, 2003, Springer Verlag, ISBN:3540002189.
3. http://www.cs.iit.edu/courses/cs553.html
4. http://www.luc.ac/courses/bsc_computer-science-is.shtml
5. http://www.cs.cf.ac.uk/teaching/modules/CM0256.pdf

CS1131 PERVASIVE COMPUTING												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	I	j	k
		x										
2.	Mapping of instructional objectives with student outcome	1,2,3										
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
								X				
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1132	**NETWORK ROUTING ALGORITHMS**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	CS1006				

PURPOSE

This course aims to explore the functionalities of network routing algorithms.

INSTRUCTIONAL OBJECTIVES

1.	To study about circuit switched and packet networks

2.	To learn the functionalities of High speed networks
3.	To understand about cellular and mobile networks

UNIT I - CIRCUIT SWITCHED NETWORKS (9 hours)

Dynamic alternate routing - Introduction – DAR for fully connected networks – DAR dual – parented implementation in BT network – International access network – multiparented networks - Dynamic routing in telephone networks – ATM networks with virtual paths – statistical multiplexing and homogeneous sources - delay guarantees – No statistical multiplexing , heterogeneous sources.

UNIT II - PACKET SWITCHED NETWORKS (9 hours)

Distance vector routing - Basic distance vector algorithm – responding to changes in link costs – RIP protocol description - Inter -domain routing - Exterior gateway protocol - Border gateway protocol - Inter domain routing protocol.

UNIT III - LINK STATE ROUTING AND APPLE TALK ROUTING (9 hours)

LSR – describing the routing domain: ISAS – reliable flooding – routing calculations - area routing – examples of link state protocols – Apple talk internetworking basics - propagating routing information on LAN's – RTMP - ZIP – NBP packet forwarding - data packet forwarding – AURP - alternative AppleTalk routing methods.

UNIT IV - HIGH SPEED NETWORKS (9 hours)

Optical network : A routing based taxonomy - optical link networks – single hop optical networks – multihop optical networks - hybrid optical networks - photonic networks – Routing in pla NET network – packet level routing - call level routing – network infrastructure.

UNIT V - MOBILE NETWORKS (9 hours)

Routing in cellular mobile radio communication networks - cellular system basics – network architecture – air interface functionality - mobility management in cellular systems - connectionless data service for cellular systems - packet radio networking - DARPA packet radio networks - routing algorithms for small to medium sized networks – large network routing algorithms.

TEXT BOOK

1. Martha Steenstrup, *"Routing in communication networks"* Prentice hall , 1995.

REFERENCES

1. Deepankar Medhi and Karthikeyan Ramasamy , *"Network Routing: algorithms, protocol and architecture*", Elsevier, 2007.
2. William Stallings , *"Data and computer communications",* Pearson education, 2006.

CS1132 NETWORK ROUTING ALGORITHMS												
Course designed by		Department of Computer Science and Engineering										
1.	Student outcome	a	b	c	d	e	f	g	H	i	j	k
		x										
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4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
								x				
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1133	HIGH PERFORMANCE COMPUTING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1008				

PURPOSE

The purpose of this course is to make the students familiar with High Performance Computing Principles and its environment.

INSTRUCTIONAL OBJECTIVES

1.	To learn about Modern Processors and concepts
2.	To understand the concepts of Optimizations
3.	To learn about Parallel Computers and Programming
4.	To study about Memory Parallel Programming using OpenMP and MPI

UNIT I - MODERN PROCESSORS (9 hours)

Stored Program Computer Architecture- General purpose cache-based microprocessor-Performance

based metrics and benchmarks- Moore's Law- Pipelining- Superscalarity-SIMD-Memory Hierarchies Cache- mapping-prefetch-Multicore processors-Mutithreaded processors- Vector Processors- Design Principles- Maximum performance estimates- Programming for vector architecture.

UNIT II - BASIC OPTIMIZATION TECHNIQUES FOR SERIAL CODE (9 hours)

Scalar profiling- Function and line based runtime profiling- Hardware performance counters- Common sense optimizations- Simple measures, large impact-Elimination of common subexpressions- Avoiding branches- Using SIMD instruction sets- The role of compilers - General optimization options- Inlining - Aliasing- Computational Accuracy- Register optimizations- Using compiler logs-C++ optimizations - Temporaries- Dynamic memory management- Loop kernels and iterators Data Access Optimization: Balance analysis and lightspeed estimates- Storage order- Case study: Jacobi algorithm and Dense matrix transpose.

UNIT III-PARALLEL COMPUTERS (9 hours)

Taxonomy of parallel computing paradigms- Shared memory computers- Cache coherance- UMA - ccNUMA- Distributed-memory computers- Hierarchical systems- Networks- Basic performance characteristics- Buses- Switched and fat-tree networks- Mesh networks- Hybrids

Basics of parallelization - Why parallelize - Data Parallelism - Function Parallelism-Parallel Scalability- Factors that limit parallel execution- Scalability metrics-Simple scalability laws- parallel efficiency - serial performance Vs Strong scalability- Refined performance models- Choosing the right scaling baseline-Case Study : Can slow processors compute faster- Load balance.

UNIT IV - SHARED MEMORY PARALLEL PROGRAMMING WITH OPENMP (9hours)

Introduction to OpenMP - Parallel execution - Data scoping- OpenMP work sharing for loops- Synchronization - Reductions - Loop Scheduling - Tasking - Case Study: OpenMP- parallel Jacobi algorithm- Advanced OpenMP wavefront parallelization- Efficient OpenMP rogramming: Profiling OpenMP programs - Performance pitfalls- Case study: Parale Sparse matrix-vector multiply.

UNIT V - DISTRIBUTED-MEMORY PARALLEL PROGRAMMING WITH MPI (9 hours)

Message passing - Introduction to MPI- Example- Messages and point-to-point communication-

Collective communication- Nonblocking point-to-point communication- Virtual topologies - MPI parallelization of Jacobi solver- MPI implementation - performance properties

Efficient MPI programming: MPI performance tools- communication parameters- Synchronization, serialization, contention- Reducing communication overhead- optimal domain decomposition- Aggregating messages - Nonblocking Vs Asynchronous communication- Collective communication- Understanding intranode point-to-point communication

TEXT BOOK

1. Georg Hager, Gerhard Wellein, "*Introduction to High Performance Computing for Scientists and Engineers*", Chapman & Hall / CRC Computational Science series, 2011.

REFERENCES

1. Charles Severance, Kevin Dowd, "*High Performance Computing*", O'Reilly Media, 2nd Edition, 1998.
2. Kai Hwang, Faye Alaye Briggs, "*Computer Architecture and Parallel Processing*", McGraw Hill, 1984.

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CS1134	LINUX INTERNALS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1011				

PURPOSE

To study the basic and administration concepts in Linux.

INSTRUCTIONAL OBJECTIVES	
1.	To introduce Linux server and various distributions.
2.	To understand user administration and make use of internet and intranet services.
3.	To learn Linux process control and shell programming.

UNIT I - INSTALLING LINUX AS A SERVER (9 hours)

Linux Distributions –Open source software and GNU- Difference between Windows and Linux , Installing Linux in a server configuration, GNOME and KDE – X window system, Managing software.

UNIT II - SINGLE – HOST ADMINISTRATION (9 hours)

Managing users – User text files –User management tools, Command Line, Boot loaders, File Systems, Core System services, Compiling Linux kernel, Linux Firewall.

