SRM UNIVERSITY
(Under section 3 of UGC Act 1956)

B.Tech (Full Time) – Software Engineering
Curriculum & Syllabus
2013 - 2014

Volume – I
(all courses except open electives)

Faculty of Engineering & 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. Software Engineering

Curriculum – 2013
(Applicable for students admitted from the academic year 2013-14 onwards)

SEMESTER 1						
Course code	**Category**	**Course name**	**L**	**T**	**P**	**C**
PD1001	G	SOFT SKILLS I	1	0	1	1
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
Courses from Table I						
Student shall register for minimum 20 credits in I semester and minimum 20 credits in II semester. However student shall have registered for all the courses *enlisted under Semester I and II as well the courses in Table I by the time the registration process is complete in II semester.* *Keeping this in mind student shall register for the courses in I and II semesters.*						

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**
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
SE1001	P	PROGRAMMING USING C AND C++	3	0	2	4
Courses from Table I						
Student shall register for minimum 20 credits in I semester and minimum 20 credits in II semester. However student shall have registered for all the courses enlisted under Semester I and II as well the courses in Table I by the time the registration process is complete in II semester. Keeping this in mind student shall register for the courses in I and II semesters.						

TABLE I

COURSES WHICH CAN BE REGISTERED FOR EITHER IN I OR II SEMESTER

SEMESTER I / II						
Course Code	**Category**	**Course name**	**L**	**T**	**P**	**C**
LE1001	G	ENGLISH	1	2	0	2
LE1002	G	VALUE EDUCATION	1	0	0	1
CS1001	G	PROGRAMMING USING MATLAB	0	1	2	2
BT1001*	B	BIOLOGY FOR ENGINEERS	2	0	0	2
CE1001	E	BASIC CIVIL ENGINEERING	2	0	0	2
ME1001	E	BASIC MECHANICAL ENGINEERING	2	0	0	2
EE1001	E	BASIC ELECTRICAL ENGINEERING	2	0	0	2
EC1001	E	BASIC ELECTRONICS ENGINEERING	2	0	0	2
ME1005	E	ENGINEERING GRAPHICS	0	1	4	3
IT1001	E	COMPUTER HARDWARE AND TROUBLESHOOTING LAB	0	0	4	2
NC1001/ NS1001/ SP1001/ YG1001	G	*NCC/NSS/NSO/YOGA	0	0	1	1

*NCC-National Cadet Corps
NSS-National Service Scheme
NSO-National Sports Organization (India)

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
SE1002	P	COMPUTER ORGANIZATION & ARCHITECTURE	3	0	0	3
SE1003	P	DATA STRUCTURES & ALGORITHMS	3	0	0	3
SE1004	P	SOFTWARE ENGINEERING	3	0	0	3
SE1005	P	PROGRAMMING USING JAVA	3	0	0	3
SE1006	P	DATA STRUCTURES & ALGORITHMS LAB	0	0	3	2
SE1007	P	JAVA PROGRAMMING LAB	0	0	3	2
Total			**19**	**0**	**7**	**23**
Total Contact Hours			**26**			

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
SE1008	P	PRINCIPLES OF OPERATING SYSTEM AND COMPILER	3	0	0	3
SE1009	P	COMPUTER NETWORKS	3	0	2	4
SE1010	P	SOFTWARE ARCHITECTURE	3	2	0	4
SE1011	P	SOFTWARE DESIGN	3	0	2	4
SE1012	P	SOFTWARE PROJECT MANAGEMENT	3	0	0	3
	P	Dep. Elective –I	3	0	0	3
Total			**25**	**2**	**5**	**28**
Total Contact Hours			32			

SEMESTER VI						
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
SE1013	P	DATA BASE MANAGEMENT SYSTEMS	3	0	2	4
SE1014	P	CLOUD COMPUTING	4	0	0	4
SE1015	P	SOFTWARE TESTING	3	0	2	4
SE1016	P	SOFTWARE MEASUREMENTS AND METRICS	3	2	0	4
SE1047	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*
Total			**24**	**2**	**6**	**28**
Total Contact Hours			**32**			

SEMESTER VI						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
PD1006	G	APTITUDE IV	1	0	1	1
SE1017	P	WEB PROGRAMMING	3	0	2	4
SE1018	P	ANALYSIS OF SOFTWARE ARTIFACTS	3	0	2	4
SE1019	P	SOFTWARE QUALITY MANAGEMENT	3	0	0	3
SE1020	P	SOFTWARE MAINTENANCE AND ADMINISTRATION	3	0	0	3
SE1049	P	MINOR PROJECT	0	0	2	1
	P	**Dep. Elective III**	**3**	**0**	**0**	**3**
		Open Elective II	***3***	***0***	***0***	***3***
		Open Elective III	***3***	***0***	***0***	***3***
Total			**22**	**0**	**7**	**25**
Total Contact Hours			**29**			

SEMESTER VII						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SE1021	P	SERVICE ORIENTED ARCHITECTURE	3	0	0	3
SE1022	P	SOFTWARE PROCESS MATURITY MODELS	3	0	0	3
SE1023	P	AGILE SOFTWARE PROCESS	3	0	0	3
SE1048	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**
Total			**15**			
Total Contact Hours			**16**			

SEMESTER VIII						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SE1050	P	MAJOR PROJECT / PRACTICE SCHOOL	0	0	24	12
			0	0	24	12
			24			

DEPARTMENT ELECTIVES						
SEMESTER IV						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SE1101	P	VISUAL PROGRAMMING	3	0	0	3
SE1102	P	NETWORKS SECURITY	3	0	0	3
SE1103	P	E-COMMERCE	3	0	0	3
SE1104	P	SOFT COMPUTING	3	0	0	3
SE1105	P	OBJECT ORIENTED SOFTWARE ENGINEERING	3	0	0	3
SE1106	P	PERSONAL SOFTWARE PROCESS	3	0	0	3

SEMESTER V						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SE1107	P	ADVANCED JAVA PROGRAMMING	3	0	0	3
SE1108	P	DISTRIBUTED OPERATING SYSTEMS	3	0	0	3
SE1109	P	TCP/IP PRINCIPLES	3	0	0	3
SE1110	P	WIRELESS AND MOBILE COMMUNICATION	3	0	0	3
SE1111	P	MOBILE DATABASES	3	0	0	3
SE1112	P	HUMAN COMPUTER INTERACTION	3	0	0	3
SE1113	P	KNOWLEDGE BASED SYSTEMS	3	0	0	3
SE1114	P	BIO INFORMATICS	3	0	0	3
SE1115	P	INFORMATION SECURITY	3	0	0	3
SE1116	P	DESIGN PATTERN	3	0	0	3

SEMESTER VI						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SE1117	P	WINDOWS INTERNAL	3	0	0	3
SE1118	P	C# AND .NET TECHNOLOGIES	3	0	0	3
SE1119	P	HIGH SPEED NETWORKS	3	0	0	3
SE1120	P	FIREWALL ARCHITECTURE	3	0	0	3
SE1121	P	DATA WARE HOUSING	3	0	0	3
SE1122	P	MULTIMEDIA SYSTEM	3	0	0	3
SE1123	P	DIGITAL IMAGE PROCESSING	3	0	0	3
SE1124	P	ARTIFICIAL INTELLIGENCE	3	0	0	3
SE1125	P	ETHICAL HACKING	3	0	0	3
SE1126	P	SOFTWARE REUSE	3	0	0	3

SEMESTER VII						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
SE1127	P	REAL TIME SOFTWARE SYSTEM	3	0	0	3
SE1128	P	LINUX INTERNAL	3	0	0	3
SE1129	P	XML & WEB SERVICES	3	0	0	3
SE1130	P	PERVASIVE COMPUTING	3	0	0	3
SE1131	P	NETWORKS MANAGEMENT	3	0	0	3
SE1132	P	EMBEDDED SYSTEMS	3	0	0	3
SE1133	P	ENTERPRISE RESOURCE PLANNING	3	0	0	3
SE1134	P	DECISION SUPPORT SYSTEM	3	0	0	3
SE1135	P	DATA MINING	3	0	0	3
SE1136	P	GENETIC ALGORITHM AND MACHINE LEARNING	3	0	0	3
SE1137	P	EVOLUTIONARY COMPUTING	3	0	0	3
SE1138	P	SOFTWARE AGENTS	3	0	0	3
SE1139	P	ANDROID PROGRAMMING	3	0	0	3
SE1140	P	SOFTWARE RELIABILITY	3	0	0	3

Summary of credits										
Category	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**Total**	**%**
G (Excluding open and departmental electives)	4	4	3	3	1	1			16	8.9
B (Excluding open and departmental electives)	12	11	4	4	4				35	19.5
E (Excluding open and departmental electives)	6	7							13	7.2
P (Excluding open and departmental electives)		4	16	18	17	15	10	12	92	51.1
Open Elective					3	6			**9**	5
Dep. Elective				3	3	3	6		**15**	8.3
Total	22	26	23	28	28	25	16	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

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

PD1001 - SOFT SKILLS-I												
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										

MA1001	**CALCULUS AND SOLID GEOMETRY**	**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 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 DIFFERENTIALCALCULUS (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										

PY1001	**PHYSICS**	**L**	**T**	**P**	**C**
	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				
	Prerequisite	3	0	0	3
	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.

<table>
<tr><th colspan="14">CY1001 CHEMISTRY</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="12">Department of Chemistry</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 colspan="2">k</td></tr>
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<tr><td>4.</td><td>Approval</td><td colspan="12">23rd meeting of Academic Council, May 2013</td></tr>
</table>

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										

SEMESTER II

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

INSIGHT, 2009. Career Development Centre, SRM Publications.

REFERENCE

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.

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<tr><th colspan="13">MA1002 ADVANCED CALCULUS AND COMPLEX ANALYSIS</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Mathematics</td></tr>
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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.

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<tr><th colspan="13">PY1003 MATERIALS SCIENCE</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Physics and Nanotechnology</td></tr>
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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										

	Programming Using C and C++	**L**	**T**	**P**	**C**
SE1001	Total Contact Hours - 60	**3**	**0**	**2**	**4**
	Prerequisite				
	Nil				

PURPOSE

To familiarize the students with the fundamentals and programming basics of C and C++ language. To master all techniques of software development using C++ Programming Language.

INSTRUCTIONAL OBJECTIVES	
1.	To learn the basics of C declarations, operators and expressions.
2.	To work on all the elementary statements and arrays, manipulation of strings, functions and pointers.
3	Perform object oriented programming to develop solutions to problems demonstrating usage of control structures and other standard language constructs.
4	Demonstrate aptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance
5	Learn syntax, features of the Standard Template Library and exception handling technique.

UNIT I - Data Types and Input- Output (8 hours)

Introduction to the C Language - The C Language and its Advantages -The Structure of a C Program -Data Types, Variables, Constants -Operands, Operators, and Arithmetic Expressions- Input/ Output Management- The getchar() and putchar() Functions - Single-character I/O – string I/O -Formatted Input and output Function

UNIT II-Control Structures& Functions (9 hours)

Introduction - goto statement - If-else statement- nested if-else statement- switch statement - for loop - nested for loop- while loop- do-while loop - break statement- continue statement- exit() function.**Functions:** Introduction-Call by Value and Call by Reference- returnvalues- recursion- **Arrays -** Introduction to Arrays- Initialization of Array- Multi dimensional Arrays- passing arrays to functions-**Strings-** Arrays of Strings - Standard Library String Functions.

UNIT III-Pointers, Structures & Files (9 hours)

Pointers – Introduction-definition - address operator-pointer variables-pointers to pointers-pointers and arrays- -pointers and functions-**Files-**Introduction- File Structure- File handling functions- File Types- Error Handling-**Structure** – Introduction-declaring – initialization- Operations on Structures- Array of Structures- Pointers to Structures- **Unions-** Differences between Unions and Structures- Operations on Unions- Scope of a Unions.

UNIT IV-Introduction to OOP, Class & Objects (10 hours)

Object Oriented Programming Paradigm- Basic Concepts of OOP- Benefits of OOP- Object Oriented Languages- Features of OOP- How OOP Differ from Procedure Oriented Programming-applications of OOP-a Simple C++ Program-structure of C++ Program-basic Data Types in C++- Operators in C++ - Scope Resolution Operator- Member Dereferencing Operators- memory

management operators- Introduction of Classes-Inline member functions-Objects - Arrays of Objects- Objects as Function Arguments- Static data member and static member functions – Constructors- Parameterized Constructors- Default Argument constructors - Copy Constructors- Destructors – Friend functions.

UNIT V-Polymorphism, Templates & Exception Handling (9 hours)

Introduction to Operator overloading- Rules for Operator overloading- overloading of binary and unary operators-Introduction to inheritance–Types of inheritance-Abstract Classes- new Operator and delete Operator- Pointers to Objects- this Pointer- Virtual Functions- Pure Virtual Functions- Introduction to Class Templates- Function Templates-Member Function Templates- Basics of Exception Handling- Types of exceptions- Exception Handling Mechanism- Throwing and Catching Mechanism- Rethrowing an Exception- Specifying Exceptions.

TEXT BOOKS

1. Ashok N. Kamthane, *"Programming in C 2/e"*, Pearson Education, 2011.
2. Makesh Bhave, *"Object Oriented Programming with C++"*, Pearson Education, 2012.

REFERENCES

1. Kashi Nath Dey, *"C Programming Essentials 1/e"*, Pearson Education, 2011.
2. Madhusudan Moth , *"C ++ Programming : A practical Approach, 1/e"*, 2012.
3. Venugopal K.R, *"Mastering C"*, Tata McGraw- Hill, 2010.
4. Venugopal K.R, *"Mastering C++"*, Tata McGraw- Hill, 2010.

Lab Experiments (15 hours)

C Programs:

1. Program to illustrate Primitive Data types, variables, constants and expressions.
2. Program to illustrate String functions, getchar and putchar.
3. Program to illustrate Control Structures (if,do-while,for,switch,while-do,go to)
4. Program to illustrate to functions (pass by value, pass by reference)
5. Program to illustrate to arrays.
6. Program to illustrate to pointers
7. Program to illustrate to structures and unions
8. Program to illustrate to file handling technique.

C++ Programs:

1. Simple C++ programs
2. Program to illustrate class and objects
3. Program to illustrate inline member function

4. Program to illustrate static data and member functions
5. Program to illustrate constructors.
6. Program to illustrate friend functions
7. Program to illustrate operator overloading (Unary and Binary)
8. Program to illustrate function overloading.
9. Program to illustrate inheritance (single,multiple,multilevel,hybrid,hierarchical)
10. Program to illustrate pointer to objects
11. Program to illustrate virtual functions
12. Program to illustrate templates (class, function)
13. Program to illustrate exception handling.

<table>
<tr><th colspan="14">SE1001 Programming Using C and C++</th></tr>
<tr><th colspan="2">Course designed by</th><td colspan="12">Department of Software 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 colspan="3"></td><td colspan="2"></td><td colspan="3"></td><td colspan="2">x</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Broad area</td><td colspan="3">Software Engineering</td><td colspan="2">Computer Engineering</td><td colspan="5">Knowledge Engineering</td></tr>
<tr><td colspan="3">--</td><td colspan="2">X</td><td colspan="5">--</td></tr>
<tr><td>5</td><td>Approval</td><td colspan="12">23rd Meeting of academic council, May 2013</td></tr>
</table>

COURSES WHICH CAN BE REGISTERED FOR EITHER IN I OR II SEMESTER

	ENGLISH	L	T	P	C
LE1001	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										

	VALUE EDUCATION	L	T	P	C
LE1002	Total Contact Hours- 15	**1**	**0**	**0**	**1**
	Prerequisite				
	Nil				

PURPOSE

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.

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

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.

REFERENCES

1. Bansal R.K, Goel A.K, Sharma M.K, "*MATLAB and its Applications in Engineering*", Pearson Education, 2012.
2. Amos Gilat, *"MATLAB-An Introduction with Applications"*, Wiley India, 2009.
3. 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										

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**,** 2004.
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.

<table>
<tr><th colspan="14">BT1001 BIOLOGY FOR ENGINEERS</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="12">Department of Biotechnology</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</td><td></td><td></td><td>2</td><td></td><td></td><td></td><td></td><td></td><td>3</td><td></td></tr>
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<tr><td>4.</td><td>Approval</td><td colspan="12">23rd Meeting of academic council, May 2013</td></tr>
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CE1001	BASIC CIVIL ENGINEERING	L	T	P	C
	Total contact hours 30				
	Prerequisite	2	0	0	2
	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 (6 hours)

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 (6 hours)

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 (6 hours)

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 (6 hours)

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 (6 hours)

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 Material"s*, 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										

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.

ME1001 BASIC MECHANICAL ENGINEERING												
Course designed by		**Department of Mechanical 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- 3				1- 3						
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										

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										

	BASIC ELECTRONICS ENGINEERING	L	T	P	C
EC1001	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
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. T. Thyagarajan, K.P. SendurChelvi, T.R. Rangaswamy, *"Engineering Basics: Electrical, Electronics and Computer Engineering"*, New Age International, Third Edition, 2007.
2. B. Somanathan Nair, S.R. Deepa, "*Basic Electronics",* I.K. International Pvt. Ltd., 2009.

REFERENCES

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

<table>
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<tr><td colspan="2">Course designed by</td><td colspan="12">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="12">23rd Meeting of academic council, May 2013</td></tr>
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ME1005	ENGINEERING GRAPHICS	L	T	P	C
	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.

REFERENCE BOOKS

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										

IT1001	**COMPUTER HARDWARE AND TROUBLESHOOTING LAB**	**L**	**T**	**P**	**C**
	Total contact hours - 30	**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	1													
3.	Category	General (G)			Basic Sciences (B)		Engineering Sciences and Technical Arts (E)					Professional Subjects (P)			
							x								
4.	Broad Area	Programming			Net working		Data base		Web System			Human Computer Interaction		Plat form Technologies	
							x								
5.	Approval	23rd Meeting of 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, MuthrasAnalysis of Thought - Meditation Santhi Physical Exercises III & IVBenefits of Thuriyam - Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, MuthrasAttitude - Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, MuthrasImportance of Arutkappy & Blessings - Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, MuthrasBenefits 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 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

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

REFERENCES

German for Dummies
Schulz Griesbach

<table>
<tr><th colspan="13">LE1003 GERMAN LANGUAGE PHASE I</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>2.</td><td>Mapping of instructional objectives with student outcome</td><td></td><td></td><td></td><td></td><td></td><td></td><td>1-5</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="3">Basic Sciences (B)</td><td colspan="4">Engineering Sciences and Technical Arts (E)</td><td colspan="2">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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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

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

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.

LE1006KOREAN 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	lu	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

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.

LE1007CHINESE 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										

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

PD1003 – APTITUDE-I												
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			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										

MA1003	TRANSFORMS AND BOUNDARY VALUE PROBLEMS	L	T	P	C
	Total Contact Hours - 60	4	0	0	4
	(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

UNITI - 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 ours)

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										

	COMPUTER ORGANIZATION AND ARCHITECTURE	**L**	**T**	**P**	**C**
SE1002	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				
PURPOSE					
To study the basic structure of a digital computer and the organization of the Control unit, the Arithmetic and Logical unit, the Memory unit and the I/O unit.					

INSTRUCTIONAL OBJECTIVES	
1.	To have an understanding of the basic structure and operation of a digital computer.
2.	Discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
3.	To study in detail the different types of control 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 its 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 its 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 devices.

UNIT V–I/O ORGANIZATION (9 hours)

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

TEXT BOOKS

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition *"Computer Organization",* McGraw-Hill, 2002.
2. Ghosh T.K, *"Computer Organization and Architecture",* Tata McGraw-Hill, 2011.

REFERENCES

1. William Stallings, *"Computer Organization and Architecture – Designing for Performance"*, 7th Edition, Pearson Education, 2006.
2. Behrooz parahami, *"Computer Architecture"* Oxford University Press-Eighth Impression, 2011.
3. David A. Patterson and John Hennessy L, *"Computer Architecture-A Quantitative Approach"*, Fifth edition, Elsevier, a division of reed India Private Limited, 2012.

SE1002 – COMPUTER ORGANIZATION AND ARCHITECTURE												
Course designed by		**Department of Software Engineering**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x		x	x		x				x
2.	Mapping of instructional objectives with student outcome	1,2	2		2	3		1				2
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
				X								
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge Engineering					
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1003	**DATA STRUCTURES AND ALGORITHMS**	**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 structure and algorithms concepts.

INSTRUCTIONAL OBJECTIVES	
1.	Student will able to demonstrate understanding of the abstract properties of various data structures such as stacks, queues and lists.
2.	Student will able to understand the advanced data structures and their algorithms.
3.	Student will able to apply algorithm analysis techniques to evaluate the performance of an algorithm and to compare data structures.
4.	Student will able to compare algorithms that solve the same problem.

UNIT I–INTRODUCTION (9 hours)

Fundamentals of Data Structure – Algorithm Analysis – Asymptotic notation – Efficiency classes – Mathematical analysis of Nonrecursive algorithm - Mathematical analysis of recursive algorithm . Problem types – sorting and searching.

UNIT II-LISTS, STACKS AND QUEUES (9 hours)

Abstract Data Types – List : implementation of lists - Linked Lists - Doubly linked lists - Circular linked lists – Examples, Stack : implementation – Applications, Queue: implementation – Applications. Hash Table – Hash Function – Open Hashing – Closed Hashing.

UNIT III-TREES AND GRAPHS (9 hours)

Trees: Binary tree - Binary Search tree - Tree Traversal. Graph: Representation of Graph – Graph Traversal – Minimum Cost spanning trees – Greedy approach - Prim's Algorithm - Kruskal's Algorithm - Dijikstra's Algorithm.

UNIT IV-DIVIDE-AND-CONQUER METHOD AND DYNAMIC PROGRAMMING (9 hours)

Divide-and-Conquer: General Method - Binary search - Merge sort – Quick sort. Dynamic Programming: General Method - Floyd's algorithm – Warshall's algorithm – Knapsack problem.

UNIT V-BACKTRACKING AND BRANCH-AND-BOUND (9 hours)

Backtracking: n-Queens problem, Hamiltonian circuit problem, Subset-sum problem. Branch-and-Bound: Assignment problem - Knapsack problem - Travelling salesman problem.

TEXT BOOKS

1. Mark Allen Weiss – *"Data Structures and Algorithm Analysis in C"* – 2nd Edition – Pearson Education, 2007.
2. Anany Levitin – *"Introduction to the Design and Analysis of Algorithms"* – III Edition – Addison Wesley, 2012.

REFERENCES

1. Alfred V. Aho, John E. Hopcroft, Jeffrey D.Ullman – *"Data Structure and Algorithms"* - Pearson Education, 2009.
2. Sara Baase and Allen Van Gelder - *"Computer Algorithms - Introduction to Design and Analysis"* – 3rd Edition, Pearson Education, 2008.
3. Richard *F. Gilberg, Behrouz A. Forouzan – "Data Structures: A Pseudocode Approach with C"* – 2010 Cengage Learning.

SE1003 - DATA STRUCTURES AND ALGORITHMS												
Course designed by		Department of Software 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						
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Knowledge Engineering			Computer Engineering					
							x					
5.	Approval	23rd Meeting of academic council, May 2013										

SE1004	SOFTWARE ENGINEERING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				

PURPOSE

The main purpose of this course is to impart knowledge on the basic principles of software development life cycle.

INSTRUCTIONAL OBJECTIVES

1.	Understand the software life cycle models
2.	Understand the importance of the software development process
3.	Understand the importance of modeling and modeling languages
4.	Design and develop correct and robust software products

UNIT I - INTRODUCTION (9 hours)

Software Engineering-Software Process- Generic process model-Prescriptive process model-specialized, unified process-Agile development-Agile Process-Extreme Programming- Other agile Process models-Software engineering Knowledge-core Principles-Principles that guide each framework Activity.

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

Requirements Engineering-Establishing the Groundwork-Eliciting Requirements-Developing use cases-Building the requirements model-Negotiating, validating Requirements-Requirements Analysis-Requirements Modeling Strategies.

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

MODELING WITH UML: Modeling Concepts and Diagrams - Use Case Diagrams - Class Diagrams - Interaction Diagrams - State chart Diagrams - Activity Diagrams - Package Diagrams - Component Diagrams – Deployment Diagrams - Diagram Organization- Diagram Extensions. Design Process- Design concepts: Abstraction, Architecture, patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes- Design Model: Data, Architectural, Interface, Component, Deployment Level Design Elements .

UNIT IV-SOFTWARE IMPLEMENTATION **(9 hours)**

Structured coding Techniques-Coding Styles-Standards and Guidelines-Documentation Guidelines-Modern Programming Language Features: Type checking-User defined data types-Data Abstraction-Exception Handling-Concurrency Mechanism.

UNIT V-TESTING AND MAINTENANCE **(9 hours)**

TESTING: Software Quality- Software Quality Dilemma- Achieving Software Quality- Testing: Strategic Approach to software Testing- Strategic Issues-Testing: Strategies for Conventional Software, Object oriented software, Web Apps-Validating Testing- System Testing- Art of Debugging.

MAINTENANCE: Software Maintenance-Software Supportability- Reengineering-Business Process Reengineering- Software Reengineering- Reverse Engineering-Restructuring- Forward Engineering- Economics of Reengineering

TEXT BOOKS

1. Roger S, *"Software Engineering – A Practitioner's Approach",* seventh edition, Pressman, 2010.
2. Pearson Edu, *"Software Engineering by Ian sommerville",* 9th edition, 2010.

REFERENCES

1. Hans Van Vliet, *"Software Engineering: Principles and Practices"*–, 2008.
2. Richard Fairley, *"Software Engineering Concepts",* 2008.

SE1004 - SOFTWARE ENGINEERING												
Course designed by		**Department of Software 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						
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)		Professional Subjects (P)				
								x				
4.	Broad Area	Software Engineering		Computer Engineering		Knowledge Engineering						
		x				x						
5.	Approval	23rd Meeting of academic council, May 2013										

SE1005	**Programming using Java**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge of C and C++ Programming is required				

PURPOSE

The aim of the course is to give a thorough grounding in object-oriented techniques for Java, as well as to examine the major uses of Java - internet programming, design pattern, user interfaces and Networking.

INSTRUCTIONAL OBJECTIVES

1.	The Student will able to understand the Object Basics, Platform independency, Arrays
2.	The Student will able to understand and apply the object oriented concept like Classes and Objects, encapsulation, Inheritance, Polymorphisms
3.	Understand the importance of modeling and modeling languages.
4.	The Student will able to understand and derive the design pattern.
5.	The Student will able to demonstrate java object models
6.	The Student will able to handle the exception cases, understand the I/O operations
7.	The Student will able to develop simple web applications using Applet

UNIT I - INTRODUCTION **(7 hours)**

The History of Java, Java's Key Features, The Java Virtual Machine, The First Application. Basic Syntax - Identifiers, Comments, Keywords, The Eight Primitives, Using Objects. Expression and Arrays : Using Operators, The 'If-Else' Statements, Using 'While' Loop, Selecting with 'Switch' statement, Dealing with Primitive Casts. Using Arrays - Creating an Array, Array Initialization, Working with Arrays, Using Multi-dimensional Arrays. Classpath & JARs: The 'Classpath' in Java, Java Archives.

UNIT II-CLASSES **(10 hours)**

Classes & Packages, The 'import' Statement, The Importance of Encapsulation, Java Constructors, Access Modifiers (private, default and public), Method Overloading. Polymorphism and Inheritance: The 'Protected' Modifier, Using 'this' and 'super', The 'final' keyword, Static Members & Methods. Interfaces & Abstract Classes, The Complete Construction Process, The Class 'Object', Nested Classes, Enums in Java.

UNIT III-BASIC DESIGN PATTERNS **(9 hours)**

Basic Concepts of Design Patterns, Iterators, The Pattern Concept, The OBSERVER Pattern, Layout Managers and the STRATEGY Pattern, components, Containers, and the COMPOSITE Pattern, Scroll Bars and the DECORATOR Pattern. The Java Object Model: The Java Type System, Type Inquiry, the Object Class, Shallow and Deep Copy, Serialization, Reflection

UNIT IV-EXCEPTION, COLLECTIONS AND IO **(9 hours)**

Exceptions & Assertions: Types of Program Errors, The Exception Model, Checked and Unchecked Exceptions, Defining Custom Exceptions, Assertions. Working with Common Classes: java.lang.String, java.lang.System, java.util.Calendar. The Java Collection Framework & Generics: List Basics, Using Lists Wisely, Other Collection Classes. Java IO: Input Stream/Output Stream, Java Serialization, Readers & Writers, Working with Files.

UNIT V-THREAD AND APPLET **(10 hours)**

Threads: The Java Thread Model, Thread Priorities, Synchronization, Messaging, Thread Class, Runnable Interface. Applet Architecture – Skeleton- Simple Applet Display Methods- HTML APPLET tag – Passing Parameters to the Applet-AudioClip and AppletStub Interface - Delegation Event Model – Event Classes.Networking: Overview, TCP/IP Sockets, Writing Your Own Web Server.

Total 45 hours

TEXT BOOKS

1. Herbert Schildt, *"Java The Complete Reference",* Eighth Edition, Tata Mc Graw-Hill Edition India, 2011.
2. Cay Horstmann, *"Object Oriented Design & Patterns"*, John Wiley & Sons, 2004.

REFERENCES

1. Bruce Eckel, *"Thinking in Java"*, 4th edition, Pearson Education, 2006.
2. Ramesh Vasappanavara et al, *"Object-oriented Programming Using C++ and Java"*, First Impression, Pearson, 2011.
3. Cay Horstmann, "*Big Java 4e for Java 7 and 8*", John Wiley & Sons, 2010.

<table>
<tr><td colspan="13">SE1005 - PROGRAMMING USING JAVA</td></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Software 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>
<tr><td>x</td><td>x</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>x</td><td>x</td></tr>
<tr><td>2.</td><td>Mapping of instructional objectives with student outcome</td><td>1,2</td><td>3,4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>5</td><td>6</td></tr>
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<tr><td colspan="3"></td><td colspan="3"></td><td colspan="3"></td><td colspan="2">x</td></tr>
<tr><td rowspan="2">4.</td><td rowspan="2">Broad Area (for courses under 'P' only)</td><td colspan="3">Software Engineering</td><td colspan="3">Computer Engineering</td><td colspan="5">Knowledge Engineering</td></tr>
<tr><td colspan="3">x</td><td colspan="3">x</td><td colspan="5"></td></tr>
<tr><td>5.</td><td>Approval</td><td colspan="11">23rd Meeting of academic council, May 2013</td></tr>
</table>

<table>
<tr><td rowspan="4">SE1006</td><td>DATA STRUCTURES AND ALGORITHMS LAB</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>Total Contact Hours - 30</td><td>0</td><td>0</td><td>3</td><td>2</td></tr>
<tr><td>Prerequisite</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Knowledge of Data Structure and JAVA are Required</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6">PURPOSE</td></tr>
<tr><td colspan="6">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 for problems given.</td></tr>
</table>

INSTRUCTIONAL OBJECTIVES	
1.	Implementing Stack, Queue , Linked List , Binary tree
2.	Sorting and Searching Techniques
3.	Divide and Conquer, Dynamic Programming methods
4.	Greedy method , Traversals and Backtracking

LIST OF EXERCISES

CYCLE – I **(15 hours)**

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

CYCLE- II **(15 hours)**

1. Divide and Conquer Method
   - Binary Search
   - Max Min Problem
2. Greedy Method
   - Knapsack Problem
3. Traversal Technique
   - Depth First Search
   - Breadth First Search
4. Backtracking
   - 8-Queens Problem

TOTAL **(30 hours)**

SE1006 - DATA STRUCTURES AND ALGORITHMS LAB												
Course designed by		Department of Software 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	1,2,3,4			4					5	6
3	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4	Broad Area	Software Engineering		Computer Engineering			Knowledge Engineering					
		x										
5	Approval	23rd Meeting of academic council, May 2013										

SE1007	JAVA PROGRAMMING LAB	L	T	P	C
	Total Contact Hours - 30	0	0	3	2
	Prerequisite				
	Knowledge of Classes and Objects required				

PURPOSE	
This laboratory course gives a thorough understanding of the concepts of Java	
INSTRUCTIONAL OBJECTIVES	
1.	Implementing control structures , classes and objects.
2.	Implementing Arrays, Overloading and Overriding
3.	Implementation some patterns using Java.
4.	Implementing Exception Handling and streams
5.	File Handling and applet

LIST OF EXERCISES

1. Program to illustrate various date types in Java.
2. Program to illustrate class and objects.
3. Program to illustrate control structures (if-then, while, switch).
4. Program to illustrate the concept of arrays (creation, initialization and processing).
5. Program to illustrate Multidimensional arrays.
6. Program to illustrate Constructor and its overloading.
7. Program to illustrate Inheritance and Packages.
8. Program to illustrate Interface and static methods.
9. Program to illustrate modifiers protected, this, final and super.
10. Program to illustrate Patterns and Iterator using Java(Observer / Strategy/Composite)
11. Program to illustrate Exception Handling Technique.
12. Program to illustrate to input/output streams.
13. Program to illustrate File handling technique.
14. Program to illustrate threading.
15. Program to illustrate simple Java applets.

TOTAL - (30 hours)

SE1007 – JAVA PROGRAMMING LAB												
Course designed by		**Department of Software 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	1,2,3,4								5	
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge Engineering					
		x										
5.	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/wollen wir"—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

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

REFERENCES

German for Dummies
Schulz Griesbach

<table>
<tr><th colspan="13">LE01008 GERMAN LANGUAGE PHASE II</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>
</table>

	FRENCH LANGUAGE PHASE II	L	T	P	C
LE1009	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

Tech French

REFERENCES

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

<table>
<tr><th colspan="14">LE1009 FRENCH LANGUAGE PHASE II</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="12">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>4.</td><td>Approval</td><td colspan="12">23rd Meeting of academic council, May 2013</td></tr>
</table>

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

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
	Total Contact Hours-30	**2**	**0**	**0**	**2**
	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

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.

<table>
<tr><th colspan="13">LE1011KOREAN 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="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>4.</td><td>Approval</td><td colspan="11">23rd Meeting of academic council, May 2013</td></tr>
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LE1012	**CHINESE LANGUAGE PHASE II**	**L**	**T**	**P**	**C**
	Total Contact Hours-30	**2**	**0**	**0**	**2**
	Prerequisite				
	LE1007-Chinese Language Phase I				
	Total Contact Hours-30				

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ˆyou ˇ好ˆgood 'well ˇ工作ˆwork 'job ˇ人员ˆpersonnel 'staff member ˇ请问ˆMay I ask… ˇ贵ˆexpensive 'valuable ˇ姓ˆone's family name is ˇ

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ˆfamily 'home ˇ有ˆhave ˇ几ˆ several ˇ
爸爸 (father ˇ妈妈 (mother) 哥哥 (elderly brother ˇ

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
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

LE1012CHINESE 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**
	APTITUDE-II	**1**	**0**	**1**	**1**
	Total Contact Hours - 30				
	Prerequisite				

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:

Personality Development -Verbal Work Book, Career Development Centre, SRM Publications

REFERENCE

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										

MA1014	**PROBABILITY AND QUEUING THEORY**	**L**	**T**	**P**	**C**
	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 (9 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 (9 hours)

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

UNIT III–TESTING OF HYPOTHESES (9 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 (9 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 (9 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.

REFERENCE

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										

	PRINCIPLES OF OPERATING SYSTEM AND COMPILER	L	T	P	C
SE1008	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge about Computer Architecture				

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 of a lexical analyzer & parser.

INSTRUCTIONAL OBJECTIVES

1.	Structure and functions of OS
2.	Processes and Threads, Scheduling algorithms
3.	Principles of concurrency and Memory management
4.	I/O management and File systems
5.	To understand, design and implement Lexical analyzer & parser

UNIT I - INTRODUCTION (9 hours)

Computer System Overview-Basic Elements, Interrupts, Operating system overview-objectives and functions, Evolution of OS- Process States, Process Description and Process Control. Processes and Threads, Types of Threads, Multithreading.

UNIT II-CONCURRENCY & MEMORY MANAGEMENT (9 hours)

Principles of Concurrency - Mutual Exclusion, Semaphores, Deadlocks – prevention- avoidance – detection .Scheduling: Types of Scheduling – Scheduling algorithms. Memory management - Partitioning, Paging and Segmentation-Virtual memory.

UNIT III-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.

UNIT IV-INTRODUCTION TO COMPILING (9 hours)

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Specification of Tokens.

UNIT V-SYNTAX ANALYSIS (9 hours)

Role of the parser –Writing Grammars –Context-Free Grammars – Top Down parsing – Recursive Descent Parsing – Predictive Parsing – Bottom-up parsing – Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser- Syntax directed definitions – Construction of syntax trees

TEXT BOOKS

1. William Stallings, "*Operating Systems – internals and design principles*", Prentice Hall, 7th Edition, 2011.
2. Andrew S. Tannenbaum & Albert S. Woodhull, "*Operating System Design and Implementation*", Prentice Hall, 3rd Edition, 2006.

REFERENCES

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, *"Compilers Principles, Techniques and Tools",* Pearson Education Asia, 2010.
2. Allen I. Holub, *"Compiler Design in C",* Prentice Hall of India, 2003.
3. Fischer C. N. and LeBlanc R. J, *"Crafting a compiler with C"*, Benjamin Cummings, 2003.
4. Andrew S. Tannenbaum, *"Modern Operating Systems",* Prentice Hall, 3rd Edition, 2007.
5. Gary J. Nutt, "*Operating Systems*", Pearson/Addison Wesley, 3rd Edition 2004.
6. http://os-book.com

SE1008 – PRINCIPLES OF OPERATING SYSTEM AND COMPILER												
Course designed by		**Department of Software 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	5							
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering		Knowledge Engineering						
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1009	COMPUTER NETWORKS	L	T	P	C
	Total Contact Hours - 60	3	0	2	4
	Prerequisite				
	Nil				

PURPOSE

This course provides an understanding of various principles, protocols and design aspects of computer networking.

INSTRUCTIONAL OBJECTIVES

1.	To understand the concepts of data communications.
2.	To study the functions of different layers.
3.	To introduce IEEE standards employed in computer networking.
4.	To make the students to get familiarized with different protocols and network components.

UNIT I - INTRODUCTION (9 hours)

Network Architecture – Historical review – Network software architecture: layers and protocol, OSI Vs TCP. Network hardware architecture: topologies, devices. Introduction to types of networks - Optical Networks, Sensor networks.

UNIT II-PHYSICAL AND DATA LINK LAYERS (9 hours)

Basics for Data communications - Transmission Media - Guided and unguided transmission media - Communication satellites - Data link Layer design issues - Error Detection & Correction - Elementary Data link Protocols - Sliding window Protocols.

UNIT III-MAC & NETWORK LAYERS **(9 hours)**

Media access control and LANs: The channel allocation – Methods and protocols for LANs – IEEE 802 standards and LAN technologies – Ethernet, token ring – hardware addressing - Network layer design issues - Routing Algorithms - Congestion Control Algorithms-Internetworking.

UNIT IV-RANSPORT LAYER **(9 hours)**

Transport services - Elements of transport Protocols - A simple transport Protocols –UDP –TCP - Performance issues.

UNIT V-APPLICATION LAYER **(9 hours)**

DNS - E-mail (SMTP, MIME, POP3, IMAP) - WWW-Multimedia - Introduction to Cryptography–Symmetric _key Algorithms - Public_ key Algorithms--firewalls.

TEXT BOOKS

1. Andrew S. Tanenbaum, "*Computer Networks*", Pearson, Fourth Edition, 2010.
2. James F. Kurose and Keith W. Ross, "*Computer Networking: A Top-Down Approach Featuring the Internet*", Pearson Education, Fourth Edition 2011.