UNIT III - INTERNET SERVICES (9 hours)

DNS, FTP-Mechanics- Installing and customizing the server, setting up web server using Apache, SMTP - Install, configure and run postfix server, POP and IMAP, SSH - public key cryptography, creating a secure tunnel.

UNIT IV -INTRANET SERVICES (9 hours)

NFS – enable and configure NFS server and client, NIS – configuring Master and secondary NIS server and Client -NIS tools, SAMBA – Administration, Printing – Install cups – add and manage print jobs, DHCP, Virtualization.

UNIT V - LINUX PROCESS CONTROL & SHELL PROGRAMMING (9 hours)

Linux process environment – login process – parent child relationship – process variable- process monitoring – Invoking foreground and background process – terminating process - Daemons .Introduction to Shell programming – Shell scripts – executing shell scripts - creating scripts – simple examples.

TEXT BOOKS

1. Wale Soyinka, "*Linux Administration A Beginners Guide"*, 5th edition, Tata McGraw-Hill, 2009. Ch1-9,13,16-24,26-28)Unit I-IV
2. Mc Kinnon, Mc Kinnon, "*Installing and Administrating Linux*", 2nd edition, Wiley, 2004. (Ch12,13)Unit-V

REFERENCES

1. Richard Petersen, "*Linux:The Complete Reference*", 6th edition, Tata McGraw-Hill, 2007.
2. Mark G. Sobell. "*Practical Guide to Fedora and Red HatEnterpriseLinux"*, 6th Edition, Prentice Hall, 2011.
3. www.linuxhomenetworking.com
4. www.linux.org
5. www.linux.com
6. http://www.oreillynet.com/linux/cmd/

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<tr><td>5.</td><td>Approval</td><td colspan="11">23rd meeting of Academic Council, May 2013</td></tr>
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GROUP III
SEMESTER IV

CS1135	**COMPUTATIONAL LINGUISTICS**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE	
This Course deals with the fundamentals required for developing a Computational Linguistics model.	
INSTRUCTIONAL OBJECTIVES	
1.	To learn the fundamentals required for Computational Linguistics
2.	To understand the concepts of Language design, Text Transformer and their Products
3.	To study various Linguistic Models

UNIT I – INTRODUCTION (8 hours)

Role of Natural Language Processing- Linguistics and its structure - Motivations- what is computational Linguistics? - Ambiguity and uncertainty in language- The Turing test, **Regular Expressions:** Chomsky hierarchy - Regular Languages and their limitations - Finite-state automata- Regular expressions for finding and counting language phenomena

UNIT II – CONTEXT FREE GRAMMARS, UNIFICATION, DEPENDENCY TREES (9 hours)

Structuralist approach- Chomsky Normal Form- Context Free Grammar- Head-Driven Phrase structure Grammar- Top Down and Bottom up parsing- CFG parsing with CYK- Unification- Multistate Transformer and Government Patterns- Dependency Trees – Semantic Links

UNIT III – ENCODING OF LANGUAGES, REGIONAL LANGUAGES (10hours)

Encoding – ASCII- 8-bit encoding- 16-bit and 32-bit encoding- Word Processors. Regional Computation: Handling Different Languages in Computers – Handling Language Keyboards – Data Processing- Developing Software in Regional Languages – Content Development in Regional Languages – Natural Language Processing

UNIT IV – PRODUCTS OF COMPUTATIONAL LINGUISTICS (9 hours)

Classification of applied Linguistic systems- Automatic Hyphenation – Spell Checking – Grammar checking – Style Checking – Information Retrieval – Topical

Summarization – Automatic Translation – Natural Language Interface – Extraction of Factual data from Texts – Text Generation – Language understanding

UNIT V – LINGUISTIC MODELS **(9 hours)**

Linguistic modeling – Neurolinguistic models- Psycholinguistic models – Functional models of Language – Research Linguistic models- Common features of modern models of language – Reduced models – Need for Linguistic models- Analogy in Natural Languages – Empirical Vs Rationalist approaches- Limited scope of modern linguistic theories

TEXT BOOK

1. Igor Bolshakov and Alexander Gelbukh, *"Computational Linguistics: Models, Resources, Applications",* Direccion de Publications, Mexico, 2004.

REFERENCES

1. Jurafsky and Martin, "*Speech and Language Processing*", Prentice Hall, 2009.
2. Manning and Schutze, "*Foundations of Statistical Natural Language Processing",* MIT Press, 2003.
3. Ronald Hausser *"Foundations of Computational Linguistics",* Springer-Verleg, 1999.
4. James Allen *"Natural Language Understanding",* Benjamin / Cummings Publishing Co. 1995
5. Steve Young and Gerrit Bloothooft *"Corpus – Based Methods in Language and Speech Processing"*, Kluwer Academic Publishers, 1997.

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CS1136	BIOINFORMATICS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

Aims to impart an elementary knowledge of Bioinformatics and Databases, Tools and Algorithms

INSTRUCTIONAL OBJECTIVES

1.	To study the scope of Bioinformatics
2.	To understand the types of Databases and their uses
3.	To analyze the Tools and Algorithms
4.	To learn the Pair wise Sequence Alignment methods

UNIT I – BIOINFORMATICS: AN INTRODUCTION (9 hours)

Introduction-Historical Overview and Definition- Bioinformatics Applications- Major Databases in Bioinformatics- Data Management and Analysis- Molecular Biology and Bioinformatics- Central Dogma of Molecular Biology

UNIT II –DATABASES (9 hours)

Introduction- Characteristics of Bioinformatics Databases- Categories of Bioinformatics Databases- Navigating databases- Sequence Databases- Nucleotide sequence database- secondary Nucleotide sequence database – protein sequence databases- structure databases- Structure file formats- Protein Structure Database Collaboration- PDB- CATH –SCOP- Other databases- Enzyme Databases- MEROPS- Pathway Databases:CAZy

UNIT III – TOOLS (9 hours)

Introduction- Need for Tools- Knowledge Discovery- Data- Mining Tools- Data Submission tools- Nucleotide Sequence Submission and Protein Submission tools- Data Analysis tools- Prediction Tools- Phylogenetic trees and Phylogenetic Analysis- Modelling Tools

UNIT IV – ALGORITHMS (9 hours)

Introduction- Classification of Algorithms- Biological Algorithms- Implementing Algorithms- Biological Algorithms- Bioinformatics Tasks and Corresponding Algorithms- Data Analysis Algorithms- Sequence Comparison Algorithms – Substitution Matrices Algorithms –Sequence Alignment Optimal Algorithms-

Prediction Algorithms- Phylogenetic prediction Algorithm – Protein Structure Prediction

UNIT V–GENOME ANALYSIS AND SEQUENCE ALIGNMENT (9 hours)

Introduction- Genome Analysis- Genome mapping- The Sequence Assembly Problem- Genome Sequencing- Biological Motivation of Alignment Problems- Methods of Sequence Alignments- Using Scoring matrices- Measuring Sequence Detection Efficiency- Working with FASTA and BLAST

TEXT BOOKS

1. OrpitaBosu, Simminder KaurThukral , *"Bioinformatics: Database, Tools, Algorithms",* Oxford University Press, Chennai, 2007. (Part B---Unit-II, Part C---Unit-III, Part D---Unit-IV)
2. Rastogi S. C., NamitaMendiratta, Parag Rastogi, "*Bioinformatics: Methods and Applications: Genomics, Proteomics and Drug Discovery"*, Third Edition, PHI Learning Pvt. Ltd., New Delhi, 2011.(Chapter-1---Unit-I, Chapter 3,4 and 6--Unit-V)