REFERENCES

1. Behrouz A. Forouzan, "*Data communication and Networking*", Tata McGraw-Hill, Fourth Edition 2011.
2. William Stallings, "*Data and Computer Communication*", Eighth Edition, Pearson Education, 2008.

ONLINE REFERENCES

1. www.cs.purdue.edu
2. ocw.mit.edu/
3. http://www.public.asu.edu
4. http://authors.phptr.com/tanenbaumcn4
5. cs.umass.edu
6. www.csee.usf.edu
7. www.cs.cmu.edu

LIST OF EXPERIMENTS: **(15 hours)**

1. Applications using TCP Sockets like
   a. Echo client and echo server.
   b. File transfer.
   c. Remote command execution.
   d. Chat.
   e. Concurrent server.

2. Applications using UDP Sockets like
   a. DNS.
   b. SNMP.
3. Applications using Raw Sockets like
   a. Ping.
   b. Traceroute.
4. RPC
5. Experiments using simulators like OPNET:
   a. Performance comparison of MAC protocols.
   b. Performance comparison of routing protocols.
6. Write a program to implement RMI (Remote Method Invocation)
7. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
8. Study of TCP/UDP performance.

SE1009 - COMPUTER NETWORKS												
Course designed by		**Department of Software 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						
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)		Professional Subjects (P)				
								x				
4.	Broad Area	Software Engineering		Knowledge Engineering		Software Engineering						
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1010		**L**	**T**	**P**	**C**
	SOFTWARE ARCHITECTURE	**3**	**2**	**0**	**4**
	Total Contact Hours - 60				
	Prerequisite				
	Knowledge about Software Engineering				
PURPOSE					
To analyze and design large scale software and apply different architecture styles to software design and to provide practical knowledge in software architecture.					

INSTRUCTIONAL OBJECTIVES	
1.	Understand Architectural styles and Quality Attributes.
2.	Understand common tools and terminology related to software architecture.
3.	Understand the role of the Software Architect with a development project.
4.	Use methods for constructing and evaluating architectures.
5.	Understand Advance Concepts in Architecture.

UNIT I - INTRODUCTION (9 hours)

Software Architecture –Architecture Structures and Views – Importance of Software Architecture – Predicting System Quality – Influencing Organizational Structure – Improving Cost and Schedule estimates – Context of Software architecture.

UNIT II-QUALITY ATTRIBUTES (9 hours)

Understanding quality attributes – availability – interoperability – modifiability - performance and security – testability - usability – quality attribute modeling and analysis.

UNIT III-ARCHITECTURE IN THE LIFE CYCLE (9 hours)

Architecture in the agile projects – Architecture and requirements – Designing and documentation – Implementation and testing – Architecture reconstruction and conformance.

UNIT IV-ARCHITECTURE AND BUSINESS (9 hours)

Economic analysis of Architecture – Architecture competence – Architecture and Software product lines – Case Studies.

UNIT V-ARCHITECTURE IN ADVANCE (9 hours)

Architecture in Cloud - Cloud Definition – Service Model – Economic Justification – Base Mechanism – Architecture for the Edge – Edge Document system – SDLC – Metropolis Model.

TEXT BOOKS

1. Len Bass, Paul Clements, Rick Kazman, "*Software Architecture in Practice*", 3rd edition Pearson, 2013.
2. Mary Shaw, David Garlan, "*Software Architecture: Perspectives on an Emerging Discipline*", Prentice Hall, 1996.

REFERENCES

1. Taylor R. N, Medvidovic N, Dashofy E. M, "*Software Architecture: Foundations, Theory, and Practice*", Wiley, 2009.
2. Booch G, Rumbaugh J, Jacobson I, "*The Unified Modeling Language User Guide*", Addison-Wesley, 1999.

ASSIGNMENTS **(15 hours)**

The lab exercises are performed on a case study given to a group of two students. Each assignment carries two weeks of lab sessions in which they present a step by step development of software architecture for the given case study.

1 & 2: Use Case View
- Use Case Modeling
- Risk Analysis

3 & 4: Logical View
- Use Case Realization

5 & 6: Implementation, Process, and Deployment Views
- Process and Deployment View
- Implementation of Case Study

7 & 8: Patterns
- Integrating Patterns
- Grouping

9 & 10: Component and Inter process Communication Design
- Component Design
- Inter process Communication Design

Project: Implementation of CASE STUDY
- Implementation
- Documentation
- Reporting
- Demonstration

SE1010 – SOFTWARE ARCHITECTURE												
Course designed by		**Department of Software 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				4				5		2
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Software Engineering		Knowledge engineering						
		x		x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1011	SOFTWARE DESIGN	L	T	P	C
	Total Contact Hours - 60	3	0	2	4
	Prerequisite				
	Knowledge of Software Engineering				

PURPOSE

The purpose of this course is to impart knowledge on the basic concepts of the design principles of software.

INSTRUCTIONAL OBJECTIVES

1.	Understand software modeling and Architectural Concepts
2.	Understand and apply UML notations in designing software
3.	Gain knowledge about Static and Dynamic modeling
4.	Understand the importance of Software Quality attributes in Software Design
5.	Solving various Case studies using the concepts learnt and understood in this course

UNIT I–INTRODUCTION (9 hours)

Software Modeling – Object oriented Methods and UML- Software Architectural design – Method and Notation – Evolution of Software Modeling and Design Methods - Overview of UML Notations – Software Life cycles and UML Processes – Software Life cycle and Models – Design Verification and Validation – Software Design and Architectural Concepts – OO Concepts – Information Hiding - Inheritance and Generalization- Concurrent Processing – Design Patterns – Requirements analysis and Design Modeling – Designing Software Architectures.

UNIT II–SOFTWARE MODELING (9 hours)

Use case Modeling – Static Modeling – Association between classes- Composition and Classification Hierarchies – Constraints – Static Modeling and the UML – Categorization of classes using UML stereotypes – Modeling External Classes – Static Modeling of Entity Classes – Object and class Structuring

UNIT III–DETAILED DESIGN (9 hours)

Dynamic Interaction Modeling – Object Interaction Modeling – Message Sequence Numbering on Interaction Diagram – Dynamic Interaction Modeling – Stateless Dynamic Interaction Modeling– Finite State Machines and State Transitions – Events, Guard Conditions and Actions – Hierarchical State charts – Guidelines for designing State Charts – Steps in State Dependent Dynamic Interaction Modeling – Modeling Interaction Scenarios using Interaction and State Chart Diagrams

UNIT IV–ARCHITECTURAL DESIGN (9 hours)

Software Architecture and Component Based Software Architecture – Multiple views of Software Architecture and Patterns – Documenting Software Architecture – Interface Design – Designing Software Architecture – Software Sub system Architectural Design – Designing Object oriented Software Architecture – Designing Component Based Software Architecture

UNIT V–CASE STUDIES (9 hours)

Designing Concurrent and Real time Software Architectures – Designing Software Product Line Architectures – Software Quality Attributes – Case Studies - Client – Server Software Architecture Case Study - Component Based Software Architecture Case Study – Real Time Software Architecture

Total - (45 hours)

TEXT BOOKS

1. Hassan Gomma, *"Software Modeling and design with UML"*, Cambridge University Press, 1 edition, 2011.
2. Michael Bigrigg, *"Software Design Specification with UML",* Addison-Wesley, 2007.

REFERENCES

1. David Budgen, *"Software Design",* Addison-Wesley, 2007.
2. Christopher Fox, *"Introduction to Software Engineering Design: Processes, Principles and Patterns with UML2"*, Pearson, 2007.

LIST OF EXPERIMENTS

Do the following 10 exercises in part I for any one mini project given in part II

Part I

1. To develop a problem statement
2. a. Develop an IEEE standard SRS document
   b. Also develop risk management and project plan using Gantt Chart
3. Identify use cases and develop the Use Case Model. Also give Use Case Descriptions.
4. Identify the business activities and develop the UML Activity Diagram
5 Identify the conceptual Classes and develop the Domain Model by using the Class Diagrams.
6. Using the identifies scenarios, find the interaction between the objects and represent them by using the UML Interaction Diagram.
7. Develop the State chart Diagrams, depicting the various states and transitions in the objects.

8. Identify the user interface, domain objects, and Technical services. Draw the partial layered and logical architecture diagram using the UML Package Diagram.
9. Identify the various components in your project and develop the Component Diagrams
10. Develop the Deployment Diagrams.

Part II

Suggested Domains for Mini- Project are as follows:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System
10. Recruitment System

Total Hours - (15 hours)

REFERENCE

Laboratory Manual

SE1011 – SOFTWARE DESIGN												
Course designed by		**Department of Software 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		1,2	3		4			5			4
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge engineering					
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1012	SOFTWARE PROJECT MANAGEMENT	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge of Software Engineering Principles				

PURPOSE

This course on Software Project Management highlights Software Project planning and management.

INSTRUCTIONAL OBJECTIVES

1.	Software Process and Metrics
2.	Project Planning and Risk Management
3.	Software Quality Assurance and Software Configuration Management

UNIT I - BASIC CONCEPTS **(9 hours)**

Product Process and project—Definition—Product life Cycle: Prototype Development Phase, Alpha Phase, Beta Phase, Production &Maintenance Phase—Project Life Cycle Models:Water fall Model, Prototype Model, RAD & Spiral Model—Process Models.

UNIT II-UMBRELLA ACTIVITIES **(9 hours)**

Metrics—Software Configuration Management: Process and activities ,Configuration audit, Metrics in SCM, Tools & automation –Software Quality Assurance:Quality Control & Quality Assurance, Tools, Meassure of SQA Success –Risk Management:Risk Management Cycle, Risk Identification, Quantification, Monitoring, Mitigation, Metrics in Risk Management.

UNIT III - PROJECT MANAGEMENT PROCESS AND ACTIVITIES

(9 hours)

In-Stream activities - Project initiation: activities, Outputs, Quality Records, completion criteria –Project Planning and Tracking: Components, activities specific to Project tracking—Project Closure: Effective closure Process issues, Metrics for Project Closure.

UNIT IV–ENGINEERING ACTIVITIES IN PROJECT LIFE CYCLE

(9 hours)

Software requirement Gathering: Inputs and start criteria, Dimentions, steps ,Output & Quality records, Skillsets, Challenges, Metrics for Requirement Phase – Estimation : Phases of Estimation, Methodology, Models for size estimation, Challenges, Metrics for Estimation Process —Design and Development Phases-Project Management in Testing & Maintenance Phase.

UNIT V-EMERGING TRENDS IN PROJECT MANAGEMENT (9 hours)

Globalization Issues in Project management : Evolution, Challenges, Models – Impact of the internet on Project Management:Effect of internet on Project Management, managing project for internet, Project management activities – People Focused Process Models:People centric models, P-CMM, other people-focussed Models.

Total - (45 hours)

TEXT BOOKS

1. Ramesh Gopalaswamy, "*Managing and global Software Projects"*, Tata Mc Graw Hill.Tenth Reprint 2011.**(Revised)**

REFERENCES

1. Roger S.Pressman, *"Software Engineering - A Practitioner's Approach"*, 7th Edition McGraw Hill, 2010.**(Revised).**
2. Humphery Watts, *"Managing the Software Process"*, Addision Wesley, 1989.**(Revised).**
3. Wheelwright and Clark: "*Revolutionizing product development"*, The Free Press, 1993

SE1012 – SOFTWARE Project Management												
Course designed by		**Department of Software Engineering**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x		x	x		x	x			x
2.	Mapping of instructional objectives with student outcome	1,2	2		2	3		1	5			2
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge engineering					
		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

UNITIV **(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 LOGICO (**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 LANGUAGES (**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. Sundaresan. V, Ganapathy Subramanian .K.S. and Ganesan .K, "*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. Liu .C.L., "*Elements of Discrete Mathematics*", 2nd Edition, McGraw Hill Publications, 1985.

<table>
<tr><th colspan="13">MA 1015 - DISCRETE MATHEMATICS</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Mathematics</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>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>1-5</td><td></td><td></td><td></td><td>1-5</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="3">General (G)</td><td colspan="3">Basic Sciences (B)</td><td colspan="3">Engineering Sciences and Technical Arts (E)</td><td colspan="2">Professional Subjects (P)</td></tr>
<tr><td colspan="3">--</td><td colspan="3">x</td><td colspan="3">--</td><td colspan="2">--</td></tr>
<tr><td>4.</td><td>Approval</td><td colspan="11">23rd Meeting of academic council, May 2013</td></tr>
</table>

SE1013	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
	Total Contact Hours - 60	3	0	2	4
	Prerequisite				
	Nil				

PURPOSE

To study the foundations of database systems, concepts of Relational Database design, basics such as the relational algebra and data model, query processing, transactions and query languages.

INSTRUCTIONAL OBJECTIVES

1.	To present an introduction to database management systems (DBMS), with an emphasis on how to organize, maintain and retrieve efficiently, and effectively the information from a DBMS.
2.	To explain the fundamental concepts of the relational model, including relations, attributes, domains, keys, foreign keys, entity integrity and referential integrity.
3.	To demonstrate how relations can be normalized. The normalization process requires an understanding of first through fifth normal forms, functional dependencies and multi-valued dependencies.
4.	To list the operations of relational algebra and show how they can be used to create new relations from existing relations.
5.	To define and manipulate the relational databases in SQL.

UNIT I - INTRODUCTION (9 hours)

Introduction to databases and their applications- Overview of a Database Management System-Data abstraction and database architecture - The Entity-Relationship Data Model: Elements of the E/R Model , Design Principles, The Modeling of Constraints, Weak Entity Sets - Basics of the Relational Model-From E/R Diagrams to Relational Designs-Converting Subclass Structures to Relations.

UNIT II-THE RELATIONAL DATABASES & SQL (9 hours)

Functional Dependencies-Rules About Functional Dependencies-Design of Relational Database Schemas – Multivalued Dependencies - Normalization - Relational Algebra: Relational Operations, Extended Operators of Relational Algebra, Constraints on Relations - Tuple Relational Calculus and Domain Relational Calculus - Introduction to SQL - Entering Information - Extracting Information

UNIT III-SQL ADVANCED DATABASE DESIGN AND PL/SQL (9 hours)

Ensuring Data Validity with Constraints - Speeding Up Results with Indexes - Manipulating Data - Grouping and Aggregating Data - Selecting Data from Different Tables - Queries within Queries - Views - Security and User Authorization in SQL - PL/SQL: Fundamentals - Conditional and Sequential Control- Loops - Cursors in PL/SQL - Stored Procedures and Functions

UNIT IV-FILES ORGANIZATIONS, QUERY OTIMIZATION, CONCURRENCY CONTROL (9 hours)

Index Structures: Indexes on Sequential Files, B-Trees, Hash Tables - Query Processing and Optimization: Selection and Join processing algorithms, query tree, query transformation, and evaluation plan - ACID properties - Concurrency Control by Lock, Timestamp, Validation.

UNIT V-FAILURE RECOVERY AND CASE STUDIES (9 hours)

Transaction management: Serializability and Recoverability, View Serializability, log-Based Recovery, Resolving Deadlocks - Distributed Databases - XML databases – Open source database tools: MySQL, Postgresql, SqLite.

TEXT BOOKS

1. Henry F. Korth, Abraham Silberschatz, Sudarshan S, *"Database System Concepts"*, 6th Edition, Tata McGraw-Hill Education, 2010.
2. Benjamin Rosenzweig, Elena Silvestrova, "*Oracle PL/SQL by Example",* 4th Edition, Pearson Education, 2009.

REFERENCES

1. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, *"Database Systems: The Complete Book"* - Pearson Education, 2002.
2. Paul Wilton and John W. Colby, "*Beginning SQL".* - Wiley Publishing, Inc., 2005.

List of Programs (15 hours)

Implement the following exercises by developing one application.

1. SQL DDL Commands
2. SQL DML Commands
3. Inbuilt functions in SQL.
4. Nested Queries & Join Queries.
5. Set operators & Views.
6. PL/SQL Conditional and Iterative Statements
7. PL/SQL Procedures and Functions
8. PL/SQL Cursors
9. PL/SQL Exception Handling
10. PL/SQL Trigger

SE1013 - DATABASE MANAGEMENT SYSTEMS												
Course designed by		Department of Software 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	3,4	5	2		3				1		6
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering		Knowledge engineering						
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1014	CLOUD COMPUTING	L	T	P	C
	Total Contact Hours - 60	4	0	0	4
	Prerequisite				
	Networks				

PURPOSE

To provide a comprehensive introduction to Object Oriented Programming (OOP) uses C++, Java and C# programming language. This course aims to teach OOP concepts, such as classes, interfaces, inheritance, and polymorphism.

INSTRUCTIONAL OBJECTIVES

1.	The Student will able to understand the Cloud Computing basics and its models.
2.	The Student will able to understand the fundamentals of Data Centers.
3.	The Student will able to understand the Architecture of Data Centers.
4.	The Student will able to understand the Data Center design principles.
5.	The Student will able to understand the Security aspects of Data Center and the security framework.

UNIT I - INTRODUCTION (12 hours)

Introduction to Cloud Computing - Understanding Cloud Computing - Developing Cloud Services - A Simple Model of the Cloud - Infrastructure as a Service - Platform as a Service - Software as a Service.

UNIT II-DATA CENTERS (12 hours)

Overview of Data Centers - Application Architecture Models - Data Center Architecture - Data Center Services- Server Architecture : Client and Server

Packet Processing - Configuring a Web Server - Network Architecture Design Options - Application Architectures : Integration of Applications - Multitier Applications.

UNIT III-DATA CENTER DESIGN AND SECURITY (12 hours)

Data Center Design: Types of Server Farms and Data Centers - Data Center Topologies - Data Center Security: Vulnerabilities and Common Attacks - Network Security Infrastructure - Security Fundamentals - Data Center Security Framework.

UNIT IV-VIRTUALIZING SOFTWARE (12 hours)

Introduction to Server Virtualizing software – Introduction to VMware vSphere - Configuring vSphere Environment - Creating and Managing Virtual Networking - Configuring and Managing Storage - Managing Virtual Machines.

UNIT V-USING CLOUD SERVICES (12 hours)

Collaborating on Calendars, Schedules, Task Management, Event Management, Project Management - Collaborating on Databases - Storing and Sharing Files and Other Online Content - Collaborating via Web-Based Communication Tools - Collaborating via Social Networks and Groupware - Collaborating via Blogs and Wikis.

TEXT BOOKS

1. Michael Miller, *"Cloud Computing"*, Pearson Education, New Delhi, 2009.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, *"Cloud Computing: A Practical Approach"*, McGraw Hill, 2009.

REFERENCES

1. Mauricio Arregoces, Maurizio Portolani, "*Data Center Fundamentals"*, Cisco Press, 2004
2. Scott Lowe, Jason W, Mc. Carty and Mathew K. Johnson, "*VMware, Vsphere 4 Administration, Instant Reference"*, Published by Sybex, 2009.
3. George Reese, "*Cloud Application Architectures Building Applications and Infrastructure in the Cloud"*, O'Reilly Media, 2009.
4. Grantt Sauls *"Introduction to Data Centers",* Certified Data Centers Specialist, Tutorial.
5. Brendan O'Brien, Alberto Rodriguez, Stephen Sutherland and Mark Wheatley, *"Server Virtualization Software"*, Tutorial, 2009.

SE1014 - Cloud Computing												
Course designed by		Department of Software 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		5			3,5				6	1,7	2
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge engineering					
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1015	SOFTWARE TESTING	L	T	P	C
	Total Contact Hours - 60	3	0	2	4
	Prerequisite				
	Knowledge about software Engineering				

PURPOSE

The purpose of this course is to provide an understanding of concepts and techniques for testing software and assuring its quality.

INSTRUCTIONAL OBJECTIVES

1.	To Gain Knowledge in the Test Environment
2.	Ability to plan tests
3.	Ability to execute tests, design test cases, use test tools, etc
4.	Ability to develop testing status reports

UNIT I - INTRODUCTION (9 hours)

Activities of a Test Engineer - Testing Levels Based on Software Activity - Beizer's Testing Levels Based on Test-Process Maturity - Automation of Test Activities - Software Testing Limitations and Terminology - Coverage Criteria for Testing - Infeasibility and Subsumption - Characteristics of a Good Coverage Criterion - Older Software Testing Terminology

UNIT II-GRAPH TESTING (9 hours)

Graph Coverage Criteria - Structural Coverage Criteria - Graph Coverage for Source Code - Graph Coverage for Design Elements - Graph Coverage for Specifications - Graph Coverage for Use Cases - Representing Graphs Algebraically

UNIT III-LOGIC TESTING & INPUT SPACE PARTITIONING (9 hours)

Logic Predicates and Clauses - Logic Expression Coverage Criteria - Structural Logic Coverage of Programs -Specification-Based Logic Coverage - Logic Coverage of Finite State Machines - Disjunctive Normal Form Criteria. Input Domain Modeling - Combination Strategies Criteria - Constraints among Partitions

UNIT IV-SYNTAX TESTING (9 hours)

Syntax- Based Coverage Criteria - Program-Based Grammars - Integration and Object-Oriented Testing - Specification-Based Grammars - Input Space Grammars. Regression Testing - Integration and Testing - Test Process - Test Plans

UNIT V-ENGINEERING CRITERIA (9 hours)

Testing Object-Oriented Software - Unique Issues with Testing OO Software - Types of Object-Oriented Faults – Testing Web Applications and Web Services - Testing Static Hyper Text Web Sites - Testing Dynamic Web Applications -Testing Web Services - Testing Graphical User Interfaces - Testing GUIs - Real-Time Software and Embedded Software

TEXT BOOKS

1. Paul Ammann, Jeff Offutt, "*Introduction to Software Testing*", Cambridge University Press, 2008.
2. Srinivasan Desikan, Gopalaswamy Ramesh, "*Software Testing: Principles and Practices*", Pearson, 2012.

REFERENCES

1. Aditya P. Mathur, "*Foundations of Software Testing*", Pearson, 2008.
2. Paul C. Jorgensen, "*Software Testing: A Craftsman's Approach*", Auerbach Publications, 2008.

LIST OF EXPERIMENTS (15 hours)

Using Testing Tool, do the following Experiments

1. Test Principles and Concepts
2. Test Management
3. Build the Test Environment
4. Test Planning Process
5. Test Design
6. Performing Tests
7. Defect Tracking and Correction
8. Acceptance Testing
9. Status of Testing
10. Test Reporting

SE1015 – SOFTWARE TESTING												
Course designed by		Department of Software 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						
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering		Knowledge engineering						
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1016	SOFTWARE MEASUREMENTS AND METRICS	L	T	P	C
	Total Contact Hours - 60	3	2	0	4
	Prerequisite				
	Knowledge about Software Engineering				

PURPOSE

The purpose of this course is to provide the knowledge about Software Metrics, Essentials of software metrics and practical knowledge to assess software.

INSTRUCTIONAL OBJECTIVES

1.	To provide a solid background knowledge about software Metrics.
2.	To educate various metrics and models to assess software.
3.	To provide hands on experience to use and implement metrics.

UNIT I - THE HISTORY AND EVOLUTION OF SOFTWARE METRICS (9 hours)

Evolution of the software industry and evolution of software measurements – The cost of counting function point metrics – The paradox of reversed productivity for high-Level languages- The Varieties of functional metrics – Variations in application size and productivity rates – Future Technical Developments in Functional Metrics- Software measures and metrics not based on function points.

UNIT II-MEASURING SOFTWARE QUALITY (9 hours)

Quality control and international competition – Defining quality for measurement and estimation – Five steps to software quality control- Measuring software defect removal- Measuring Defect removal efficiency – Measuring the costs of defect removal – Evaluating defect prevention methods – Measuring customer reported defects- Measuring invalid defects, Duplicate defects and special cases- Reliability Models - The Rayleigh Model- Reliability Growth Models.

UNIT III-PROCESS METRICS (9 hours)

In-Process Metrics for Software Testing - Test Progress S Curve - Testing Defect Arrivals Over Time - Product Size Over Time - CPU Utilization - Effort/Outcome Model. Complexity Metrics and Models - Lines of Code - Halstead's Software Science - Cyclomatic Complexity. - Syntactic Constructs - Structure Metrics. Metrics for Object-Oriented Projects - Concepts and Constructs - Design and Complexity Metrics - Lorenz Metrics and Rules of Thumb - CK OO Metrics Suite - Productivity Metrics.

UNIT IV-MECHANICS OF MEASUREMENT (9 hours)

Software Assessments – Software Baselines – Software Benchmarks- What a Baseline analysis covers – Developing or Acquiring a baseline data collection Instrument – Administering the data collection questionnaire – Analysis and aggregation of the Baseline data. Measuring and Analyzing Customer Satisfaction - Surveys - Data Collection - Sampling Methods - Analyzing Satisfaction Data. Conducting In-Process Quality Assessments - Preparation - Evaluation - Quantitative Data - Qualitative Data - Evaluation Criteria - Overall Assessment.

UNIT V-MEASUREMENTS, METRICS AND INDUSTRY LEADERSHIP (9 hours)

Measures and metrics of industry leaders – Measures, metrics and innovation – Measurements, metrics and outsource litigation – Measurements, metrics and behavioral changes – Commercial software measurement tools. Measuring Process Maturity - Process Capability - Value of Process Improvement - Process Adoption – Process Compliance. Function Point Metrics to Measure Software Process Improvement - Software Process Improvement Sequences.

TEXT BOOKS

1. Caper Jones, *"Applied Software Measurement: Global Analysis of Productivity and Quality"*, Third Edition, McGraw Hill Companies, 2008.
2. Stephen H. Kan, *"Metrics and Models in Software Quality Engineerin*g", Addison Wesley, 2011.

REFERENCES

1. Mark Lorenz, Jeff Kidd, *"Object-Oriented Software Metric*s", Prentice Hall, 2000.
2. Naresh Chauhan, *"Software Testing Principles and Practices"*, Oxford University Press, 2010.
3. Ravindranath Pandian C, *"Software Metrics A Guide to planning, Analysis, and Application"*, Auerbach, First Indian Reprint, 2011.

ASSIGNMENTS **(15 hours)**

1. For any given project, Identify and calculate Unadjusted Function Points and Complexity adjustment Factors. Based on that compute FP.
2. Create a program to find the LOC of Given Software project.
3. Illustrate and Implement Halstead metrics.
4. Illustrate and implement Cyclomatic Complexity Metrics.
5. Narrate and Implement JM Model.
6. Create a program to implement any two sampling Methods.
7. Make a customer satisfaction survey of given application.
8. Implement any five Object Oriented Metrics.

SE1016 – SOFTWARE MEASUREMENTS AND METRICS												
Course designed by		**Department of Software 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
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)		Professional Subjects (P)				
						x						
4.	Broad Area	Software Engineering		Computer 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**
SE1047	2 week practical training in industry	**0**	**0**	**1**	**1**
	Prerequisite				
	Nil				

PURPOSE

To provide hands-on experience at industrial places where software engineering projects are carried out

INSTRUCTIONAL OBJECTIVES

1. Students have to undergo two – week practical training in Software Engineering related project. 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 Software Engineering related project 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.

<table>
<tr><th colspan="13">SE1047 INDUSTRIAL TRAINING I</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Software 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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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 II - ARITHMETIC – III **(6 hours)**
Time, Speed & Distance, Time & Work

UNIT III - ALGEBRA – II **(6 hours)**
Quadratic Equations, Linear equations & inequalities

UNITIV– GEOMETRY **(6 hours)**
2D Geometry, Trigonometry, Mensuration

UNIT V – MODERN MATHEMATICS – II **(6 hours)**
Sets & Functions, Sequences & Series, Data Interpretation, Data Sufficiency

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

REFERENCE

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
3. Edgar Thrope*, Test Of Reasoning For Competitive Examinations,* Tata Mcgraw Hill, 4th Edition
4. *Other material related to quantitative aptitude*

PD1006 - APTITUDE-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			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										

SE1017	WEB PROGRAMMING	L	T	P	C
	Total Contact Hours - 60	3	0	2	4
	Prerequisite				
	Knowledge about Java				

PURPOSE

To explain internet Programming concepts and related programming with scripting languages and to provide practical knowledge in web programming.

INSTRUCTIONAL OBJECTIVES

1.	To describe basic Internet Protocols.
2.	Understand JAVA and HTML tools for Internet programming.
3.	Describe scripting languages – Java Script.
4.	Understand HTML5 programming.
5.	Understand Server Side Programming tools, AJAX , Silver light and flash macromedia

UNIT I - BASIC NETWORK AND WEB CONCEPTS (9 hours)

Internet standards – TCP and UDP protocols – URLs – MIME – CGI – Introduction to SGML

Java basics – I/O streaming – files – Socket programming –client/server programs – E-mail client – SMTP - POP3 programs – web page retrieval – protocol handlers – content handlers - applets – image handling - Remote Method Invocation.

UNIT II-SCRIPTING LANGUAGES & SERVER SIDE SCRIPTING (9 hours)

HTML5 introduction – Introduction to JavaScript and DOM – Event Handler – Java script functions – objects – simple web applications – Talking to the Web – Web Storage and Workers - HTTP GET and POST requests – session tracking – cookies – JDBC – simple web applications – multi-tier applications.

UNIT III–AJAX AND SILVERLIGHT (9 hours)

Introduction to AJAX on ASP.NET – DHTML – JavaScript and DOM – Data Communication: XML, XSLT, and JSON – Introduction to Silver light – Silver light User interface control – Content integration in silver light application – Network Communication – Working with data-Introduction to Flash – working with object editor – Publishing flash files.

UNIT IV-CORBA TECHNOLOGIES (10 hours)

Java and CORBA – Interface Definition Language – Object Request Broker (ORB) – System Object Model – Portable Object Adapter – CORBA services – CORBA component model – Containers – Application server – Model driven architecture.

UNIT V-COMPONENT FRAMEWORK AND DEVELOPMENT (8 hours)

COM + contexts – EJB containers – CLR contexts and channels – Black box component framework – Directory objects – Cross development environment – Component Oriented programming – Component design and Implementation tools – Testing tools – Assembly tools.

TEXT BOOKS

1. Deitel, Deitel and Nieto, *"Internet and World Wide Web – How to program"*, 4th Edition, Pearson Education Publishers, 2009.
2. Elliotte Rusty Harold, *"Java Network Programming"*, O'Reilly Publishers, 2009.

REFERENCES

1. Krishnamoorthy R. & Prabhu S, *"Internet and Java Programming",* New Age International Publishers, 2004.
2. Eric Freeman, Elisabeth Robson, *"HTML5 Programming",* first edition, O'Reilly Publishers, 2011.
3. Ashish Ghoda, *"Introducing Silverlight 4"*, APRESS, 2010.
4. Wallace B. McClure, Scott Cate, Paul Glavich, Craig Shoemaker, *"Beginning Ajax with ASP.NET"*, Wiley Publishing, Inc, 2006.
5. Ellen finkelstein, Gurdy leete, "*Macromedia flash 8"*, TEAM LinG
6. Ed Roman, *"Mastering Enterprise Java Beans"*, 3rd edition, John Wiley Publications, 2005.
7. Mowbray, *"Inside CORBA"*, Pearson Education, 2006.

LIST OF EXPERIMENTS **(15 hours)**

1. Create a web page with the following using HTML5
   i) To embed an image map in a web page
   ii) To fix the hot spots
   iii)Show all the related information when the hot spots are clicked.
2. Create a web page with all types of Cascading style sheets.
3. Client Side Scripts for Validating Web Form Controls using DHTML
4. Write programs in Java to create applets
5. Programs using Flash
6. Programs using AJAX
7. Programs using JDBC
8. Programs using XML – Schema – XSLT/XSL
9. Develop a middleware component for retrieving Weather Forecast information using CORBA
10. Develop a web service application

SE1017 – WEB PROGRAMMING												
Course designed by		**Department of Software 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			5						4
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)		Professional Subjects (P)				
								x				
4.	Broad Area	Computer Engineering		Software Engineering		Knowledge engineering						
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1018	ANALYSIS OF SOFTWARE ARTIFACTS	L	T	P	C
	Total Contact Hours - 60	3	0	2	4
	Prerequisite				
	Knowledge of software engineering, software testing is required.				

PURPOSE

To enhance students software testing and analysis skills.

INSTRUCTIONAL OBJECTIVES

1.	Understand the concepts of quality models, frame work and testing
2.	Gain knowledge in analysis of software under various dimensions
3.	Gain knowledge in the area of evaluating an architecture & verification & validation of software.

UNIT I - QUALITY MODELS (9 hours)

Introduction-views on quality-cost of quality-quality models-Statistics and measurements-Statistics and measurements-Analysis of given source code using SQALE and Sonar models.

UNIT II-QUALITY FRAMEWORK and TESTING: (9 hours)

Quality framework characteristics – verification- Measuring test adequacy-overview of black box testing techniques-decision tables-combinatorial testing-classification tree method- white box testing- Random and exploratory.

UNIT III-SOFTWARE ANALYSIS (9 hours)

Introduction to Static analysis- Static analyzer for finding dynamic programming errors-dataflow testing – procedure to apply data flow testing- examples-performance analysis and verification- Security analysis and verification – Software vulnerabilities and exploitation.

UNIT IV-QUASAR METHOD (9 hours)

Applying the Design structure matrix to system decomposition and integration problems- achieving Agility through Architecture visibility-Recovering and verifying architecture through design structure matrices.

UNIT V-QUALITY MANAGEMENT (9 hours)

Project quality management- Essential Testing-Test driven development – guidance for software verification and validation plans-Master test planning.

TEXT BOOKS

1. Edited by Kshirasagar Naik and Priyadarshi Tripathy, *"Software testing and Quality Assurance: theory and practice"*, John wiley & sons Inc, copyright, 2008.
2. Daniel Galin, *"Software Quality Assurance from Theory to Implementation"*, Pearson Education Ltd., 2004.

REFERENCES

1. *"Quality models to engineering quality requirements"* published in journal of object technology, chair of Software engineering, Vol.2, No. 5 Sep. – October 2003. Online at http://www.jot.sm.
2. Tyson R. Browning, A review and new directions, *"Applying the design structure matrix to system decomposition and integration problems"*, IEEE transactions on Engineering management, Vol. 48, No.3, August 2001.
3. Neeraj sangal and frank waldman in the journal of *"Defense software engineering Dependency models to manage software Architecutre",* Online at www.stsc.hill.af.mil., November 2005.

Lab experiments in the following Topics **(15 hours)**

1. Data Flow Testing and analysis
2. Static Analysis
3. Model Checking Theory
4. Performance and Queuing Theory
5. Design Structure Matrices

SE1018 - ANALYSIS OF SOFTWARE ARTIFACTS												
Course designed by		**Career Development centre**										
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	2			3				3		2
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										X		
4.	Broad Area	Software Engineering		Computer Engineering		Knowledge Engineering						
		X										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1019	SOFTWARE QUALITY MANAGEMENT	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Principles of software engineering and software testing.				

PURPOSE

This course covers the principles of software development emphasizing processes and activities of quality assurance.

INSTRUCTIONAL OBJECTIVES

1.	Define quality assurance plans
2.	Apply quality assurance tools & techniques
3.	To learn about standards and certifications
4.	To describe procedures and work instructions in software organizations

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

Software Quality Challenge - Software Quality Factors - Components of the Software Quality Assurance System. Pre-Project Software Quality Components - Contract Review - Development and Quality Plans

UNIT II-SQA COMPONENTS IN THE PROJECT LIFE CYCLE

(9 hours)

Integrating Quality Activities in the Project Life Cycle – Reviews - Software Testing – Strategies - Software Testing –Implementation - Assuring the Quality of Software Maintenance - Assuring The Quality of External Participants' Parts - Case Tools and their Affect on Software Quality.

UNIT III-SOFTWARE QUALITY INFRASTRUCTURE COMPONENTS (9 hours)

Procedures and Work Instructions - Supporting Quality Devices - Staff Training-Instructing and Certification - Preventive and Corrective Actions - Configuration Management - Documentation and Quality Records Controls.

UNIT IV-SOFTWARE QUALITY MANAGEMENT COMPONENTS

(9 hours)

Project Progress Control - components of project progress control- Progress control of internal projects and external participants- Implementation of project progress control. Software Quality Metrics - Objectives of quality measurement-Process metrics- Product metrics . Software Quality Costs - Objectives of cost of software quality metrics- classic model of cost of software quality.

UNIT V-STANDARDS- CERTIFICATION AND ASSESSMENT (9 hours)

SQA Standards - ISO 9001 Certification - Software Process Assessment. Organizing for Quality Assurance -Management and its Role in Quality Assurance - The Software Quality Assurance Unit - SQA Trustees and Committees

TOTAL - (45 hours)

TEXT BOOKS

1. Daniel Galin - "*Software Quality Assurance: From Theory to Implementation*" - Pearson Addison-Wesley, 2012.
2. Allen Gilles, "*Software quality: Theory and management*" - International Thomson - Computer press, 1997.

REFERENCES

1. Stephen H.Kan - "*Metrics and models in software quality Engineering*" - Addison – Wesley, 1955.
2. Roger S. Pressman - "*Software Engineering-A Practitioner's Approach*" - McGraw Hill pub, 2001.
3. Humphrey Watts - "*Managing the Software process*", Addison Wesley, 1986.

SE1019 – SOFTWARE QUALITY MANAGEMENT												
Course designed by		**Department of Software 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
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Computer Engineering		Software Engineering			Knowledge engineering					
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1020	SOFTWARE MAINTENANCE AND ADMINISTRATION	L	T	P	C
	Total Contact Hours – 45	3	0	0	3
	Prerequisite				
	Knowledge about Software Engineering				

PURPOSE

To study how to maintain and administrate the software

INSTRUCTIONAL OBJECTIVES

1.	To study about reverse Engineering
2.	To study about Configuration management
3.	To Study about Software maintenance tools
4.	To study about software administration and performance.

UNIT I–FUNDAMENTALS OF SOFTWARE MAINTENANCE (9 hours)

Meaning of software maintenance, software change, ongoing support, economic implications of modifying software, the nomenclature and image problem, software maintenance framework, potential solutions to maintenance problem. Maintenance process models: Definition of critical appraisal of traditional process models, maintenance process models. Program understanding: Aims of program comprehension, maintainers and their information needs comprehension process models, mental models, program comprehension strategies, factors that affect understanding, implications of comprehension theories and studies.

UNIT II-REVERSE ENGINEERING (9 hours)

Definition, purposes and objectives, levels of reverse Engineering, supports techniques, benefits. Reuse and reusability: Definitions, objective and benefit of reuse, approach to reuse, domain Analysis, COMPONENTS engineering, reuse process model, factors that impact upon reuse. Maintenance measures, Definitions, objectives of software measurement, example measures, guidelines for selecting maintenance measures.

UNIT III-CONFIGURATION MANAGEMENT (9 hours)

Definition for configuration management, change control, documentation. Management and organizational issues, Management responsibilities, enhancing maintenance productivity, maintenance teams, personnel Education and Training, organization modes.

UNIT IV-BUILDING AND SUSTAINING MAINTAINABILITY (9 hours)

Quality Assurance, fourth generation languages, object oriented paradigms. Maintenance tools: Criteria for selecting tools, taxonomy of tools, program understanding and reverse engineering testing, configuration management, and other tasks. Past, present and future of software maintenance.

UNIT V-SOFTWARE ADMINISTRATION **(9 hours)**

Analyzing system logs**,** operating system updates, patches, and configuration changes, Performing backups. Installing and configuring new hardware and software. Adding, removing, or updating user account information, resetting passwords, System performance tuning. Performing routine audits of systems and software.

TEXT BOOKS

Armstrong A Takang and Penny A.Grubb, *"Software Maintenance: concepts and Practice"*, International Thomson Computer press, London.