REFERENCES

1. Bryan Bergeron, "*Bioinformatics computing",* PHI Learning Pvt. Ltd, New Delhi, 2010.
2. Rastogi S.C., NamitaMendiratta, Parag Rastogi, "*Bioinformatics: Concepts"*, Skills & Applications, Second Edition, CBS Publishers & Distributors Pvt. Ltd, 2009
3. Arthur M. Lesk, *"Introduction to Bioinformatics*", Third Edition, Oxford University Press, Chennai, 2010
4. Gautham N., *"Bioinformatics:Databases and Algorithms",* alpha Science 2006
5. http://staff.aub.edu.lb/~webbic/nemer/index.html
6. http://bip.weizmann.ac.il/education/course/introbioinfo/04/lect1/introbioinfo04/index.html
7. http://engineeringppt.net/algorithms-in-bioinformatics-pdf-lecture- notes/

CS1136 BIOINFORMATICS													
Course designed by		Department of Computer Science and Engineering											
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k	
		x											
2.	Mapping of instructional objectives with student outcome	1,2, 3,4											
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)			
										x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering			
										x			
5.	Approval	23rd meeting of Academic Council, May 2013											

CS1137	GEOGRAPHICAL INFORMATION SYSTEMS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

This course aims at understanding Geographical Information Systems and Techniques

INSTRUCTIONAL OBJECTIVES

1.	To identify, manipulate and analyze spatial data using state-of-the-art software
2.	To understand and interpret data in different ways that reveal relationships
3.	To analyse the patterns and trends in the form of maps, globes, reports, and charts.

UNIT I - FUNDAMENTALS OF GIS (9 hours)

What is GIS – Introduction Defining GIS – Components of a GIS – Spatial data – Introduction - Maps and their influence on the character of spatial data – Other sources of spatial data

UNIT II - SPATIAL DATA MODELING (9 hours)

Introduction – Entity definition – Spatial data models – Spatial data structures – Modeling surfaces – Modeling networks – Building computer networks – Modeling the third dimension –modeling the fourth dimension - **Attribute data**

management - Introduction – Why choose a databaseapproach? - Database data models – Creating a database – GIS database applications – Developments in databases

UNIT III - DATA INPUT AND EDITING **(9 hours)**

Introduction – Methods of data input –Data editing – Towards an integrated database - **Data analysis**: Introduction – Measurements in GIS – lengths, perimeters and areas – Queries – Reclassification – Buffering and neighborhood functions – Integrating data –map overlay – Spatial interpolation – Network analysis.

UNIT IV - ANALYTICAL MODELING IN GIS **(9 hours)**

Introduction – process models – Modeling physical and environmental processes – Modeling human Processes –Modeling the decision – making process – Problems with using GIS to model spatial processes - **Output: from new maps toenhanced decisions:** Introduction – Maps as output – Non-cartographic output – Spatial multimedia – Mechanisms of delivery – GIS and spatial decision support

UNIT V - ISSUES IN GIS **(9 hours)**

The development of computer methods for handling spatial data – Introduction – Handling spatial data manually – The development of computer methods for handling spatial data – The development of GIS - Data quality issues – Introduction –Describing data quality and errors sources of errors in GIS

TEXT BOOK

1. Ian Heywood, Sarah Cornelius and Steve carver, "*Introduction to geographical information systems*", Pearson Education, 4th Edition, 2012.

REFERENCES

1. DeMers, M.N., "*Fundamentals of Geographic Information Systems*", 3rdEdition, Wiley Press, 2009.
2. Lo C.P. and Yeung, A.K.W.,"*Concepts and Techniques of Geographic Information Systems",* Prentice Hall, 2002.
3. Burrough, P.A. and R.A. McDonald, "*Principles of Geographical Information Systems",* Oxford University Press, 1998.

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SEMESTER V

CS1138	**MULTIMEDIA DATABASE**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	CS1015, CS1004				

PURPOSE

To make the students learn about Multimedia, Spatial and Temporal database acquiring, storing, indexing, compressing and querying in detail.

INSTRUCTIONAL OBJECTIVES

1.	To understand the most fundamental MDBMS concepts and techniques
2.	To study multimedia database design with a strong focus on distributed multimedia databases.
3.	To study the modern database technologies suitable for multimedia data management and new multimedia data forms.
4.	To learn techniques required for building, maintaining, and querying multimedia databases.

UNIT-I - BASICS OF DATABASE MANAGEMENT SYSTEMS (9 hours)

Database Management Systems - Relational Model – SQL, Functional Dependencies - Normal Forms – Multivalued Dependencies, Join Dependencies – Examples - An introduction to Object-oriented Databases.

UNIT II - MULTIDIMENSIONAL DATA STRUCTURES (9 hours)

Multidimensional Data Structures: k-d Trees - Point Quad trees - The MX-Quad tree - R-Trees - comparison of Different Data Structures.

UNIT III - TEXT/DOCUMENT DATABASES (9 hours)

Text/Document Databases - Precision and Recall - Stop Lists - Word Stems and Frequency Tables - Latent Semantic Indexing - TV-Trees - Other Retrieval Techniques

Image Databases - Raw Images - Compressed Image Representations - Similarity-Based Retrieval - Alternative Image DB Paradigms - Representing Image DBs with Relations - Representing Image DBs with R-Trees - Retrieving Images By Spatial Layout - Implementations.

UNIT IV - AUDIO AND VIDEO DATABASES (9 hours)

Audio Databases - A General Model of Audio Data - Capturing Audio Content through Discrete Transformation - Indexing Audio Data.

Video Databases - Organizing Content of a Single Video - Querying Content of Video Libraries - Video Segmentation

UNIT V - MULTIMEDIA DATABASE ARCHITECTURE (9 hours)

Design and Architecture of a Multimedia Database - Organizing Multimedia Data Based on The Principle of Uniformity - Media Abstractions - Query Languages for Retrieving Multimedia Data.

TEXT BOOK

1. Subramanian V. S., "*Principles of Multimedia Database Systems*", Elsevier Publishers, Reprint 2011.

REFERENCES

1. Elmasri and *Navathe "Fundamentals of Database Systems"*, 4th Edition, Addison Wesley, 2003.
2. Subramanian S., *"Principles of Multimedia Database Systems",* Elsevier, 1998.
3. Date C. J., *"An Introduction to Database Systems"*, Seventh Edition, Pearson Education, 2000.
4. Khoshafian S. and A. B. Bakor, *"Multimedia and Imaging Databases",* Elsevier, 1996.
5. Kingsley C. Nwosu, "*Multimedia Database Systems: Design and Implementation Strategies",* Kluwer Academic Publishers, 1996.
6. Prabhakaran, "*Multimedia Database Management Systems"*, Springer, 1st Edition, 1996.
7. Lynne Dunckley, "*Multimedia Databases: An Object-Relational Approach*"**,** Pearson Education, 2003.

CS1138 MULTIMEDIA DATABASE													
Course designed by		Department of Computer Science and Engineering											
1	Student outcome	a	b	c	d	e	f	g	h	i	j	k	
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2	Mapping of instructional objectives with student outcome	1,3		2,3									
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4	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering			
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5	Approval	23rd meeting of Academic Council, May 2013											

CS1139	NATURAL LANGUAGE PROCESSING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	NIL				

PURPOSE

This course provides a sound understanding of Natural Language Processing and challenges involved in that area.

INSTRUCTIONAL OBJECTIVES

1.	To provide the student with knowledge of various levels of analysis involved in NLP
2.	To understand language modeling,
3.	To gain knowledge in automated natural language generation and machine translation

UNIT I - OVERVIEW AND LANGUAGE MODELING (8 hours)

OVERVIEW: Origins and challenges of NLP-Language and Grammar-Processing Indian Languages-NLP Applications-Information Retrieval.

LANGUAGE MODELING: Introduction-Various Grammar-based Language Models-Statistical Language Model

UNIT II - WORD LEVEL AND SYNTACTIC ANALYSIS (9 hours)

WORD LEVEL ANALYSIS: Introduction- Regular Expressions-Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes-Part-of Speech Tagging.

SYNTACTIC ANALYSIS: Introduction-Context-free Grammar-Constituency-Parsing-Probabilistic Parsing

UNIT III - SEMANTIC ANALYSIS AND DISCOURSE PROCESSING (10 hours)

SEMANTIC ANALYSIS: Introduction- Meaning Representation-Lexical Semantics-Ambiguity-Word Sense Disambiguation.

DISCOURSE PROCESSING: Introduction- cohesion-Reference Resolution-Discourse Coherence and Structure

UNIT IV - NATURAL LANGUAGE GENERATION AND MACHINE TRANSLATION (9 hours)

NATURAL LANGUAGE GENERATION: Introduction-Architecture of NLG Systems-Generation Tasks and Representations-Application of NLG.

MACHINE TRANSLATION: Introduction-Problems in Machine Translation-Characteristics of Indian Languages- Machine Translation Approaches-Translation involving Indian Languages

UNIT V - INFORMATION RETRIEVAL AND LEXICAL RESOURCES (9 hours)

INFORMATION RETRIEVAL: Introduction-Design features of Information Retrieval Systems-Classical, Non-classical, Alternative Models of Information Retrieval - Evaluation

LEXICAL RESOURCES: Introduction-WordNet-FrameNet-Stemmers-POS Tagger-Research Corpora

TEXT BOOK

1. Tanveer Siddiqui, U.S. Tiwary, "*Natural Language Processing and Information Retrieval"*, Oxford University Press, 2008.

REFERENCES

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. James Allen, Bejamin/cummings, *"Natural Language Understanding"*, 2nd edition, 1995.

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CS1140	INFORMATION STORAGE AND MANAGEMENT	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

Information Storage and Management has highly developed into a sophisticated pillar of information technology, provides a variety of solutions for storing, managing, accessing, protecting, securing, sharing and optimizing information.

INSTRUCTIONAL OBJECTIVES

1.	Evaluate storage architecture; understand logical and physical components of storage Infrastructure including storage subsystems
2.	Describe storage networking technologies such as FC-SAN, NAS, IP-SAN and data archivalsolution – CAS
3.	Identify different storage virtualization technologies and their benefits
4.	Understand and articulate business continuity solutions including, backup and recovery technologies, and local and remote replication solutions
5.	Define information security, and storage security domains and Identify parameters of managing and monitoring storage infrastructure and describe common storage management activities and solutions.

UNIT I - INTRODUCTION TO STORAGE MANAGEMENT (9hours)

Introduction to Information Storage Management - Intelligent Storage System (ISS) and its components Implementation of ISS as high-end and midrange storage-arrays.Direct Attached -Storage - Introduction to SCSI - Introduction to parallel SCSI,SCSI Command Model – Storage Area Networks - Fiber Channel Connectivity, Login types, Topologies.

UNIT II - STORAGE NETWORKING TECHNOLOGIES (9hours)

Network-Attached Storage- General purpose servers vs NAS Devices - Benefits of NAS,NAS File I/O - NAS Components, Implementation, File Sharing protocols, I/O operations – IPSAN-ISCSI,Components of ISCSI- Content-Addressed Storage.

UNIT III - STORAGE VIRTUALIZATION (9hours)

Fixed Content and Archives, Types, Features, Benefits, CAS Architecture, object storage and Retrieval, examples - Storage Virtualization-forms of virtualization, SNIA Taxonomy – Storage virtualization configurations, challenges, Types of storage virtualization - Business Continuity- Overview of emerging technologies such as Cloud storage, Virtual provisioning, Unified Storage, FCOE, FAST.

UNIT IV - BUSINESS CONTINUITY AND RECOVERY (9hours)

Information Availability, BC Terminology, Life cycle, Failure analysis - Backup and Recovery- Backup purpose, considerations, Backup Granularity, Recovery considerations- Backup methods, process, backup and restore operations , Overview of emerging technologies - duplication, offsite backup.

UNIT V - STORAGE SECURITY AND MANAGEMENT (9hours)

Storage security framework, Securing the Storage infrastructure Risk triad - Managing the storage infrastructure, Monitoring the storage infrastructure,. Identify key parameters and components to monitor in a storage infrastructure • List key management activities and examples Define storage management standards and initiative-Industry trend.

TEXT BOOK

1. EMC Corporation, *"Information Storage and Management"*, First Edition, 2009. Wiley India.

REFERENCES

1. IBM, "*Introduction to Storage Area Networks and System Networking"* Fifth Edition, November 2012.
2. Robert Spalding, "*Storage Networks: The Complete Reference*", Tata McGraw Hil, Osborne, Sixth Reprint 2003.
3. Marc Farley, "*Building Storage Networks*", Tata McGraw Hill, Osborne, First Edition, 2001.
4. Tom Clark, "*Designing Storage Area Networks -A Practical Reference for Implementing Fibre Channel and IP SANs*" 2nd Edition, Tata McGraw Hill 2003.

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SEMESTER VI

CS1141	DATA MINING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1015				

PURPOSE

This course provides a way to understand the concepts and the basics of da mining strategies with mining tools

INSTRUCTIONAL OBJECTIVES

1. To learn the concepts of data processing
2. To understand the different data mining techniques
3. To perform data mining tasks with relevant tools

UNIT I - FUNDAMENTALS **(9 hours)**

DATA MINING, DATA PROCESSING AND DATA WAREHOUSES

Data Mining – History – Strategies – Techniques – Applications – Challenges – Future- Types of Data – Data Warehouses – Data Processing - Quality Measure – OLAP – Sampling.

DATA TYPES, INPUT AND OUTPUT OF DATA MINING ALGORITHMS - Different Types of features – Concept Learning – Output of Data Mining Algorithms.

PREPROCESSING IN DATA MINING – Steps – Discretization – Feature Extraction, Selection and construction – Missing Data and Techniques for dealing it.

UNIT II - WEKA TOOL **(9 hours)**

Introduction – Installation- Visualisation – filtering- selecting attributes- other popular packages.

CLASSIFICATION TASK: Introduction – Decision trees – Naïve Bayes' classification-

Artificial Neural Networks and Support Vector Machines.

UNIT III - MODEL EVALUATION TECHNIQUES **(9 hours)**

Accuracy Estimation- ROC-Lift Charts- Cost –Bagging and Boosting- Model Ranking Approach.

ASSOCIATION RULE MINING: Concepts, Relevance, Functions of Association rule Mining – Apriori Algorithm- Strengths and Weaknesses of ARM- Applications.

UNIT IV - CLUSTERING AND ESTIMATION **(9 hours)**

CLUSTERING TASK: Introduction- Distance Measure – Types – KNN for clustering – validation - Strengths and Weaknesses of Algorithms – Applications.

ESTIMATION TASK: Scatter Plots and Correlation – Linear regression Models – Logistic regression – Regression Analysis - Strengths and Weaknesses of Estimation- Applications.