REFERENCES

Roger *S* Pressman, "*Software Engineering"*, 6th edition, Tata McGraw-Hill, 2004.

SE1020 - SOFTWARE MAINTENANCE AND ADMINISTRATION												
Course designed by		**Department of Software Engineering**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x	X		x	X		x				x
2.	Mapping of instructional objectives with student outcome	1,2	2		2	3		1				2
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge engineering					
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1049		L	T	P	C
	MINOR PROJECT	**0**	**0**	**2**	**1**
	Total Contact Hours - 30				
	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.

SE1049 MINOR PROJECT												
Course designed by		**Department of Software 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										

SEMESTER VII

SE1021	SERVICE ORIENTED ARCHITECTURE	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about Web Programming				

PURPOSE

To gain the basic principles of service orientated architecture

INSTRUCTIONAL OBJECTIVES

1.	To learn service oriented analysis techniques
2.	To learn technology underlying the service design
3.	To learn advanced concepts such as service composition, orchestration and Choreography
4.	To know about various WS specification standards

UNITI-INTRODUCTION (9 hours)

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate -Principles of service orientation.

UNIT II-WEB SERVICE AND SOA (9 hours)

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination –Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer.

UNIT III-BUILDING SOA (9 hours)

Service oriented analysis – Business-centric SOA – Deriving business services-service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task centric business service design.

UNIT IV-SOA Platforms (9 hours)

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE).

UNIT V-SERVICE ORIENTED DESIGN (9 hours)

WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WS Security.

TEXT BOOKS

1. Thomas Erl, "*Service-Oriented Architecture: Concepts, Technology, and Design"*, Pearson Education, 2009.
2. Thomas Erl, "*SOA Principles of Service Design"* (The Prentice Hall Service-Oriented Computing Series from Thomas Erl), 2005.

REFERENCES

1. Newcomer, Lomow, *"Understanding SOA with Web Services",* Pearson Education, 2005.
2. Sandeep Chatterjee, James Webber, *"Developing Enterprise Web Services, An Architect's Guide"*, Pearson Education, 2005.

SE1021 – SERVICE ORIENTED ARCHITECTURE												
Course designed by		**Department of Software 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
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Computer Engineering		Software Engineering			Knowledge Engineering					
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1022	**SOFTWARE PROCESS MATURITY MODEL**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge of Software Engineering				

PURPOSE

To know about the software process and Software Process Maturity Models

INSTRUCTIONAL OBJECTIVES

1.	To study about various Software process maturity models
2.	To study about how to assess software process
3.	To know about the key process areas of the software process
4.	To study about software improvement sequences

UNIT I–INTRODUCTION **(9 hours)**

Software Process - Software Maturity Framework – Software process Improvement – Process Maturity levels – Principles of Software process Change – Software Process Assessment.

UNIT II–CMM **(9 hours)**

CMM Introduction – CMM Maturity Levels - Initial process- Repeatable Process – Defined Process – Managed Process – Optimizing Process.

UNIT III–CMMI **(9 hours)**

Evolution of CMMI – CMMI Framework – CMMI for Development – Capability level – Maturity levels – Case Study.

UNIT IV– TMM **(9 hours)**

Introduction to TMM – Structure of the TMM – Components of TMMi – Generic Goals and Generic Practices – Process areas for Generic practices - TMMi Maturity Levels – Initial – Managed – Defined – Management and Measurement – Optimization.

UNIT V–AGILE MATURITY MODEL **(9 hours)**

Agile Software Development – Process Improvement framework for Agile Software Development – Intial Level – Explored Level – Defined level – Improved Level – Sustained Level - Software Process Improvement for Agile Software Development Practices.

TEXT BOOKS

1. Watts S. Humphrey, *"Managing the Software process",* Pearson education, 2008.
2. Marry Beth Chrissis, Mike Konnard, Sandy Shrum, *"CMMI : guidelines for Process Integration and Product Improvement"*, Addison Wesley, 3rd Edition, 2011.

REFERENCES

Mark. C. Paulk, *"CMM:Guidelines for Improving the Software Process"*, 2011.

SE1022 – SOFTWARE PROCESS MATURITY MODEL												
Course designed by		**Department of Software Engineering**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x		x	x		x				x
2.	Mapping of instructional objectives with student outcome	1,2	2		2	3		1				2
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge engineering					
		x		x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1023	AGILE SOFTWARE PROCESS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisites: Software Engineering Principles				

PURPOSE

This course impart knowledge to students in the basic concepts of Agile Software Process, methodology and its development.

INSTRUCTIONAL OBJECTIVES

1.	To understand the basic concepts of Agile Software Process.
2.	To gain knowledge in the area of various Agile Methodologies.
3.	To develop Agile Software Process
4.	To know the principles of Agile Testing

UNIT I–INTRODUCTION (9 hours)

Software is new product development – Iterative development – Risk-Driven and Client-Driven iterative planning – Time boxed iterative development – During the iteration, No changes from external stakeholders – Evolutionary and adaptive development - Evolutionary requirements analysis – Early "Top Ten" high-level requirements and skilful analysis – Evolutionary and adaptive planning – Incremental delivery – Evolutionary delivery – The most common mistake – Specific iterative and Evolutionary methods.

UNIT II–AGILE AND ITS SIGNIFICANCE (9 hours)

Agile development – Classification of methods – The agile manifesto and principles – Agile project management – Embrace communication and feedback – Simple practices and project tools – Empirical Vs defined and prescriptive process – Principle-based versus Rule-Based – Sustainable discipline: The human touch – Team as a complex adaptive system – Agile hype – Specific agile methods. The facts of change on software projects – Key motivations for iterative development – Meeting the requirements challenge iteratively – Problems with the waterfall.

Research evidence – Early historical project evidence – Standards-Body evidence – Expert and thought leader evidence – A Business case for iterative development – The historical accident of waterfall validity.

UNIT III–AGILE METHODOLOGY (9 hours)

Method overview – Lifecycle – Work products, Roles and Practices values – Common mistakes and misunderstandings – Sample projects – Process mixtures – Adoption strategies – Fact versus fantasy – Strengths versus "Other" history.

UNIT IV–CASE STUDY **(9 hours)**

Agile – Motivation – Evidence – Scrum – Extreme Programming – Unified Process – Evo – Practice Tips.

UNIT V–AGILE PRACTICING AND TESTING **(9 hours)**

Project management – Environment – Requirements – Test – The agile alliances – The manifesto – Supporting the values – Agile testing – Nine principles and six concrete practices for testing on agile teams.

TEXT BOOKS

1. Craig Larman, *"Agile and Iterative Development – A Manager's Guide"*, Pearson Education – 2004.
2. Elisabeth Hendrickson Quality Tree Software Inc, *"Agile Testing"* 2008.

REFERENCES

1. Agile Software Development – Wikipedia.
2. Alistair *"Agile Software Development series"* Cockburn - 2001.
3. www.agileintro.wordpress.com/2008.
4. www.serena.com/docs/repository/solutions/intro-to-agile-devel.pdf.
5. www.qualitytree.com.
6. en.eikipedia.org/wiki/agile_software_development

SE1023 - AGILE SOFTWARE PROCESS												
Course designed by		Department of Software Engineering										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x		x	x		x				x
2.	Mapping of instructional objectives with student outcome	1			2	1,2,3		1				2
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer 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
SE1048	3 week practical training in industry	**0**	**0**	**1**	**1**
	Prerequisite				
	Nil				

PURPOSE

To provide hands-on experience at industrial places where software engineering projects are carried out

INSTRUCTIONAL OBJECTIVES

1. Students have to undergo three – week practical training in Software Engineering related project. So that they become aware of the practical application of theoretical concepts studied in the class rooms.

Students have to undergo three-week practical training in Software Engineering related project 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.

SE1048 INDUSTRIAL TRAINING II												
Course designed by		**Department of Software Engineering**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
					X		X	X	X	X	X	
2.	Mapping of instructional objectives with student outcome				1	1	1	1	1	1	1	
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences & Technical Arts (E)			Professional Subjects (P)		
										X		
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge Engineering					
		--		--			--			--		
5.	Approval	23rd Meeting of academic council, May 2013										

SEMESTER VIII

	MAJOR PROJECT / PRACTICE SCHOOL	L	T	P	C
	Total Contact Hours - 360	0	0	24	12
SE1050	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 PROJ
ECT

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.

SE1050 MAJOR PROJECT												
Course designed by		Department of Software 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										

ELECTIVES FOR SEMESTER IV

	VISUAL PROGRAMMING	L	T	P	C
SE1101	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about C, C++ and Java programming				

PURPOSE

The purpose of this course is to make the students familiar with Visual Basic .Net programming and develop Windows based applications.

INSTRUCTIONAL OBJECTIVES

Upon completion of this course, students should be able to

1.	Learn the fundamentals of Visual Basic .Net programming.
2.	Create and run simple applications in VB.NET.
3.	Debug, run and test C++ programs.
4.	Learn Database connectivity.
5.	Develop Windows based applications using VB .NET.

UNIT I - VISUAL BASIC .NET AND ITS FRAMEWORK (7 hours)

Introduction to .net framework - Common Language Runtime (CLR)- Visual Studio.Net – IDE - Navigating the IDE- Creating a Visual Basic .NET Solution.

UNIT II-PROGRAMMING FUNDAMENTALS IN VB .NET (11 hours)

Elements of Visual Basic .net - Naming and Notation - Character and Lines - Statements and Blocks - Data types - Type conversion - Variables and Constants - Visual Basic .Net Operators - Operator Overloading - Control Structures - Conditional Statements: If Then, If Then Else, Nested If, Select Case, goto - Looping Statement: Do loop, For Next, For Each Next Loop, While Loop - Pausing, Resuming, and Exiting Iteration – Methods.

UNIT III-WINDOWS PROGRAMMING WITH VB .NET (9 hours)

Windows Forms - MDI Applications - Components and controls - Menus and Toolbars - Responding to User Input - Collecting User Input - Presentation and Informational Controls- Drag and Drop.

UNIT IV-OBJECT ORIENTED CONCEPTS (9 hours)

Classes - Class characteristics - Abstract classes - Inheritance - Sealed Classes - Shared Classes - Interfaces - Collections - Arrays - Exception handling.

UNIT V-DATABASE CONNECTIVITY IN VB.NET (9 hours)

Data Access with ADO.NET - Binding Controls to Databases - Handling Databases in Code.

TEXT BOOKS

1. Jeffery R. Shapiro, "*The Complete Reference Visual Basic .NET*", Tata McGraw Hills.
2. Steven Holzner, "*Visual Basic.NET Black Book*", Dreamtech Press.

REFERENCES

1. Jesse Liberty, "*Learning Visual Basic .NET"*, O'Reilly, 2009.
2. Bill Evjen, Jason Beres, "*Visual Basic .NET Bible*", John Wiley & Sons, 2001.
3. Steve Holzner, Bob Howell, "*ADO.NET Programming in Visual Basic .NET*", Second Edition, Prentice Hall, 2002.

ASSIGNMENT PROGRAMS:

1. Simple programs to illustrate various operators in VB.Net.
2. Programs to illustrate conditional statements in VB.Net.
3. Programs to illustrate looping statements in VB.Net.
4. Simple programs to illustrate various windows form controls in VB.Net.
5. Illustrate drag and drop operations.
6. Programs to illustrate object oriented concepts.
7. Programs to demonstrate exception handling mechanism.
8. Programs to illustrate database connectivity using ADO.Net.
9. Programs to develop windows based applications

SUGGESTED EXERCISES FOR ASSIGNMENT

1. Simple Calculator.
2. Student mark sheet preparation.
3. Employee pay bill creation.
4. Electricity bill generation.
5. Quiz application.
6. Library information system.
7. Bank transaction system.

SE1101 - VISUAL PROGRAMMING												
Course designed by		Department of Software Engineering										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x		x	x		x				x
2.	Mapping of instructional objectives with student outcome	1	2,3			4		1				5
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge engineering					
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1102	NETWORKS SECURITY	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about computer networks				

PURPOSE

This course provides an understanding of various principles, protocols and design aspects of Network Security.

INSTRUCTIONAL OBJECTIVES

This course introduces the students to

1.	Encryption techniques and key generation techniques.
2.	Authentication and security measures.
3.	Intrusion and filtering analysis.

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 BOOKS

1. William Stallings, "*Cryptography & Network Security*", Pearson Education, 4th Edition, 2010.
2. William Stallings and Lawrie Brown, "Computer Security: Principles and Practice", PHI, 2008.

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. Douglas R Simson "*Cryptography – Theory and practice*", CRC Press, 1995.

ONLINE REFERENCES

1. www.williamstallings.com/Security2e.html.
2. www.ocw.mit.edu/OcwWeb/Electrical-Engineering-and-Computer-Science/6 - 857Fall2003/CourseHome/index.htm.

SE1102 NETWORKS SECURITY													
Course designed by		**Department of Software 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		2		3		1				5	
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
										x			
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge engineering						
		x											
5.	Approval	23rd Meeting of academic council, May 2013											

SE1103	E-COMMERCE	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about Software Engineering				

PURPOSE

The purpose of the course is to impart knowledge on E-Commerce and its various applications.

INSTRUCTIONAL OBJECTIVES

1.	To understand E-Commerce framework and business model applications of E-Commerce.
2.	To apply security algorithms.
3.	To understand e-payment mechanisms.
4.	To familiar with marketing and advertising techniques.

UNIT I-INTRODUCTION (7 hours)

Introduction to E- Commerce – Generic Framework of E- Commerce – Business Models – Network Infrastructure - E- Commerce and World Wide Web.

UNIT II-E-COMMERCE APPLICATIONS (9 hours)

Consumer Oriented E- Commerce Applications – Mercantile Process Models - Electronic Payment Systems – Digital Token Based Electronic Payment Systems – Smart Cards – Credit Cards – Risks – Designing Electronic Payment Systems.

UNIT III-ORGANIZATIONAL COMMERCE AND EDI (10 hours)

Electronic Data Interchange – EDI Applications in Business – EDI and E-Commerce– EDI standardization and Implementation – Internet based EDI.

UNIT IV-SECURITY (10 hours)

Security Issues – Security Services – Cryptology - Encryption Techniques – Security Protocols for Web Commerce – E-Payment Systems.

UNIT V-AGENTS AND MOBILE COMMERCE (9 hours)

Agents in E-Commerce – Types – Technologies – Standards and Protocols – Advertising and Marketing on the Internet – Overview of Mobile Commerce and its Applications – E-Commerce Strategy in Business Models and Internet Start-ups: A Business Case Study.

TEXT BOOKS

1. Ravi Kalakota and Andrew B Whinston, *"Frontiers of Electronic Commerce",* Pearson Education Asia, 2009.
2. Bharat Baskar, *"Electronic commerce Framework, Technologies and Applications"*, 3rd Edition 2009, Tata McGraw-Hill Edition.

REFERENCES

Judy Strauss and Raymond Frost, "*E Marketing"*, PHI, 2008.

<table>
<tr><th colspan="13">SE1103 - E-COMMERCE</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Software 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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SE1104	SOFT COMPUTING	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 ANN, Genetic Algorithms and Fuzzy systems and its applications.

INSTRUCTIONAL OBJECTIVES

1.	Basics of ANN and its learning algorithms.
2.	Fuzzy principles and relations.
3.	Genetic algorithms and its applications.
4.	Hybrid systems and usage of MATLAB toolbox.

UNIT I-NEURAL NETWORKS (9 hours)

Fundamentals of Neural Networks – History- Architectures- Learning methods- XOR problem-Delta rule- derivation-Backpropagation- applications- parameters in BPN- Associative memory – Hetero associative- BAM- energy function- problems-applications of associative memories- ART1- ART2- applications of adaptive networks.

UNIT II-FUZZY LOGIC (9 hours)

Fuzzy set theory – crisp sets – fuzzy sets – crisp relations – Fuzzy relations – Fuzzy systems- Crisp logic – predicate logic – fuzzy logic- fuzzy based systems - Defuzzification methods – applications.

UNIT III-GENETIC ALGORITHMS (9 hours)

Fundamentals of GA – creation of offsprings – encoding – fitness function- reproduction – crossover- insertioo& deletion- mutation- bitwise operators – applications.

UNIT IV-HYBRID SYSTEMS (9 hours)

Hybrid systems – Neuro Fuzzy – Neuro Genetic – fuzzy Genetic hybrids- GA based weight determination and applications- fuzzy BPN – simplified fuzzy ARTMAP.

UNIT V-PROGRAMMING USING MATLAB (9 hours)

Using Neural Network toolbox – Using Fuzzy Logic toolbox- Using Genetic Algorithm & directed search toolbox.

TEXT BOOKS

1. Rajasekaran S. and VijayalakshmiPai G.A, *"Neural Networks, Fuzzy Logic and Genetic Algorithms"*, PHI, 2011.
2. Timothy J.Ross, "*Fuzzy Logic with Engineering applications",* John Wiley and Sons, 2010.

REFERENCES

1. Jang J.S.R, Sun C.T, Mizutani E, "*Neuro fuzzy and Soft Computing"*, PHI Learning Pvt. Ltd., 2012.
2. Davis E. Goldberg, *"Genetic Algorithms: Search, Optimization and Machine Learning"*, Addison Wesley, N.Y., 1989.

<table>
<tr><td colspan="14">SE1104 - SOFT COMPUTING</td></tr>
<tr><td colspan="2">Course designed by</td><td colspan="12">Department of Software 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 rowspan="2">4.</td><td rowspan="2">Broad Area</td><td colspan="3">Software Engineering</td><td colspan="3">Computer Engineering</td><td colspan="6">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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SE1105	OBJECT ORIENTED SOFTWARE ENGINEERING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3

PURPOSE

To study about the concepts of object oriented software engineering

INSTRUCTIONAL OBJECTIVES

1.	To learn the fundamentals of OO Software Engineering
2.	To learn about software prototyping, analysis and design
3.	To learn the various OO Design models and Testing Objects
4.	Case studies to apply the principles

UNIT I - INTRODUCTION (8 hours)

Software Engineering Paradigms - Software Development process models - Project & Process - Project management – Process & Project metrics - Object Oriented concepts & Principles.

UNIT II-PLANNING & SCHEDULING (9 hours)

Software prototyping - Software project planning – Scope – Resources - Software Estimation - Empirical Estimation Models-Planning-Risk Management - Software Project Scheduling – Object Oriented Estimation & Scheduling.

UNIT III-ANALYSIS & DESIGN (12 hours)

Analysis Modeling - Data Modeling - Functional Modeling & Information Flow-Behavioral Modeling-Structured Analysis - Object Oriented Analysis - Domain Analysis-Object Oriented Analysis process - Object Relationship Model - Object Behavior Model. Design Concepts & Principles - Design Process - Design Concepts - Modular Design –Design Effective Modularity - Introduction to Software Architecture - Data Design – Transform Mapping – Transaction Mapping – OOD - Design System design process- Object design process -Design Patterns.

UNIT IV-IMPLEMENTATION & TESTING (8 hours)

Top-Down , Bottom-Up , object oriented product Implementation & Integration. Software Testing methods-White Box, Basis Path-Control Structure –Black Box-Unit Testing- Integration testing-Validation & System testing. Testing OOA & OOD models-Object oriented testing strategies.

UNIT V-MAINTENANCE (8 hours)

Maintenance process-System documentation-program evolution dynamics-Maintenance costs- Maintainability measurement – Case Studies

TEXT BOOKS

1. Bernd Bruegge & Allen H. Dutoit, "*Object-Oriented Software Engineering*", 2009.
2. Ivar Jacobson, "*Object-Oriented Software Engineering*", Pearson Education, 2009.

REFERENCES

1. Stephen R. Schach, "*Object-Oriented Classical Software Engineering*", Mc Graw Hill, 2010.
2. Yogesh Singh, "*Object-Oriented Software Engineering*", 2012.