UNIT V - MINING OF TIME SERIES **(9 hours)**

Fundamentals – Time series Models – Regression, Periodic Models - Strengths and Weaknesses of Time series Analysis – Applications. Text and Web Mining – Privacy, security and Ethical Issues in Data Mining.

TEXT BOOK

1. Shawkat Ali A B M, Saleh A. Wasimi*, "Data Mining: Methods and Techniques*", Third Indian Reprint, Cengage Learning, 2010.

REFERENCE

1. Soman K. P., Shyam Diwakar, Ajay V. *"Insight into Data Mining Theory and Practice" ,* Fifth Printing, PHI Learning, 2011.

CS1141 DATA MINING												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objectives with student outcome	1,2	3									3
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)					Professional Subjects (P)	
											x	
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering			Knowledge Engineering	
											x	
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1142	DATA WAREHOUSING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1015				

PURPOSE

This course aims to understand the concepts of Data Warehousing and its applications.

INSTRUCTIONAL OBJECTIVES

1.	To learn the fundamentals of designing large-scale data warehouses using relational technology.
2.	To study the design aspects of Data Warehousing
3.	To plan about capacity and to estimate load and development
4.	To study about the implementation of Data warehouse in various applications

UNIT I - INTRODUCTION (9 hours)

Introduction – Data warehouse delivery method – system process – typical process flow within a Data ware house – query management process – process architecture.

UNIT II-DESIGN ASPECTS (9 hours)

Design aspects – Designing dimension tables – Designing star flake schema – Multi dimensional schema – partitioning strategy aggregations – Data marting-Meta data – System Data warehouse process manager.

UNIT III-HARDWARE (9 hours)

Hardware and operational design – server hardware, network hardware – parallel technology – Security input on design of Hardware – backup and recovery – Service level Agreement – Operating the data warehouse.

UNIT IV-PLANNING AND DEVELOPMENT (9 hours)

Capacity planning – Estimating the load – Tuning the data warehouse – Assessing performance –Tuning the data load and queries – Testing data warehouse – Development Of test plan – Testing the data base and operational environment.

UNIT V-CASE STUDIES (9 hours)

Data Warehousing in the Tamilnadu Government-Data Warehouse for the Ministry of commerce- Data Warehouse for the government of Andhra Pradesh- Data Warehousing in Hewlett –Packard- Data Warehousing in Levi Strauss- Data

Warehousing in the World Bank- HARBOR, A Highly available Data Warehouse-A typical Business data Warehouse for a Trading company.

TEXT BOOKS

1. Sam Anahory & Dennis Murray, "*Data Warehousing in the real world*", Pearson Education Ltd., 2011.(UNIT 1,2,3,4)
2. Prabhu C.S.R. , "*Data Ware housing: Concepts, Techniques, Products and Applications*", Prentice Hall of India, 2011, (UNIT V).

REFERENCES

1 Reema Theraja, "*Data Warehousing*", Oxford University Press, 2009.
2. Han, M.Kamber , "*Data Mining: Concepts and Techniques*", Academic Press, Morgan Kanfman Publishers, 2001.
3 Pieter Adrians, Dolf Zantinge, "*Data Mining*", Addison Wesley, 2000.
4. Seidman, "*Data Mining with Microsoft SQL Server*", Prentice Hall of India, 2001.
5 Berry and Lin off , "*Mastering Data Mining: The Art and Science of Customer Relationship Management*", John Wiley and Sons, 2001.
6. David Hand, Heikki Mannila, Padhraic Smyth, "*Principles of Data Mining*", PHI, 2004.

<table>
<tr><th colspan="13">CS1142 DATA WAREHOUSING</th></tr>
<tr><th colspan="2">Course designed by</th><th colspan="11">Department of Computer Science and Engineering</th></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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CS1143	MOBILE DATABASES	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1015				

PURPOSE	
To Study about the Mobile Database Technology	
INSTRUCTIONAL OBJECTIVES	
1.	To learn about the fundamentals of distributed databases
2.	To understand Data Processing and mobility models
3.	To learn about the Data Consistency and Concurrency Control mechanisms
4.	To study mobile Database Recovery techniques and Wireless Information Broadcast schemes

UNIT I – INTRODUCTION (9 hours)

Fully connected information space – Types of Mobility – Wireless Network Communication.

Radio Frequency: Spectrum and Band – Cellular Communication - Continuous Connectivity – Structure of a Channel – Absence of Free Channel – Signal Fading – Frequency Reuse – PCS and GSM – PCS Personal Communication Service – Interface – Call Processing – GSM Global System for Mobile Communication – Location and Handoff Management – Location Management – Handoff Management – Roaming.

UNIT II - FUNDAMENTALS OF DISTRIBUTED DATABASES (9 hours)

Conventional Database Architecture – Database Partition and Distribution – Database Processing – Transaction Structure – Serialization of Transactions – Serializability – Based Correctness Criteria – Serializability Theory – Degree of Isolation – Advanced Transaction Model – Nested Transaction Model – SAGA – Cooperative Transaction – ConTract – Flex Transaction – Introduction to Concurrency Control Mechanisms – Ways of Locking Data Items – The Phantom Problem – Multigranularity Locking – Heuristic Approach in Locking Schemes – Non-Locking Based Schemes – Mixed Approaches – Multiversion Approach – Optimistic Concurrency Control Mechanisms – Two-Phase Locking for Distributed Database Systems

UNIT III - DATA PROCESSING AND MOBILITY -TRANSACTION MANAGEMENT (9hours)

Effect of Mobility on the Management of Data – Transaction Management in Mobile Database Systems – Mobile Database System – Transaction Execution in MDS – Mobile Transaction Model – Execution Model based on ACID Transaction

Framework – Pre-write Transaction Execution Model – Mobile Transaction Models – HiCoMo – Moflex - Kangaroo – MDSTPM Transaction Execution Model – Mobilaction – Atomicity for Mobilaction – Isolation for Mobilaction – Consistency and Durability for Mobilaction

UNIT IV – DATA CONSISTENCY AND CONCURRENCY CONTROL (9 hours)

Data Consistency in intermittent |Connectivity - The Consistency Model – Weak Connectivity Operation – A Consistency Restoration Schema – Concurrency Control Mechanism – Transaction Commit – Commitment of Mobile Transactions – Transaction Commitment in Mobile Database Systems.

UNIT V - MOBILE DATABASE RECOVERY AND WIRELESS INFORMATION BROADCAST (9 hours)

Log Management in Mobile Database Systems – Mobile Database Recovery Schemes – Wireless information Broadcast – introduction – Broadcast Disk – Broadcast Infrastructure – Exponential Index – Location-Based Indexing – On-Demand Data Scheduling – Data Dissemination System.

TEXT BOOK

1. Vijay Kumar , *"Mobile Database Systems"*, Wiley Interscience Publication, 2006

REFERENCES

1. Leong (Hong VA) , Lee (Wang Chen), *"Mobile Data Access"*, Springer, 1999.
2. Rifaat A. Dayem, "*Mobile Data & Wireless LAN Technologies*", Prentice Hall Inc., 1997.
3. TAN(Kian Lee), Franklin(Michael J*), "Mobile Data Management*", Springer, 2001.

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SEMESTER VII

CS1144	TEXT MINING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1139				

PURPOSE

This course teaches how to build text mining application to manage vast amounts of text and turn into useful data

INSTRUCTIONAL OBJECTIVES

1.	To understand the tools to manage the high volume of information that is easily available
2.	To learn how search engine work and how they present information
3.	To organize, analyze and monitor collected information

UNIT I - INTRODUCTION **(10 hours)**

Origin of Text Mining - Understanding Text – Applications - Information Visualization - Architecture for Text Mining Applications.