SE1105 – Object Oriented Software Engineering												
Course designed by		**Department of Software 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						3		2
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge engineering					
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1106	**PERSONAL SOFTWARE PROCESS**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Software Engineering Principles				

PURPOSE

To learn about how a software professional personally manages the software processes in all aspects

INSTRUCTION OBJECTIVES

1	To study how to manage and track the time for software processes
2.	To study how to plan a product and how to measure size of a product
3.	To learn how to schedule a process
4.	To learn about software Development process
5.	To learn how to estimate the product and process quality.

UNIT I - INTRODUCTION AND TIME MANAGEMENT (9 hours)

Software Engineering – Personal Software Process – Improvement Process – Time Management – Logic of Time Management - Elements of Time Management – Categorizing your Activities – Gather Data on time spent by Activity – Evaluating your Time Distribution – Setting Ground rules – Prioritizing your time – Track Time – Recording your Time Data – Tracking your time – Handling Interruptions – Tracking Completed tasks.

UNIT II-PRODUCT PLANNING AND PRODUCT SIZE (9 hours)

Product Plan - Need for product Planning – Planning Small Jobs – Job Number Log – Product Planning Process – Size Measurement - Program Size – Estimating Program Size

UNIT III-MANGING COMMITMENTS AND SCHEDULES (9 hours)

Defining Commitment – Responsibly made Commitment – Handling Missed Commitments – Importance of Managing Commitments – Consequences of not Managing Commitments – Way to Manage Commitments – Need for Schedules – Gnatt Chart – Making a Project Schedule – Checkpoints – Tracking Project Plans – Tracking Earned Value

UNIT IV-SOFTWARE DEVELOPMENT PROCESS (9 hours)

Need for Processes – Process Script – Checkpoints and phases – Updated Project Plan Summary Form - Defects – Software Quality – Defects and Quality – Defects Versus Bugs – Defect Types – Understanding Defects – Defect Recording Log – Steps in Finding Defects – Ways to Find and Fix Defects.

UNIT V-PRODUCT AND PROCESS QUALITY (9 hours)

Product Quality – Testing – The Filter view of Testing - Calculating yield values – Estimating the Ultimate Yield – Prototyping – Process Quality – Process Measures – Defect Removal Paradox – Defect Removal strategy – Appraisal/Failure ratio.

TEXT BOOK

Watts.S.Humphery, *"Introduction to the Personal Software Process"*, Addison Wesley, 1997.

REFERENCE

Watts.S.Humphery, *"PSP: A Self-Improvement Process for Software Engineers"*, Addison Wesley, 2005.

SE1106 - PERSONAL SOFTWARE PROCESS												
Course designed by		**Department of Software Engineering**										
1.	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x		x	x		x		x		x
2.	Mapping of instructional objectives with student outcome	1,2	2		2	2		1		3		2
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge engineering					
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

ELECTIVES FOR SEMESTER V

SE1107	ADVANCED JAVA PROGRAMMING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge in Java programming				

PURPOSE

The aim of the course is to study the advanced java concepts and its extended capability.

INSTRUCTIONAL OBJECTIVES

1.	To learn to design GUI java applications with Applet.
2.	To learn java component technologies such as Java Beans.
3.	To learn Networking concepts and advance java network programming.
4.	To study the distributed computing capability of JAVA Platform.
5.	To learn JDBC and to perform SQL operations from java application.

UNIT I - INTRODUCTION TO ADVANCED JAVA (8 hours)

Java Streaming – Components and events handling – Threading concepts – Networking features – Byte code interpretation – Media Techniques.

UNIT II-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 III-ADVANCED NETWORKING (10 hours)

Java Socket and URLs - Socket and Interprocess Communication - Client/Server Methodology - Content and Protocols handlers – Developing distributed applications – CORBA and IIOP - Interfaces - RMI – Remote objects – Object serialization.

UNIT IV-JAVA DATABASE PROGRAMMING (9 hours)

Inside JDBC - Connecting to Databases – Basic steps of JDBC - Databases and SQL - Retrieving Informaion - Storing Information - Accessing Multimedia databases – Working with database metadata - Database support in Web applications.

UNIT V-Web Servers, Server-Side Java, and More. (9 hours)

Inside an HTTP Server - Web Server Architecture, The HTTP Protocol, Using a Web Server, Advanced Web Server Features, HTTP Server Overview - Common Gateway Interface and CGI Scripts - Servlets - Dynamic Documents, Creating the Servlet. A Servlet Version of the Featured App. doGet( ). getAppointments( ). newAppointmentForm( ). insertNewAppointment( ). JSP - Seeting up the JSP environment, Generating dynamic content.

TEXT BOOKS

1. Harvey M. Deitel, Paul J. Deitel, Sean E. Santry, "*Advanced Java(TM) 2 Platform How to Program"*, Pearson Education, 2002.
2. Dick Steflik, PrashantSridharan, "*Advanced Java Networking",* 2/E, Pearson Education, 2000.

REFERENCES

1. Eric Jendrock, Ian Evans, Devika Gollapudi, Kim Haase, Chinmayee Srivathsa, "*The JavaEE6 Tutorial Basic Concepts",* 4/E, Pearson Education, 2011.
2. Hans Bergsten, "*Java Server Pages",* 3/E, O'Reilly Media, 2004.
3. George Reese, "*Database Programming with JDBC and Java"*, 2/E, O'Reilly Media, 2000.

SE1107 - ADVANCED JAVA PROGRAMMING												
Course designed by		**Department of Software 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	2,5	1,6,7							3	4,8,9	
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge engineering					
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1108	DISTRIBUTED OPERATING SYSTEMS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Operating system				

PURPOSE

This course provides in-depth knowledge of Advanced Operating System concepts.

INSTRUCTIONAL OBJECTIVES

1.	Basic introduction to Operating System principles.
2.	Distributed Computing techniques , Synchronous and Processes.
3.	Shared Data access, Files , Case study.

UNIT I - OVERVIEW OF OPERATING SYSTEMS (6 hours)

Introduction – overview of operating system concepts – Process management and Scheduling, Memory management : partitioning, paging, segmentation, virtual memory, Device and File management Databases.

UNIT II-DISTRIBUTED COMPUTING (11 hours)

Introduction - Distributed Systems – Hardware and Software concepts – Design issues; Communication in Distributed systems : Layered protocols - ATM networks - Client Server model – Remote Procedure Calls- Group communication Tools.

UNIT III-SYNCHRONIZATION AND PROCESSES (11 hours)

Synchronization : Clock synchronization – Mutual exclusion – Election algorithms, - Atomic transactions – Deadlocks; Processes : Threads – System models – processor allocation – Scheduling – Fault tolerance – Real time distributed systems.

UNIT IV-SHARED MEMORY AND FILE SYSTEMS (11 hours)

Shared memory : Consistency models – Page based distributed shared memory – Shared variables– Object based distributed shared memory; Distributed File Systems : Design and Implementation.

UNIT V-CASE STUDY – AMOEBA & MACH (11 hours)

Introduction to Amoeba – Object and Capabilities – memory management – Communication –Amoeba Servers. Introduction to Mach – Process management – Memory Management – Communication.

TEXT BOOKS

1. Andrew S Tanenbaum, *"Distributed Operating Systems"*, Pearson Education India, 2008.
2. Mukesh Singhal, Niranjan G Shivratri, *"Advanced Concepts in Operating Systems"*, McGraw Hill International 2002.

REFERENCES

1. Pradeep K Sinha, *"Distributed Operating Systems Concepts and Design"*, PHI, 2002.
2. http://www.seas.gwu.edu/~jstanton/courses/cs251/
3. http://cse.yeditepe.edu.tr/~sbaydere/courses_new/cse532/
4. http://www.cs.odu.edu/~price/cs471/notes/index.html

SE1108 - DISTRIBUTED OPERATING SYSTEMS												
Course designed by		Department of Software 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	Software Engineering		Computer Engineering		Knowledge engineering						
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1109	TCP/IP PRINCIPLES	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about Computer Networks				

PURPOSE

To learn the principle s of TCP / IP.

INSTRUCTIONAL OBJECTIVES

1.	Network Layer and Applications.
2.	UDP and TCP applications.
3.	Transport Layer Reliability.
4.	To understand the basic concepts of TCP/IP Architecture.

UNIT I–INTRODUCTION (9 hours)

Intermediate communication entities- Layering network addresses-DNS-Client server model- Port numbers-Standardization process-RFC's-Standard simple services-Application programming interfaces-Ethernet & IEEE 802 – encapsulation-SLIP-PPP-loop back interface-MTU-path MTU-ARP cache – Packet format – proxy ARP & Gratitions ARP –ARP command – RARP- Structure TCP/IP s/w in operating system.

UNIT II-NETWORK LAYER AND APPLICATION (9 hours)

Introduction- IP header- IP routing - Subnet addressing- Subnet mask- Special case IP addresses – Examples- Ifconfig – Netstat- routing principles - ICMP host and Network unreachable errors - ICMP redirect errors – ICPM router discovery messages- Dynamic routing - UNIX routing daemons- routing information protocol (RIP)-OSPF-CIDR –Case study: Voice over IP for two way Communication.

UNIT III-UDP AND APPLICATIONS (9 Hours)

Introduction- UDP header- UDP checksum- examples-IP fragmentation - ICMP unreachable errors – Path MTU discovery- Interaction between UDP and ARP-UDP datagram size- ICMP source quench error- Broad casting and Multi casting - IGMP- NFS- -TFTP-BOOTP.

UNIT IV-TCP (9 hours)

Introduction- TCP services- TCP header – Connection establishment and termination – Maximum size – TCP half close– TCP state transition diagram – Reset segments- Simultaneous open and close – TCP options – Interactive input –Delayed acknowledgement – Nagle algorithm – Window size advertisement-Normal data flow – Sliding window –Window size - PUSH flag – Slow start– Bulk data throughput – Urgent mode.

UNIT V-TRANSPORT LAYER RELIABILITY AND APPLICATION (9 Hours)

CP/IP time out – Retransmission – Roundtrip time measurement – Congestion avoidance algorithms – Fast retransmit and fast recover algorithm – Repacaketization - ICMP errors- TCP persistent – TCP features and performance – Telnet and rhogin - SMTP – TCP dump.

TEXT BOOKS

1. Behrouz A. Forouzam, "*TCP/IP Protocol Suite*", 4th edition, Tata McGraw Hill, 2010.
2. Douglas E. Comer, David L.Stevens "*Internetworking with TCP/IP Volume – II, III*" PHI Learning Private Limited, Third edition, 2009.

REFERENCES

1. Richard Stevens W, "*TCP/IP Illustrated, The Protocol-Volume I,II,II*", Addison-Wesley Pub Co, 1st Edition2, 2011.
2. Dougles E. Comer, "*Internetworking with TCP/IP–Principles, Protocols & Architecture*", Pearson education, 4th Edition, 2000.

ONLINE REFERENCES

1. http://www.rhyshaden.com/ipadd.html
2. http://ckp.made-it.com/ieee8023.html
3. http://en.wikipedia.org/wiki/IEEE_802
4. http://edia.org/wiki/Transmission_Control_Protocol#Protocol_ operation

SE1109 - TCP/IP PRINCIPLES												
Course designed by		**Department of Software 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	2,3	4							
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										X		
4.	Broad Area	Software Engineering		Computer Engineering		Knowledge Engineering						
				X								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1110	WIRELESS MOBILE COMMUNICATION	L	T	P	C
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge about networks				

PURPOSE

It provides a basic foundation of Wireless and Mobile networks and its applications.

INSTRUCTIONAL OBJECTIVES

1.	Wireless transmission basics and Protocols.
2.	Wireless LAN and ATM.
3.	Mobile Application Architecture, Messaging and security.

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

History and evolution of mobile radio systems. Types of mobile wireless services/systems-Cellular, WLL, Paging, Satelite systems, Standards, Future trends in personal wireless systems- Cellular concept and frequency reuse, Multiple Access Schemes, channel assignment and handoff.

UNIT II-WIRELESS MEDIA **(9 hours)**

Wireless Media access control protocols – SDMA – FDMA – TDMA – CDMA – comparison. Telecommunication systems – GSM – DECT – TETRA – UMTS and IMT – 2000, satellite systems – GEO 139, LEO 139, MEO 140. Routing – localization – handover – broadcast systems – overview. Cyclic repetition of data – digital audio broadcasting – digital video broadcasting.

UNIT III-WIRELESS LAN and ATM **(9 hours)**

Wireless LAN – IEEE 802.11 standards – HIPERLAN – Blue tooth technology and protocols. Wireless Local Loop technologies. Wireless ATM – motivation – working group – services – reference model – functions – radio access layer – handover – location management – addressing – mobile QoS issues, delays, error and packet loss, error control schemes – Access point control protocol.

UNIT IV-MOBILE ARCHITECTURE **(9 hours)**

Choosing the right architecture –Application Architecture—Smart Client—Messaging Types—Messaging Value Chain.

UNIT V-MOBILE AND WIRELESS SECURITY **(9 hours)**

Security Primer –Creating a Secure environment –Threads—Technologies—Other Security Measures—WAP Security—Smart Client Security—Overview of Smart Client Architecture—Mobile Operating Systems.

TEXT BOOKS

1. Jochen Schiller, *"Mobile Communications",* Addision Wesley, 2nd Edition, 2011.
2. Martyn Mallick, *"Mobile and Wireless Design Essentials"*, Wiley Dreamtech India Pvt. Ltd., 2004.

REFERENCES

1. Uyless Black, *"Mobile and Wireless Networks"*, Prentice Hall, 1996.
2. Willian C.Y.Lee, *"Mobile Communication Design Fundamentals",* John Wiley, 1993.

SE1110 – WIRELESS MOBILE COMMUNICATION												
Course designed by		Department of Software 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	Computer Engineering		Software Engineering		Knowledge Engineering						
		X										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1111	MOBILE DATABASES	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about DBMS				

PURPOSE

To study about Mobile database concepts.

INSTRUCTIONAL OBJECTIVES

1.	Introduction about data bases
2.	Design about mobile data bases and its transactions.

UNIT I - INTRODUCTION TO DATA BASES (9 hours)

Introduction to databases, Data base environment, Data base planning, fact-finding techniques, E-R Modeling, Normalization.

UNIT II-INTRODUCTION TO MOBILE COMPUTING (9 hours)

Introduction to Mobile and Cellular Communication Systems, Cellular Concept: Cellular Geometry, Frequency Reuse and Sectoring, Elements of Cellular Radio System Design, Spread Spectrum Techniques, Spectral Efficiency of FDMA, TDMA and CDMA Handoff Technologies.

UNIT III-MOBILE DATABASE SYSTEM (9 hours)

Introduction to MDS- Fully Connected Information Space-Types of Mobility, Cellular Network, Mobility Management, Database Technology.

UNIT IV-MDS TRANSACTIONS (9 hours)

Serialization of Transactions-The Phantom Problem-Multigranularity Locking-Heuristic Approach in Locking Schemes, Mobile Database Systems- Transaction

Execution in MDS, Mobile Transaction Model-Execution Model based on ACID Transaction Framework.

UNIT V-MOBILE TRANSACTION MODEL (9 hours)

Proactive management of Mobile, Mobile Transaction Model, HiCoMo, MDSTPM Transaction Execution Model, Mobilaction-A Mobile Transaction Model, Commitment of Mobile Transactions, TCOT steps - No Failure, Log Management in Mobile Database Systems, A Three Phase Hybrid Recovery Scheme, Wireless Data Dissemination.

TEXT BOOKS

1. Thomas Connolly and Carolyn, Begg. Data base Systems, "*A practical approach to design implementation and management",* Fourth edition, 2010.
2. Gottapu Sasibhushana Rao, *"Mobile Cellular Communication"* - first edition - pearson education", 2012.

REFERENCES

1. Vijayakumar, "Mobile data base systems", Kansas City, Wiley Interscience, 2010.
2. Tom Nadeau, Jagadish H.V*, "Data base Modelling and design"* - Morgann Kaufmann elseiver inc publications*, T*oby teorey, Sam Lightstone, 5th edition, 2011.
3. Ramez Elmasri, Shamkant. Navathe B, *"Fundamentals of Data base systems",* Fifth Edition, Pearson Education, 2010.

SE1111- MOBILE DATABASES												
Course designed by		**Department of Software 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.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)					Professional Subjects (P)	
											x	
4.	Broad Area	Computer Engineering		Software Engineering							Knowledge Engineering	
		X										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1112	HUMAN COMPUTER INTERACTION	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about Software Engineering				

PURPOSE

This course covers the basics of human computer interaction with implementation support and evaluation techniques

INSTRUCTIONAL OBJECTIVES

1.	To Understand the requirement of considering various human factors in developing interfaces for computer systems
2.	To apply the software process and design rules in human -computer interfaces development
3.	To understand existing models for human computer interaction
4.	Have knowledge in Ubiquitous computing and its contribution for human computer interaction

UNIT I - BASICS OF HUMAN COMPUTER INTERACTION (9 hours)

Human Input-output channels and memory of the human--Psychology and design of the interaction model-computer input and output channels—models of interaction-- Frameworks & HCI—Industrial interface—Interaction styles—WIMP interfaces—interactivity

UNIT II-SOFTWARE PROCESS & DESIGN RULES (9 hours)

Interaction design basics – the process of design, user focus, navigation design, screen design & layout; HCI in software process –software life cycle, Usability engineering, Interactive design & prototyping; Design rules – Principles to support usability, standards, guidelines

UNIT III-IMPLEMENTATION SUPPORT, EVALUATION TECHNIQUES AND USER SUPPORT (9 hours)

Implementation support – Windowing system elements, using tool kits. User interface management; Evaluation techniques – goals, expert analysis, user participation, choosing a method; User support – requirements, approaches, adaptive help systems

UNIT IV-HUMAN COMPUTER INTERACTION MODELS (9 hours)

Cognitive models – Goal & task hierarchies – Linguistic models – Physical & device models – cognitive architectures Communication & collaboration models – Face-to-face communication, conversation ,text based communication and group working; Task analysis – task decomposition, Knowledge based analysis, ER based techniques

UNIT V-UBIQUITOUS COMPUTING AND WEB TECHNOLOGY (9 hours)

Ubiquitous computing—Defining ubiquitous computing , features of ubiquitous computing , application research, virtual and augmented reality, information & data visualization; Hypertext – finding things, Web Technology and related issues, Static web content, dynamic web content;

TEXT BOOK

Alan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale, *"Human Computer interaction"*, Third Edition, Pearson Education, 2004.

REFERENCE

John M. Carrol, "*Human Computer Interaction in the New Millennium*", Pearson Education, 2002.

ONLINE REFERENCES

1. www.scis.nova.edu/nova/hci/notes.html
2. http://courses.iicm.tugraz.at/hci/hci.pdf
3. www.ida.liu.se/~miker/hci/course.html

SE1112– HUMAN COMPUTER INTERACTION												
Course designed by		**Department of Software 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		2,3								
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)					Professional Subjects (P)	
											x	
4.	Broad Area	Computer Engineering				Software engineering					Knowledge Engineering	
						x						
5.	Approval	23rd Meeting of academic council, May 2013										

SE1113	**KNOWLEDGE BASED SYSTEMS**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge about Artificial Intelligence				

PURPOSE

This course provides a comprehensive view of Knowledge Based System Design in the context of Knowledge Engineering

INSTRUCTIONAL OBJECTIVES	
1.	To understand the concepts of Knowledge Based System Design
2.	To understand the components of Knowledge Based Systems
3.	To understand the issues and approaches in Knowledge Based System Design

UNIT I - INTRODUCTION TO KNOWLEDGE ENGINEERING (9 hours)

The Human Expert and an Artificial Expert – Knowledge Base and Inference Engine – Knowledge Acquisition and Knowledge Representation – Problem Solving Process.

UNIT II-PLANNING & SCHEDULING (9 hours)

Rule Based Systems – Heuristic Classifications – Constructive Problem Solving – Tools for Building Expert Systems.

UNIT III-ANALYSIS (9 hours)

Case Based Reasoning – Semantic of Expert Systems – Modeling of Uncertain Reasoning – Applications of Semiotic Theory.