Mathematics Background: Probability-Bayes's Rule-Probability Distribution-Sampling Distribution-Hypothesis Testing-Matrices.

Exercises-Text Mine Installation

UNIT II- EXPLORING TEXT **(5 hours)**

Words-Sentences-Indexing Document Text

UNIT III- MARKOV MODELS AND POS TAGGING **(8 hours)**

Hidden Markov Models - POS Taggers - Word Sense disambiguation.

Exercises: creation of text statistics, entity extraction, POS tags for words (using Text Mine).

UNIT IV- INFORMATION EXTRACTION **(11 hours)**

IE Application - Entity Extraction - IE Systems - Phrase Extraction.

Search Engines: Early Search Engines-Indexing text for Search-Indexing Multimedia-Queries-Searching an index-Viewing search results.

Exercises: index scripts search and create an index for local files (using Text Mine).

UNIT V: SEARCHING THE WEB **(11 hours)**

Web Structure-Search Engine Coverage-A distributed Search-Crawlers-Visualization Summarization: Training a summarizer- Sentence Selection-Information Monitor.

Exercises: Implementation of crawler in text mine – News collection using RSS

TEXT BOOK

1. Manu Konchady "*Text Mining Application Programming*", Cengage Learing, Fourth Indian Reprint, 2009.

REFERENCE

1. Thomas W. Miller,Prentice Hall, "*Data and Text Mining-A Business Applications Approach"*, Second impression, 2011.

CS1144 – TEXT MINING												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
			x				x					x
2.	Mapping of instructional objectives with student outcome		1,3				2					1,3
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
		--		--		--			--		x	
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1145	**SEMANTIC WEB**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE	
This course introduces semantic web technologies and web services.	
INSTRUCTIONAL OBJECTIVES	
1.	To understand the concepts of semantic web technology
2.	To appreciate the merits of semantic web over traditional web

3.	To appreciate the merits of semantic web over traditional web
4.	To learn and appreciate RDF and its taxonomy and ontology
5.	To describe OWL and its usage in semantic web
6.	To understand various technologies related to semantic web services

UNIT I - THE BASICS OF SEMANTIC WEB (9 hours)

Traditional web to semantic web – WWW and its usage- meta data and its creation, addition in the web page; meta data tools - search engines for semantic web –search engine for web page mark up problem and query building problem.

UNIT II-RESOURCE DESCRIPTION FRAME WORK (RDF) (9 hours)

RDF and its basic elements-Why we need RDF-RDF triples-RDF tools-Fundamental rules of RDF- relationship between DC,and RDF and XML and RDF-core elements of RDF- ontology and taxonomy-inferencing based on RDF.

UNIT III - WEB ONTOLOGY LANGUAGE (OWL) (9 hours)

The basics idea of Web ontology language– OWL to define classes- OWL to define properties-set operators-Three faces of OWL-Ontology Matching and Distributed Information- Validating OWL ontology.

UNIT IV - SEMANTIC WEB SERVICES (9 hours)

Web services – web services standards – web services to semantic web services- UDDI and its usage- Concept of OWL-S and its building blocks - mapping OWL-S to UDDI- WSDL-S overview and its usage.

UNIT V - REAL WORLD EXAMPLES AND APPLICATIONS OF SEMANTIC WEB (9hours)

Swoogle- architecture, usage and examples of using Swoogle; FOAF – Explanation, vocabulary –creating FOAF documents – overview of semantic markup – semantic web search engines.

TEXT BOOK

1. Liyang Yu , "*Introduction to the Semantic Web and Semantic web services*" Chapman & Hall/CRC, Taylor & Francis group, 2007.

REFERENCES

1. Johan Hjelm, "*Creating the Semantic Web with RDF* " , Wiley, 2001
2. Grigoris Antoniou and Frank van Harmelen, "*A Semantic Web Primer*", MIT Press, 2004.

3. Karin K. Breitman K., Marco Antonio Casanova, Walt Truszkowski, "*Semantic web : concepts, Technologies and applications"* Walt Truszkowski - 2007.
4. http://www.w3.org/standards/semanticweb/
5. http:/semanticweb.org
6. http://www.searchenginejournal.com/semantic-web-are-you-taking-advantage-of-semantic- search/62047/
7. http://www.springer.com/computer/database+management+%26 +information +retrieval/ book/978- 3-540-70893-3
8. http://www.swsi.org/resources/swp-wise2003.ppt

CS1145 SEMANTIC WEB												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objectives with student outcome	1,2, 4,6	3,4,5									5
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										X		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Artificial intelligence		Network Engineering		Knowledge Engineering		
		--		--		--		--		x		
5.	Approval	23rd meeting of Academic Council, May 2013										

CS1146	WEB MINING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

The course gives a comprehensive understanding on web data Retrieval and web search, web Information integration and web usage mining.

INSTRUCTIONAL OBJECTIVES

1.	To understand the characteristics of the Internet and data mining
2.	To know about the web crawling algorithm implementation
3.	To study the web data collection and analysis of web data for new patterns

UNIT I – INTRODUCTION **(9 hours)**

Introduction: World Wide Web, History of the Web and the Internet, What is Data Mining? What is Web Mining? Introduction to Association Rule Mining, Supervised Learning & Unsupervised Learning.

Information Retrieval and Web Search: Basic Concepts of Information Retrieval, Information Retrieval Models, Relevance Feedback, Evaluation Measures, Text and Web Page Pre-Processing, Inverted Index and Its Compression, Latent Semantic Indexing, Web Search, Meta-Search: Combining Multiple Rankings, Web Spamming.

UNIT II- SOCIAL NETWORK ANALYSIS **(9 hours)**

Social Network Analysis: Introduction, Co-Citation and Bibliographic Coupling, PageRank, HITS Algorithm, Community Discovery.

Web Crawling: A Basic Crawler Algorithm, Implementation Issues, Universal Crawlers, Focused Crawlers, Topical Crawlers, Evaluation, Crawler Ethics and Conflicts.

UNIT III - STRUCTURED DATA EXTRACTION **(9 hours)**

Structured Data Extraction: Wrapper Generation, Preliminaries, Wrapper Induction, Instance-Based Wrapper Learning, Automatic Wrapper Generation: Problems, String Matching and Tree Matching, Building DOM Trees, Extraction Based on a Single List Page, Extraction Based on Multiple Pages,

UNIT IV - INFORMATION INTEGRATION **(9 hours)**

Information Integration: Introduction to Schema Matching, Pre-Processing for Schema Matching, Schema -Level Matching, Domain and Instance-Level Matching, Combining Similarities, 1: m Match, Integration of Web Query Interfaces, Constructing a Unified Global Query Interface.

Opinion Mining and Sentiment Analysis: The Problem of Opinion Mining, Document Sentiment Classification, Sentence Subjectivity and Sentiment Classification, Opinion Lexicon Expansion, Aspect-Based Opinion Mining, Opinion Search and Retrieval, Opinion Spam Detection.

UNIT V- WEB USAGE MINING **(9 hours)**

Web Usage Mining: Data Collection and Pre-Processing, Data Modeling for Web Usage Mining, Discovery and Analysis of Web Usage Patterns, Recommender Systems and Collaborative Filtering, Query Log Mining, Computational Advertising.