UNIT IV-DESIGN (9 hours)

Designing for Explanation – Expert System Architectures - High Level Programming Languages – Logic Programming for Expert Systems.

UNIT V-IMPLEMENTATION, TESTING & MAINTENANCE (9 hours)

Machine Learning – Rule generation and refinement – Learning Evaluation – Testing and tuning.

TOTAL - (45 hours)

TEXT BOOKS

1. Peter Jackson, "*Introduction to Expert Systems"*, 3rd Edition, Pearson Education, 2007.
2. Robert I. Levine, Diane E. Drang, Barry Edelson, *"AI and Expert Systems: a comprehensive guide, C language"*, 2nd edition, McGraw-Hill, 1990.

REFERENCES

1. Jean-Louis Ermine, *"Expert Systems: Theory and Practice"*, 4th printing, Prentice-Hall of India, 2001.
2. Stuart Russell, Peter Norvig, *"Artificial Intelligence: A Modern Approach"*, 2nd Edition, Pearson Education, 2007.
3. Padhy N.P, *"Artificial Intelligence and Intelligent Systems"*, 4th impression, Oxford University Press, 2007.

SE1113 - KNOWLEDGE BASED SYSTEMS													
Course designed by		Department of Software 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				3				1	
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
											x		
4.	Broad Area	Software Engineering		Computer Hardware Engineering			Computer Science Engineering				Knowledge Engineering		
											x		
5.	Approval	23rd Meeting of academic council, May 2013											

SE1114	BIO INFORMATICS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about AI and Databases				

PURPOSE

To explore how biological information could be stored in digital form to create bioinformatics resources and how the same may be processed.

INSTRUCTIONAL OBJECTIVES

1.	To study the different coding techniques and standards
2.	To know about the different biological network of resources available
3.	To learn how to analyze DNA and Protein sequences
4.	To learn and understand the multiple sequence analysis techniques
5.	To understand protein classification and Structure prediction

UNIT I - INTRODUCTION (9 hours)

Definition – Importance of Bioinformatics -Biological Sequence Structure- Major databases in Bio Informatics- Molecular biology – Central Dogma- Data retrieval tools – Data mining of Databases – Gene Analysis – Prokaryotic and Eukaryotic Genomes – Sequence Assembly – Gene mapping – Physical maps – cloning – DNA, RNA sequences – Genetic code.

UNIT II-DNA and PROTEIN SEQUENCES (9 hours)

Genome Information Resources - DNA Sequence data base – Specialised genomic Resources. DNA Sequence analysis: Why analyse DNA? – Gene structure – Features of DNA sequence analysis – Approaches to EST analysis – Effect of EST data on DNA data base examples of EST analysis- Protein-predicting

properties – primary structure analysis – trans membrane segments – PROSITE patterns – interpreting scan prosite results- finding domains – CD server results – pfscan results.

UNIT III-ALIGNMENT OF PAIR OF SEQUENCES (9 hours)

Terminology – Global and Local alignment – Dot matrix – dynamic programming using scoring matrices – PAM matrices – BLOSUM. Working with FASTA – Algorithm – output – E-values – Histogram working with BLAST algorithm– gapped BLAST- PSIBLAST – comparison of FASTA and BLAST.

UNIT IV-MULTIPLE SEQUENCE ALIGNMENT (9 hours)

Multiple Sequence Alignment : Goal – Definition – Consensus – Complex – methods – Database of multiple Alignment – searching database with multiple alignment. Methods of Photo Genetics.: Distance Based Methods – Based Methods – Comparison.

UNIT V-PROTEIN CLASSIFICATION & STRUCTURE PREDICTION (9 hours)

Structure of amino acids – primary structure – secondary structure – folds and motifs – alpha and beta helix – structure based protein classification – protein structure Data bases – folding problem – PROPSEARCH – primary structure analysis and prediction – secondary structure analysis and prediction – motifs – profiles – patterns and fingerprints.

TOTAL - (45 hours)

TEXT BOOKS

1. Rostogi S.C, Mendiratta, Rasogi P, *"BioInformatics: methods and applications"*, second edition, PHI, 2006.
2. Jean Mickel Clavere & Cadrienotredom, *"Bio Informatics – A beginners guide"* Wiley DreamTech, 2003.

REFERENCES

1. Attwood T.K. and Perry Smith D.J, *"Introduction to Bio Informatics",* Pearson Education, 1st Edition, 2001.
2. Dan E.Krane, Michael L.Raymer, *"Fundamental concepts of Bio Informatics*", Pearson Education, 2004.
3. Attwood T.K, Parry-Smith D.J, *"Introduction to Bioinformatics",* Pearson Education Asia, 2003.
4. Dan E. Krane, Michale L. Raymer, *"Fundamental Concepts of Bioinformatics"*, Pearson Education Asia, 2004.

SE1114- BIO INFORMATICS												
Course designed by		Department of Software 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		2,4				3,5				1
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)			Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering					Computer Engineering			Knowledge Engineering		
										x		
5.	Approval	23rd Meeting of academic council, May 2013										

SE1115	INFORMATION SECURITY	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge of Network Security				

PURPOSE

The purpose of this course is to instruct concepts of Information Security in applying appropriate security to the system. It educates on basic fundamentals of information security and applying security to various spheres in a system like cryptography, network, physical and system security. To helps in studying the critical need for ensuring Information Security in Organizations

INSTRUCTIONAL OBJECTIVES

1.	To understand the basics of Information Security
2.	To know the legal, ethical and professional issues in Information Security
3.	To know the aspects of risk management
4.	To become aware of various standards in this area
5.	To know the technological aspects of Information Security

UNIT I–COMPUTER & INFORMATION SECURITY (9 hours)

An Overview of Computer Security, Access Control Matrix, Policy-Security policies, Confidentiality policies, Integrity policies and Hybrid policies. What is Information Security? Security Goals. History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access.

UNIT II-CRYPTOGRAPHY (9 hours)

Crypto Basic, Classic Cryptography, Symmetric Key Cryptography: Stream Ciphers, Cipher Techniques Block Ciphers, Feistel Cipher, DES, Triple DES, AES, Public Key Cryptography: Kanpsack, RSA, Defiie-Hellman, Hash FunctionMD5, SHA-1, Tiger Hash, Use of Hash Function. Key management – Session and Interchange keys, Digital Signatures,

UNIT III-ACCESS CONTROL-AUTHENTICATION AND AUTHORIZATION(9 hours)

Authentication Methods, Passwords, Biometric, Single – sign on, Authentication Protocol, Kerberos, Access control Matrix, ACLs, Multiple level security model, Multilateral security, Covert channel, CAPTCHA

UNIT IV-SOFTWARE SECURITY (9 hours)

Software Flaws, Buffer Overflow, Incomplete Mediation, Race conditions, Malware, Salami attack, Linearization Attacks, Trusting Software, Software reverse engineering, Digital Rights management, Operating System and Security

UNIT V-Network SECURITY & PHYSICAL SECURITY (9 hours)

Network security basics, TCP/IP Model and Port No., Protocol flaws, Design and Vulnerabilities, Reconnaissance of network, Packet sniffing, Session Hijacking, Spoofing, Web site and web server vulnerabilities, Denial of Service, SSL and IPSec protocol, Firewall. Intrusion Detection System, and Honey pots, Email Security. Planning, Risk Analysis, Organizational Policies, Physical Security.

TEXT BOOKS

1. Mark Stamp, *"Information security Principles and Practice"* Wiley, Second Edition, 2011.
2. Matt Bishop*, "Computer Security: Art and Science"*, Second Edition, Pearson Education, 2012.

REFERENCES

1. Michael E Whitman and Herbert J Mattord, "*Principles of Information Security"*, Vikas Publishing House, New Delhi, 2011.
2. Mark Merkow, James Breithaupt *"Information Security: Principles and Practices"* First Edition, Pearson Education, 2007.
3. William Stallings, *"Cryptography and Network Security: Principles and Practices"*, Third Edition, Pearson Education, 2011.
4. Charles P.Pfleeger and Shari Lawrence Pfleeger*, "Security in Computing"*, Third Edition, 2007.
5. Micki Krause, Harold F. Tipton*, "Information Security Management Handbook"*, Sixth Edition, Vol 6, 2012.

SE1115 - INFORMATION SECURITY												
Course designed by		**Department of Software 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, 4	4									
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge Engineering					
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1116	DESIGN PATTERNS	L	T	P	C
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge of software design				

PURPOSE

In software engineering, a design pattern is a general reusable solution to a commonly occurring problem in software design. This course teaches students advanced skills in object-oriented design and programming through learning common design patterns and refactoring software source code

INSTRUCTIONAL OBJECTIVES

1.	Understand and be able to apply incremental/iterative development
2.	Understand common design patterns
3.	Be able to identify appropriate patterns for design problems
4.	Be able to evaluate the quality of software source code
5.	Be able to refactor badly designed program by properly using design patterns

UNIT I - INTRODUCTION TO OBJECT-ORIENTED SOFTWARE DEVELOPMENT **(9 hours)**

Overview - Functional Decomposition - Problem of Requirements - Using Functional Decomposition – Object Oriented Paradigm - Special Object Methods. UML - Class Diagram - Interaction Diagrams. Standard Object-Oriented Solution.

UNIT II-INTRODUCTION TO DESIGN PATTERNS (9 hours)

Design Patterns Arose from Architecture and Anthropology - Architectural to Software Design Patterns - Advantages of Design Patterns - Adapter Pattern - Strategy Pattern - Bridge Pattern - Abstract Factory Pattern.

UNIT III-NEW PARADIGM OF DESIGN (9 hours)

Principles and Strategies of Design Patterns - Open-Closed Principle - Designing from Context - Encapsulating Variation. Commonality and Variability Analysis - Analysis Matrix - Decorator Pattern.

UNIT IV-VALUES OF PATTERNS (9 hours)

Observer Pattern - Categories of Patterns - Template Method Pattern - Applying the Template Method to the Case Study - Using Template Method Pattern to Reduce Redundancy.

UNIT V-FACTORIES (9 hours)

Design Patterns: Factories - Singleton Pattern and the Double-Checked Locking Pattern - Applying Singleton Pattern to Case Study. Object Pool Pattern - Management of Objects. Factory Method Pattern - Factory Method Pattern and Object-Oriented Languages.

TEXT BOOKS

1. Jason McC. Smith (Apr 7, 2012), *"Elemental design Patterns"*, Pearson, 2012.
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, *"Design Patterns: Elements of Reusable Object-Oriented Software"*, Addison-Wesley, 2003.

REFERENCES

Eric Freeman, Elisabeth Freeman, Kathy Sierra, Bert Bates, *"Head First Design Patterns"*, O'Reilly Media, Inc., 2004.

<table>
<tr><th colspan="14">SE1116 – DESIGN PATTERNS</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="12">Department of Software 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</td><td>2</td><td></td><td>2</td><td>3</td><td></td><td>1</td><td></td><td></td><td></td><td>2</td></tr>
<tr><td rowspan="2">3.</td><td rowspan="2">Category</td><td colspan="3">General (G)</td><td colspan="3">Basic Sciences (B)</td><td colspan="4">Engineering Sciences and Technical Arts (E)</td><td colspan="2">Professional Subjects (P)</td></tr>
<tr><td colspan="3"></td><td colspan="3"></td><td colspan="4"></td><td colspan="2">x</td></tr>
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<tr><td colspan="3">x</td><td colspan="3"></td><td colspan="6"></td></tr>
<tr><td>5.</td><td>Approval</td><td colspan="12">23rd Meeting of academic council, May 2013</td></tr>
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ELECTIVES FOR SEMESTER VI

SE1117	**WINDOWS INTERNALS**	**L**	**T**	**P**	**C**
	Total Contact Hours – 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge about Software Engineering				

PURPOSE
The purpose of this course is to make the students familiar with Windows programming techniques and concepts in windows environment.

INSTRUCTIONAL OBJECTIVES	
1.	Windows Application Programming Interface (API).
2.	Process and Thread Management.
3.	Synchronization.
4.	DLL and its Security.

UNIT I - OVERVIEW OF WINDOWS (8 hours)

Operating system essentials-windows evolution-windows principles-32 & 64 bit source code portability-windows file system-file naming- file operations –Unicode strategies-console I/O.

UNIT II-FILE, DIRECTORY PROCESSING & EXCEPTION HANDLING (9 hours)

64 bit file system-file pointers –getting the file size-file attributes and directory processing-the registry-the register management –Examples- exception and their handling-types of exception.

UNIT III-MEMORY MANAGEMENT-DLL-PROCESS MANAGEMENT (10 hours)

Windows memory management architecture-heaps-managing heap memory-memory mapped files-DLL-DLL entry point-DLL version management-windows process and threads-process creation-process identifier-duplicating handles.

UNIT IV-THREAD SCHEDULING AND SYNCHRONIZATION (9 hours)

Overview and basics-thread management-c library in threads-multithreading-performance import-need for thread Synchronization-objects (types)-mutexes-semaphores & events.

UNIT V-LOCKING-PERFORMANCE AND NT6 ENHANCEMENTS (9 hours)

Synchronization performance impact-program for performance-experimentation-tuning multiprocessor performance with cs spin-NT6 slim reader/writer locks-I/O completion ports-NT6 thread ports.

TEXT BOOKS

1. Johnson M. Hart, *"Windows System Programming"* 4th Edition, published Pearson Education, 2011.
2. Mark E. Russinovich, David A. Solomon, Windows Internals: Including Windows Server 2008 and Windows Vista, Sixth Edition published by Microsoft press, 2012.

REFERENCES

1. Joe, Duffy, Concurrent Programming on Windows, Published by Pearson Education, 2010.
2. http://www.amazon.com/Windows%C2%AE-Internals-Including-Windows-Developer/dp/0735625301
3. http://blogs.msdn.com/ntdebugging
4. www.dumpanalysis.org

SE1117 - WINDOWS INTERNALS												
Course designed by		Department of Software 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						
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)					Professional Subjects (P)	
											x	
4.	Broad Area	Software Engineering		Computer Engineering		Knowledge Engineering						
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1118	C# AND. NET TECHNOLOGIES	L	T	P	C
	Total Contact Hours – 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge about C,C++ and Java Programming				

PURPOSE

To provide an introduction to the .NET framework and enable the student to program in C#.

INSTRUCTIONAL OBJECTIVES	
1.	To study basic and advanced features of the C# language
2.	To create form based and web based applications
3.	To study the internals of the .NET framework
4.	To know and study about the Common Language Runtime (CLR) and Common Language Infrastructure (CLI)

UNIT I - C# BASICS **(9 hours)**

C# and the .NET framework – C# basics – Objects and types – Inheritance – Arrays – Operators and casts – Indexers

UNIT II - ADVANCED C# FEATURES **(9 hours)**

Delegates and events – Strings and regular expressions – Generics – Collections –Memory management and pointers – Errors and exceptions

UNIT III - I/O AND NETWORK PROGRAMMING **(9 hours)**

Tracing and events - threading and synchronization - .Net security – localization – Manipulating XML - Managing the file system – basic network programming

UNIT IV - WINDOW AND WEB APPLICATIONS **(9 hours)**

Window based applications – Data access with .NET – basics of ASP .NET - Introduction to web services

UNIT V - .NET FEATURES **(9 hours)**

Architecture – Assemblies – shared assemblies – CLR hosting – Appdomains – Reflection

TEXT BOOKS

1. Christian Nagel et al. *"Professional C# 4 with .NET 4",* Wiley India, 2010.
2. Jesse Liberty and Brian MacDonald, *"Learning C# 3.0",* O'Reilly, First Edition, 2008.

REFERENCES

Andrew Troelson, *"Pro C# 5.0 and the.NET 4.5 Framework"*, Apress, Sixth Edition, 2012.

SE1118 C# AND. NET TECHNOLOGIES												
Course designed by		Department of Software Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x		x	x		x				x
2.	Mapping of instructional objectives with student outcome	1,2	2		2	3		1				2
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering		Computer Engineering		Knowledge Engineering						
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1119	HIGH SPEED NETWORKS	L	T	P	C
	Total Contact Hours – 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge of computer Networks				

PURPOSE

The purpose of this course is to provide an understanding of high speed networks concepts and underlying various engineering and technological applications.

INSTRUCTIONAL OBJECTIVES

1.	Basic introduction to high speed networks.
2.	To study the network management ant its applications
3.	To study about wireless networks.

UNIT I - INTRODUCTION (9 hours)

High speed networks: frame relay networks –ATM protocol architecture-ATM logical connection –ATM cells-ATM servicecatogories-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 control, TCP traffic congestion control in ATM networks.

UNIT III - QOS IN IP NETWORKS. (9 hours)

Integrated and differentiated services-Integrated service architecture-queuing discipline random early detection-differentiated services -Protocol for QOS support-Resource reservation RSVP-Multi Portal Label switching-Real time transport protocol RTP.

UNIT IV - PRINCIPLES OF WIRELESS NETWORK OPERATION (9 hours)

Local broadband and Adhocnetworks. Introduction to wireless LANS-IEEE 802.11 WLAN, WATM, HTPERLAN-Adhoc networking and WPAN

UNIT V - NETWORK MANAGEMENT AND APPLICATION (9 hours)

Network management-choosing a configuration method-MIB-SNMP-XML-CORBA-COPS-UPNS-mobile IP-voice over IP-IP and ATM.

TEXT BOOKS

1. Williams Stallings*, "High Speed Nrtworks And Internet Peformance And Quality of Service, pearson*" second edition-seventeeth impression-2010.
2. Kaven Pahlavan And Prashant Krishnamoorthy, *"Principles of Wireless Network"*, Prentice Hall of India-2010.

REFERENCES

1. Adrian Farrel, "*The Internet and Its Protocols"*, Reprint 2011, Elsevier Publications.
2. Behrouz A. Forouzan, "*Data Communication and Computer Networking"*, Fourth Edision, 2011.
3. Larry L.Peterson and Bruce S.Davie*, "Computer Networks"*, Third Edition, Elsevier Publications, 2003.
4. www.utdallas.edu/∼metin/SUNet
5. www.rivier.edu/faculty/vricbov
6. http://williamstalling.com/NSNe2e.html.
7. Ce.sharif.edu/courses.

SE1119 - HIGH SPEED NETWORKS													
Course designed by		**Department of Software 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	Software Engineering		Computer Engineering		Knowledge Engineering							
				x									
5.	Approval	23rd Meeting of academic council, May 2013											

SE1120	FIREWALL ARCHITECTURE	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge of computer Networks				

PURPOSE

The purpose of this course is to provide an understanding of architecture and design concepts and underlying various engineering and technological applications.

INSTRUCTIONAL OBJECTIVES

1.	Types of firewall architecture.
2.	Design and implementation of firewall.
3.	Firewall & IP Multicast.

UNIT I - INTERNET SECURITY (9 hours)

Internet firewalls – Internet services – Firewall insertion in the network topology – routed mode vs transparent mode – Network Address Translation and port address translation – classification of firewalls.

UNIT II - FIREWALL OVERVIEW (9 hours)

Overview of ASA appliances – Firewall performance parameters – Basic ASA configuration – Remote Management Access to ASA & FWSM – Telnet Access – SSH Access – Event logging – Debug commands.

UNIT III - FIREWALLS IN NETWORK TOPOLOGY (9 hours)

IP routing and forwarding – basic concepts of routing protocols – RIP overview – Configuration and monitoring RIP - EIGRP Overview – Configuration and monitoring EIGRP - OSPF overview – Configuration and monitoring OSPF.

UNIT IV - CLASSIC IOS FIREWALL OVERVIEW (9 hours)

CBAC basics – Static NAT – Dynamic NAT – Policy NAT – Dual NAT – CBAC & NAT – Building blocks for zone based firewall policies – Intrazone firewall policies in IOS 15.X.

UNIT V - FIREWALLS & IP MULTICAST (9 hours)

Review of multicast addressing – Multicasting routing with PIM – Enabling PIM on CISCO routers – CISCO firewalls & IPV6 – Firewall Interactions.