TEXT BOOK

1. Wilbert Liu, Bing , *"Web Data Mining"*, 2nd Edition., Elseiver, 2011.

REFERENCE

1. Soumen Chakrabarti, *"Mining the Web"*, Morgan-Kaufmann Publishers, Elseiver, 2002.

CS1146 WEB MINING												
Course designed by		Department of Computer Science and Engineering										
1	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2	Mapping of instructional objectives with student outcome	1,3	2, 3									2,3
3	Category	General (G)		Basic Sciences(B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering			Network Engineering		Knowledge Engineering	
		--		--		--			--		x	
5	Approval	23rd meeting of Academic Council, May 2013										

CS1147	DATABASE SECURITY AND PRIVACY	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1015				

PURPOSE

The course provides a foundation in database security and privacy. This course utilizes Oracle scenarios and step-by-step examples. The following topics are covered: security, profiles, password policies, privileges and roles, Virtual Private Databases. The course also covers topics in data privacy issues and preservation.

INSTRUCTIONAL OBJECTIVES

1.	To understand the fundamentals of security, and how it relates to information systems
2.	To identify risks and vulnerabilities in operating systems from a database perspective
3.	To learn good password policies, and techniques to secure passwords in an organization

4.	To learn and implement administration policies for users
5.	To understand the various database security models and their advantages or disadvantages
6.	To learn to implement privacy preserving data mining algorithms

UNIT I - SECURITY ARCHITECTURE & OPERATING SYSTEM SECURITY FUNDAMENTALS (7 hours)

Security Architecture: Introduction-Information Systems- Database Management Systems-Information Security Architecture- Database Security–Asset Types and value-Security Methods

Operating System Security Fundamentals: Introduction-Operating System Overview-Security Environment – Components- Authentication Methods-User Administration-Password Policies-Vulnerabilities-E-mail Security

UNIT II ADMINISTRATION OF USERS & PROFILES,PASSWORD POLICIES, PRIVILEGES AND ROLES (11hours)

Administration of Users: Introduction-Authentication-Creating Users, SQL Server User-Removing, Modifying Users-Default, Remote Users-Database Links-Linked Servers-Remote Servers-Practices for Administrators and Managers-Best Practices

Profiles, Password Policies, Privileges and Roles: Introduction-Defining and Using Profiles-Designing and Implementing Password Policies-Granting and Revoking User Privileges-Creating, Assigning and Revoking User Roles-Best Practices

UNIT III - DATABASE APPLICATION SECURITY MODELS & VIRTUAL PRIVATE DATABASES (9 hours)

Database Application Security Models: Introduction-Types of Users-Security Models- Application Types-Application Security Models-Data Encryption

Virtual Private Databases: Introduction-Overview of VPD-Implementation of VPD using Views, Application Context in Oracle-Implementing Oracle VPD-Viewing VPD Policies and Application contexts using Data Dictionary, Policy Manager-Implementing Row and Column level Security with SQL Server

UNIT IV - AUDITING DATABASE ACTIVITIES (7 hours)

Auditing Database Activities: Using Oracle Database Activities-Creating DLL Triggers with Oracle-Auditing Database Activities with Oracle-Auditing Server Activity with SQL Server 2000-Security and Auditing Project Case Study

UNIT V - PRIVACY PRESERVING DATA MINING TECHNIQUES (11 hours)

Privacy Preserving Data Mining Techniques: Introduction- Privacy Preserving Data Mining Algorithms-General Survey-Randomization Methods-Group Based Anonymization-Distributed Privacy Preserving Data Mining-Curse of Dimensionality-Application of Privacy Preserving Data Mining

TEXT BOOKS

1. Hassan A. Afyouni, "*Database Security and Auditing",* Third Edition, Cengage Learning, 2009.(UNIT 1 to IV)
2. Charu C. Aggarwal, Philip S Yu, "*Privacy Preserving Data Mining"*: Models and Algorithms, Kluwer Academic Publishers, 2008.(UNIT V).

REFERENCES

1. Ron Ben Natan, "Implementing Database Security and Auditing", Elsevier Digital Press, 2005.
2. http://charuaggarwal.net/toc.pdf
3. http://adrem.ua.ac.be/sites/adrem.ua.ac.be/files/securitybook.pdf

CS1147 DATABASE SECURITY AND PRIVACY													
Course designed by		**Department of Computer Science and Engineering**											
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k	
				x			x		x				
2.	Mapping of instructional objectives with student outcome			3,4			1,2,5		4,6				
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)			
										x			
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering			
		--		**--**		**--**		**--**		**x**			
5.	Approval	23rd meeting of Academic Council, May 2013											

CS1148	MULTIMEDIA MINING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

The course gives a comprehensive understanding on Multimedia data Retrieval, Mining and Evaluation

INSTRUCTIONAL OBJECTIVES

1.	To study the characteristics of the Multimedia data
2.	To understand the Multimedia data Indexing and Retrieval
3.	To study the implementation described in the Multimedia application

UNIT I – INTRODUCTION (8 hours)

Introduction into Multimedia Data Mining and Knowledge Discovery - Multimedia Data Mining: An Overview-Multimedia Data Mining Architecture - Representative Features for Mining - Supervised Concept Mining - Concept Mining Through Clustering - Concept Mining Using Contextual Information - Events and Feature Discovery.

UNIT II - MULTIMEDIA DATA EXPLORATION AND VISUALIZATION (9 hours)

A New Hierarchical Approach for Image Clustering - Multiresolution Clustering of Time Series and Application to Images - Mining Rare and Frequent Events in Multi-camera Surveillance Video - Density-Based Data Analysis and Similarity Search - Feature Selection for Classification of Variable Length Multiattribute Motions.

UNIT III-MULTIMEDIA DATA INDEXING AND RETRIEVAL

(8 hours)

FAST: Fast and Semantics-Tailored Image Retrieval - New Image Retrieval Principle: Image Mining and Visual Ontology - Visual Alphabets: Video Classification by End Users.

UNIT IV - MULTIMEDIA DATA MODELING AND EVALUATION (10 hours)

Cognitively Motivated Novelty Detection in Video Data Streams - Video Event Mining via Multimodal Content Analysis and Classification- Identifying Mappings in Hierarchical Media Data - A Novel Framework for Semantic Image Classification and Benchmark Via Salient Objects - Extracting Semantics Through Dynamic Context - More Efficient Mining Over Heterogeneous Data Using Neural Expert Networks.

UNIT V - APPLICATIONS AND CASE STUDIES (10 hours)

Supporting Virtual Workspace Design Through Media Mining and Reverse Engineering - A Time-Constrained Sequential Pattern Mining for Extracting Semantic Events in Videos - Multiple-Sensor People Localization in an Office Environment - Analyzing User's Behavior on a Video Database.

TEXT BOOK

1. Petrushin, Valery A.; Khan, Latifur (Eds.), *"Multimedia Data Mining and Knowledge Discovery"*, Springer, 2007.

REFERENCES

1. Michael Granitzer , "*Multimedia Semantics — The Role of Metadata* " Springer, 2008.
2. Valery A. Petrushin, Latifur. Khan, *"Multimedia data mining and knowledge discovery"*, Springer, 2006.
3. Petra Perner, *"Data Mining on Multimedia Data"*, Springer, 2002.
4. http://www.booki.cc/methods-in-multimedia-scholarship/data-visualization/

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<tr><td rowspan="2">1</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td rowspan="2">4</td><td rowspan="2">Broad Area</td><td colspan="2">Core Engineering</td><td colspan="2">Computer Hardware Engineering</td><td colspan="2">Software Engineering</td><td colspan="2">Network Engineering</td><td colspan="3">Knowledge Engineering</td></tr>
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CS1149	DATABASE TUNING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

To apply and analysis the tuning principles on basic database systems and data warehouses.

INSTRUCTIONAL OBJECTIVES

1.	To help you tune your application on your database management system, operating system, and hardware.
2.	To teach you the principles underlying any tuning puzzle
3.	To apply tuning tools and troubleshoot the various DBMS queries
4.	To tune to data warehouse and CRM applications

UNIT I - CONCURRENCY CONTROL AND RECOVERY (9 hours)

Review of Relational Databases – Locking and Concurrency Control –– Logging and the Recovery Subsystem –– Operating Systems Considerations – Hardware Tuning.

UNIT II - INDEX TUNING AND NORMALIZATION (9 hours)

Types of Queries – Data Structures – Clustering Indexes – Non Clustering Indexes – Composite Indexes – Hot Tables – Tuning Relational Systems – Normalization – Clustering Two Tables – Aggregate Maintenance – Record Layout- Query Tuning – Triggers

UNIT III - REAL TIME DATABASES (9 hours)

Client Server Mechanisms – Objects, Application Tools and Performance – Tuning the Application Interface – Bulk Loading Data – Accessing Multiple Databases - Real- time databases – transaction chopping – optimal Chopping algorithm – Understanding Access plans case study

UNIT IV - TROUBLESHOOTING (9 hours)

Consumption chain approach-Query Plan Explainers – Performance Monitors – Event Monitors – Finding "Suspicious" Queries – Analyzing a Query's Access Plan – Profiling a Query Execution – DBMS Subsystems - Checking DBMS resources

UNIT V - TUNING DATAWAREHOUSE AND E-COMMERCE APPLICATIONS (9 hours)

Data Warehouse Tuning– Tuning for CRM Systems – Federated Data Warehouse Tuning -E-commerce architecture- Tuning e-commerce architecture – Capacity planning - Case study .

TEXT BOOK

1. Dennis Shasha and Philippe Bonnet, "*Database Tuning, Principles, Experiments, and Troubleshooting Techniques*", Morgan Kaufmann, An Imprint of Elsevier, 2003.

REFERENCES

1. Thomas Connoly and Carlolyn Begg, "*Database Systems, A Practical Approach to Design, Implementation and Management"*, Third Edition, Pearson Education, 2003.
2. Tamer M. Ozsu , Patrick Ualduriel, *"Principles of Distributed Database Systems"*, Second Edition, Pearson Education, 2003.
3. Margaret H. Dunham, S. Sridhar *"Data Mining Introductory & Advance Topics",* PHI, 2002.
4. http://www.cs.helsinki.fi/u/laine/tikape/k03/material03.html
5. http://infolab.stanford.edu/~ullman/dscb.html
6. http://cs.nyu.edu/courses/spring06/G22.2433-001/
7. http://www.doc.ic.ac.uk/~pjm/adb/index.html
8. http://www.cs.manchester.ac.uk/postgraduate/taught/programmes / fulllist/

<table>
<tr><th colspan="13">CS1149 DATABASE TUNING</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Computer Science and Engineering</td></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">Student outcome</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td></tr>
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<tr><td>2.</td><td>Mapping of instructional objectives with student outcome</td><td>1,2,4</td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>3</td></tr>
<tr><td rowspan="2">3.</td><td rowspan="2">Category</td><td colspan="2">General (G)</td><td colspan="2">Basic Sciences (B)</td><td colspan="4">Engineering Sciences and Technical Arts (E)</td><td colspan="3">Professional Subjects (P)</td></tr>
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<tr><td rowspan="2">4.</td><td rowspan="2">Broad Area</td><td colspan="2">Core Engineering</td><td colspan="2">Computer Hardware Engineering</td><td colspan="2">Software Engineering</td><td colspan="2">Network Engineering</td><td colspan="3">Knowledge Engineering</td></tr>
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<tr><td>5.</td><td>Approval</td><td colspan="11">23rd meeting of Academic Council, May 2013</td></tr>
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CS1150	ADVANCED JAVA PROGRAMMING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	CS1005				

PURPOSE

This course gives a strong foundation on Advanced Java Programming techniques

INSTRUCTIONAL OBJECTIVES

1.	To learn Java Applets, Beans and Animation Techniques
2.	To Understand Advanced Java Networking concepts
3.	To learn Server Side Programming Concepts
4.	To know about the JDBC Principles
5.	To develop Media Applications, 3D Graphics and to work with Swings

UNIT I - JAVA APPLETS AND BEANS (9 hours)

Applets and HTML – Bean Concepts – Events in Bean Box – Bean Customization and Persistence – JavaScript –Combining Scripts and Applets – Applets over web - Animation techniques – Animating images.

UNIT II - ADVANCED NETWORKING (9 hours)

Client- Sever computing – Sockets – Content and Protocols handlers – Developing distributed applications –RMI – Remote objects – Object serialization

UNIT III-SERVER SIDE PROGRAMMING (9 hours)

Introduction to Java Servelets – Overview and Architecture – Handling HTTP get & post request –Session Tracking – Multi-tier application - Implicit objects – Scripting – Standard actions –
Directives – Custom Tag libraries

UNIT IV - JAVA DATABASE PROGRAMMING (9 hours)

Connecting to Databases – JDBC principles – Databases access – Interacting – Database search – Accessing Multimedia databases – Database support in Web applications.

UNIT V - RELATED JAVA TECHNIQUES (9 hours)

Media Techniques - 3D graphics – JAR file format and creation – Internationalization –
Swing Programming – Advanced Java Scripting Techniques.

TEXT BOOKS

1. Jame Jaworski, "*Java Unleashed*", SAMS Techmedia Publications, 1999. (UNIT – I,II,III,V) (Chapters 5,8,12,19,20 – 22,24-26,30,33,37-40,43-46)
2. Deital and Deital, Goldberg, "*Internet & World Wide Web, How To Program"*, Third edition, Pearson Education, 2004. (UNIT – I , UNIT –IV) (Chapters 7,36,37)

REFERENCES

1. Deitel M. and Deitel P.J., "*Java how to program",* Prentice Hall, Eighth Edition, 2009.
2. Cay.S.Horstmann,Gary Cornell, " *Core Java Volume –II Advanced Features"*, Prentice Hall, Eighth Edition, 2008.
3. Campione, Walrath and Huml, "*The Java Tutorial*", Addison Wesley, 2003.
4. Duane A.Bailey, "*Java Structures*", McGraw-Hill Publications, 2007.
5. Herbert Schildt, *"Java The Complete Reference",* McGraw-Hill Publications, 2011.
6. http://java.sun.com/developer/onlineTraining/Programming/JDCBook
7. http://java.sun.com/docs/books/tutorial/networking/TOC.html
8. http://my.execpc.com/~gopalan/java/java_tutorial.html
9. http://www.apl.jhu.edu/~hall/java/Servlet-Tutorial/
10. http://www.informit.com/articles/article.aspx?p=30419

CS1150 ADVANCED JAVA PROGRAMMING												
Course designed by		**Department of Computer Science and Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x									x
2.	Mapping of instructional objectives with student outcome	1,2,5	3,4,5									3,5
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Core Engineering		Computer Hardware Engineering		Software Engineering		Network Engineering		Knowledge Engineering		
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5.	Approval	23rd meeting of Academic Council, May 2013										