TEXT BOOKS

1. Alexandre Moraes, "*CISCO Firewalls",* Pearson Education, 2011.
2. Elizabeth D. Zwicky, Simon Cooper and D. Brent Chapman, "*Building Internet Firewalls*", second edition, Shroff publishers 2000.

REFERENCES

1. Norbert Pohlmann Tim Crothers, "*Firewall Architecture for the Enterprise*", fourth Edition.
2. www.okcforum.org
3. www.microsoft.com
4. www.networkcomputing.com

SE1120 - FIREWALL ARCHITECTURE												
Course designed by		Department of Software 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.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering			Computer Engineering				Knowledge Engineering			
					x							
5.	Approval	23rd Meeting of academic council, May 2013										

SE1121	DATA WAREHOUSING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge of DBMS				

PURPOSE

This course enable 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, planning and development.

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 – meta data-data marting.

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.
2. Prabhu C.S.R, *"Data Ware housing: Concepts, Techniques, Products and Applications"*, Prentice Hall of India, 2011.

REFERENCES

1. Data Warehousing by Reema Theraja Oxford University Press-2009.
2. Han J, Kamber M, *"Data Mining: Concepts and Techniques",* Academic Press, Morgan Kanf man 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.

SE1121 – DATA WAREHOUSING												
Course designed by		Department of Software Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X		X	X		X				x
2.	Mapping of instructional objectives with student outcome	1,2	1		1	2		1				1
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering				Computer Science Engineering				Knowledge Engineering		
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1122	MULTIMEDIA SYSTEMS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about Networks and DBMS				

PURPOSE

The purpose of this course is to provide the knowledge about multimedia, Representations, operating system, communications and Documentation.

INSTRUCTIONAL OBJECTIVES

1.	To provide a solid background knowledge of Multimedia.
2.	To educate Different Medias and Technologies.
3.	To emphasize the importance of Networks and Operating System.
4.	To provide a modest experience to handle Multimedia Application Development.

UNIT I - Introduction (9 hours)

Multimedia an overview – Digital representation – Visual Display Systems – Multimedia Input and output Technologies.

UNIT II - Text, Image and Graphics (9 hours)

Text: Introduction- Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File Formats. Image: Image types – Seeing color – Color Models – Basic Steps for image processing – Scanner –Digital Camera – Interface standards – Specifications of digital images – Color Management Systems – Image processing Software - File Formats – Image output on monitor – Image output on printer, Graphics.

UNIT III - Audio, Video and Animation (9 hours)

Audio: Introduction – Acoustics – Nature of sound waves – Characteristics of Sound – Elements of Audio Systems- Microphone – Amplifier – Load Speaker – Audio Mixer – Digital Audio – Synthesizer – MIDI – Audio Transmission – Audio recording Devices – File Formats, Video, animation.

UNIT IV - Multimedia operating Systems and Media Server (9 hours)

Multimedia operating System: Process management – Memory Management – Device Management. Media Server: Architecture – Storage Devices – Disk Controller – File System.

UNIT V - Communication and documents (9 hours)

Compression – Network essentials – Multimedia Documents – Multimedia Application Development.

TEXT BOOKS

1. Ranjan Parekh, *"Principles Of Multimedia",* The McGraw - Hills Company, Twelfth Reprint 2011.
2. Prabhat K. Andleigh, Kiran Thakrar, *"Multimedia System Design",* PHI.

REFERENCES

Ralf Steinmetz, Klara Nahrstedt, *"Multimedia Systems",* Springer, 2009.

<table>
<tr><td colspan="13">SE1122 – MULTIMEDIA SYSTEM</td></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Software 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 colspan="3">x</td><td colspan="3"></td><td colspan="5"></td></tr>
<tr><td>5.</td><td>Approval</td><td colspan="11">23rd Meeting of academic council, May 2013</td></tr>
</table>

SE1123	DIGITAL IMAGE PROCESSING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about Soft Computing				

PURPOSE

The purpose of this course is to impart knowledge on the basic concepts of the image processing.

INSTRUCTIONAL OBJECTIVES

1.	To study the image fundamentals and mathematical transforms necessary for image processing. To study the image enhancement techniques.
2.	To study image restoration procedures
3.	To study the image compression procedures
4.	To study the image segmentation and representation techniques

UNIT I - DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS (9 hours)

Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations-Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT – Separable Image Transforms -Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms.

UNIT II-IMAGE ENHANCEMENT TECHNIQUES (9 hours)

Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters : Smoothing – Sharpening filters – Homomorphic filtering.

UNIT III-IMAGE RESTORATION (9 hours)

Model of Image Degradation/restoration process – Noise models – Inverse filtering -Least mean square filtering – Constrained least mean square filtering – Blind image restoration – Pseudo inverse – Singular value decomposition.

UNIT IV-IMAGE COMPRESSION (9 hours)

Lossless compression: Variable length coding – LZW coding – Bit plane coding-predictive coding-DPCM - Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG, Basics of Vector quantization.

UNIT V-IMAGE SEGMENTATION AND REPRESENTATION (9 hours)

Edge detection – Thresholding - Region Based segmentation – Boundary representation: chair codes- Polygonal approximation – Boundary segments – boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors- Texture.

TOTAL - (45 hours)

TEXT BOOKS

1. Rafael C Gonzalez, Richard E Woods 2nd Edition, *"Digital Image Processing"* - Pearson Education, 2003.
2. William K Pratt, *"Digital Image Processing"* John Willey, 2001.

REFERENCES

1. Millman Sonka, Vaclav hlavac, Roger Boyle, Broos/colic, *"Image Processing Analysis and Machine Vision"* –Thompson Learniy, 1999.
2. Jain A.K, PHI, *"Fundamentals of Digital Image Processing"*, New Delhi, 1995.
3. Chanda Dutta Magundar – *"Digital Image Processing and Applications",* Prentice Hall of India, 2000.

SE1123 – DIGITAL IMAGE PROCESSING												
Course designed by		**Department of Software 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	Software Engineering		Computer Engineering				Knowledge Engineering				
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1124	**ARTIFICIAL INTELLIGENCE**	**L**	**T**	**P**	**C**
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge about Soft Computing				

PURPOSE

The purpose of this course is to impart concepts of Artificial Intelligence and also to provide an overview of intelligent agent design

INSTRUCTIONAL OBJECTIVES	
1.	To study the concepts of Artificial Intelligence and Methods of solving problems using Artificial Intelligence
2.	To understand the basic techniques of knowledge representation and their use and components of an intelligent agent
3.	To be able to implement basic decision making algorithms, including search-based and problem solving techniques, and first-order logic.
4.	To know the basic issues in machine learning

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

Introduction - AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

UNIT II-SEARCHING TECHNIQUES (9 hours)

Searching-Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search- A* search Game Playing-Adversial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

UNIT III-REPRESENTATION OF KNOWLEDGE (9 hours)

Knowledge Representation & Reasons logical Agents, Knowledge – Based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in propositional logic, Resolution, Forward & Backward Chaining-First order logic. Inference in first order logic, propositional vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

UNITIV-LEARNING (9 hours)

Learning from observations – forms of learning – Inductive learning – Learning decision trees – Ensemble learning – Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information - Reinforcement learning – Passive reinforcement learning – Active reinforcement learning – Generalization in reinforcement learning.

UNIT V-APPLICATIONS (9 hours)

Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation - Perception – image Formation – Image Processing – Object Recognition – Robotics –Robotic Perception – Planning –Moving –Robotic Software Architecture.

TOTAL (45 hours)

TEXT BOOKS

1. Stuart Russel, Peter Norvig *"AI – A Modern Approach",* 2nd Edition, Pearson Education, 2007.
2. Rich E, Knight K, "*Artificial Intelligence"*, 2nd Edition, TMH, 2005

REFERENCES

1. Ivan Bratka, *"PROLOG Programming for Artificial Intelligence"* 3rd Edition, Pearson Education.
2. Patrick Henry Winston, *"Artificial Intelligence",* 3rd Edition, Pearson Edition.
3. Nils J. Nilsson, *"Artificial Intelligence: A new Synthesis"*, Harcourt Asia Pvt. Ltd., 2000.
4. George F. Luger, *"Artificial Intelligence-Structures And Strategies For Complex Problem Solving"*, Pearson Education, 2002.

SE1124 - ARTIFICIAL INTELLIGENCE												
Course designed by		Department of Software 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		2,4				3,5				1
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering				Computer Engineering				Knowledge Engineering		
										x		
5.	Approval	23rd Meeting of academic council, May 2013										

SE1125	ETHICAL HACKING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Network Security , Information Security				

PURPOSE

The purpose of this course is to instruct concepts of Ethical Hacking in applying appropriate security to the system. It educates how to scan, test, hack and secure their own systems. This course will also instruct about IDS and IDP, Policy Creation, Social Engineering, DDoS Attacks, Buffer Overflows

INSTRUCTIONAL OBJECTIVES	
1.	Understand how intruders escalate privileges in a system.
2.	Understand Intrusion Detection, Policy Creation, Social Engineering, DDoS Attacks, Buffer Overflows and Types of Attacks and Protections.
3.	Classification and Understanding Mechanism of Ethical Hacking.
4.	The basic principles, instrumentation and applications of Ethical Hacking

UNIT I – ETHICAL HACKING (9 hours)

Data Theft in 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 - Hacking AT FOOT PRINTING AND SOCIAL ENGINEERING LEVELS (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 - PHYSICAL & 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 & WEB SERVER HACKING (9 hours)

Routers, Firewall & Honeypots, IDS & IPS, Web Filtering, Vulnerability, Penetration Testing, Session Hijacking, Web Server, SQL Injection, Buffer Overflow, Reverse Engineering, Email Hacking, Incident Handling & Response, Bluetooth Hacking, Mobile sPhone Hacking

UNIT V - ETHICAL HACKING ATTACKS, PROTECTION 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, Buffer Overflow, Denial of Service Attack.

TEXT BOOKS

1. Patrick Engebretson, "*The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy"*, Syngress Basics Series – Elsevier,August 4, 2011.
2. 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. Ankit Fadia, "*Network Intruction Alert: An Ethical HackingGuide to Intrution Detection"*, Thomson, 2008.
3. Whitaker & Newman, "*Penetration Testing and Network Defense"*, Cisco Press, Indianapolis, IN, 2006.

SE1125 - ETHICAL HACKING												
Course designed by		Department of Software 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, 4	4			1,2						
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge Engineering					
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1126	SOFTWARE REUSE	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about Software Engineering				

PURPOSE

The purpose of this course is to explain about software reuse, various ways to develop reusable components, metrics and benefits.

INSTRUCTIONAL OBJECTIVES

1.	To provide a solid background knowledge about software Reuse.
2.	To educate Metrics used in software reuse.
3.	To provide Knowledge about various frameworks and COTS.

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

Software reuse and software engineering –state the art and the practice - Aspects of software reuse- Software reuse Organizations – Support services – Institutionalizing reuse.

UNIT II - DOMAIN ENGINEERING **(9 hours)**

Building Reusable assets – Domain Analysis: Basic concepts – domain scoping – Domain vs application requirements – Domain analysis methods – Domain analysis Tools- Programming paradigms and reusability.

UNIT III - OBJECT ORIENTED DOMAIN ENGINEERING **(9 hours)**

A pragmatic introduction to object orientation: Introduction- The Tenets of object oriented programming. Abstraction and parameterization techniques in object orientation: Abstraction techniques in object oriented modeling – Abstraction techniques in object oriented programming languages – Metaprogramming – Design patterns.

UNIT IV - FRAMEWORKS AND APPLICATION ENGINEERING **(9 hours)**

Application Frameworks: Framework – Fulfilling the framework contract – Building frameworks – The SWING framework. Architectural frameworks: Architecture – Architecture and reuse – CORBA – Application Engineering – Component storage and retrieval – Reusable asset integration.

UNIT V-MANAGERIAL ASPECTS OF SOFTWARE REUSE **(9 hours)**

Software Reuse metrics – Software reuse cost estimation – software reuse return on Investment – Component based software engineering – product-line Engineering – COTS based development.

TEXT BOOKS

1. Hongji Yang (De Montfort University, UK) and Xiaodong Liu (Edinburgh Napier University, UK), *"Software Reuse in the Emerging Cloud Computing Era",* 2012.
2. Hafedh Mili, Ali Mili, Sherif Yacoub, Edward Addy, "*Reuse-BasedSoftware Engineering: Techniques, Organizations, and Control",* John Wiley &Sons, 2002.

REFERENCES

1. Carma McClure, *"Software Reuse: A Standards-Based Guide"*, IEEE, 2001.
2. Wayne C. Lim,*"Managing Software Reuse"*, Prentice Hall, 2004.
3. Ivar Jacobson, Martin Gres, Patrick Johnson, *"Software Reuse"*, Pearson Education, 2004.

SE1126 - SOFTWARE REUSE												
Course designed by		**Department of Software 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
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)					Professional Subjects (P)	
											X	
4.	Broad Area	Software Engineering		Computer Engineering		Knowledge Engineering						
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

ELECTIVES FOR SEMESTER VII

	REAL TIME SOFTWARE SYSTEM	L	T	P	C
SE1127	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Operating Systems				

PURPOSE

To understand the basic concepts, design and integration of Real Time Systems.

INSTRUCTIONAL OBJECTIVES

1.	To know about the scheduling and implementation of a Real Time Systems
2.	To understand about the reliability evaluation methods
3.	To understand about real time task communication and synchronization

UNIT I – TASKS AND SCHEDULING (9 hours)

Introduction – Issues in Real Time Computing, Structure of a Real Time System, Task classes, Performance Measures for Real Time Systems, Estimating Program Run Times. Task Assignment and Scheduling – Classical uniprocessor scheduling algorithms, Uniprocessor scheduling of IRIS tasks, Task assignment, Mode changes, and Fault Tolerant Scheduling.

UNIT II – PROGRAMMING LANGUAGES AND DATABASES (9 hours)

Programming Languages and Tools – Desired language characteristics, Data typing, Control structures, Facilitating Hierarchical Decomposition, Packages, Run – time (Exception) Error handling, Overloading and Generics, Multitasking, Low level programming, Task Scheduling, Timing Specifications, Programming Environments, Run – time support.Real time Databases – Basic Definition, Real time Vs General Purpose Databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency control issues, Disk Scheduling Algorithms, Two-phase Approach to improve Predictability, Maintaining Serialization Consistency, Data bases for Hard Real Time Systems.

UNIT III – COMMUNICATION (9 hours)

Real-Time Communication – Communications media, Network Topologies Protocols, Fault Tolerant Routing. Fault Tolerance Techniques – Fault Types, Fault Detection. Fault Error containment - Redundancy, Data Diversity, Reversal Checks, Integrated Failure handling.

UNIT IV– EVALUATION TECHNIQUES & CLOCK SYNCRONIZATION (9 hours)

Reliability Evaluation Techniques – Obtaining parameter values, Reliability models for Hardware Redundancy, Software error models. Clock Synchronization – Clock, A Non fault–Tolerant Synchronization Algorithm, Impact of faults, Fault Tolerant Synchronization in Hardware, Fault Tolerant Synchronization in software.

UNIT V– HARDWARE/SOFTWARE INTEGRATION, REAL TIME APPLICATIONS (9 hours)

Goals of Real Time System Integration, Tools, Methodology, The Software Hesisenberg Uncertainty Principle, Real Time Systems As Complex System, First Real Time Application Real Time Databases, Realtime Image Processing Real Time UNIX, building Real Time Applications with Real Time Programming Languages.

TEXT BOOKS

1. C.M. Krishna, Kang G. Shin, *"Real Time Systems"*, McGraw – Hill International Editions, 2010.
2. Philip.A. Laplante, "*Real-time systems design and analysis* 3rd Edition, Wiley India, 2008.

REFERENCES

1. Jane W.S.Liu , "*Real Time Systems"*, Pearsom education Inc, 2009.
2. Rajib Mall, "*Real Time Systems"*, Dorling Kindersley India Pvt. Ltd., 2008.
3. Alan C. Shaw, "*Real time systems and software"*, John Wiley and sons, 2001.

<table>
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<tr><td colspan="2">Course designed by</td><td colspan="12">Department of Software Engineering</td></tr>
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<tr><td rowspan="2">4.</td><td rowspan="2">Broad Area</td><td colspan="2">Software Engineering</td><td colspan="2">Computer Engineering</td><td colspan="8">Knowledge Engineering</td></tr>
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SE1128	LINUX INTERNALS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge about Operating Systems				

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"*, 6th edition, Tata McGraw-Hill, 2012.
2. Mc Kinnon, Mc Kinnon, "*Installing and Administrating Linux"*, 2nd edition, Wiley, 2004.

REFERENCES

1. Richard Petersen, " *Linux:The Complete Reference"*,6 th edition, Tata McGraw-Hill, 2008.
2. Mark G. Sobell**. "***Practical Guide to Fedora and Red Hat Enterprise Linux"*, A, 6th Edition, Prentice Hall, 2011.
3. www.linuxhomenetworking.com
4. www.google.com/linux
5. www.linux.org
6. www.linux.com
7. http://www.oreillynet.com/linux/cmd/

SE1128 - LINUX INTERNALS												
Course designed by		**Department of Software 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						
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge Engineering					
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1129	XML AND WEB SERVICES	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				

PURPOSE

To study and highlight the features of different technologies involved in web services and XML.

INSTRUCTIONAL OBJECTIVES

1.	To understand basics in XML.
2.	Understanding the concepts of web services.
3.	Gaining knowledge in WSDL and UDDI.
4.	Content Management.

UNIT I - XML TECHNOLOGY FAMILY (9 hours)

XML – benefits – Advantages of XML over HTML – EDI – Databases – XML based standards – DTD –XML Schemas – X – Files – XML processing – DOM – SAX – presentation technologies – XSL –XFORMS – XHTML – voice XML – Transformation – XSLT – XLINK – XPATH – XQ.

UNIT II - ARCHITECTING WEB SERVICES (9 hours)

Business motivations for web services – B2B – B2C – Technical motivations – limitations of CORBA and DCOM – Service – oriented Architecture (SOA) – Architecting web services – Implementation view –web services technology stack – logical view – composition of web services – deployment view – from application server to peer to peer – process view – life in the runtime.

UNIT III - WEB SERVICES BUILDING BLOCK (9 hours)

Transport protocols for web services – messaging with web services – protocols – SOAP – describing web services – WSDL – Anatomy of WSDL – manipulating WSDL – web service policy – Discovering web services – UDDI – Anatomy of UDDI – Web service inspection – Ad – Hoc Discovery – Securing web services.

UNIT IV - IMPLEMENTING XML IN E – BUSINESS (9 hours)

B2B – B2C Applications – Different types of B2B interaction – Components of e – business XML systems – eb XML – Rosetta Net Applied XML in vertical industry – web services for mobile devices.

UNIT V - XML AND CONTENT MANAGEMENT (9 hours)

Semantic Web – Role of Meta data in web content – Resource Description Framework – RDF schema – Architecture of semantic web – content management workflow – XLANG – WSFL .

TEXT BOOKS

1. Ron Schmelzer et al, *"XML and Web Services Unleashed"*, Pearson Education, 2011.
2. Frank P.Coyle, *"XML, Web Services and the Data Revolution"*, Pearson Education, 2002.

REFERENCES

1. Keith Ballinger, *".NET Web Services Architecture and Implementation",* Pearson Education, 2003.
2. Henry Bequet and Meeraj Kunnumpurath, *"Beginning Java Web Services"*, Apress, 2004.
3. Russ Basiura and Mike Batongbacal, *"Professional ASP .NET Web Services"*, Apress, 2009.

SE1129 - XML AND WEB SERVICES												
Course designed by		Department of Software 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	2									4
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Computer Engineering		Software Engineering			Knowledge engineering					
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1130	PERVASIVE COMPUTING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Computer Networks, Computer Organization and Architecture				

PURPOSE

This course provides a way to understand the concepts of WIRELESS LAN, WAP, WML, PDA and its issues.

INSTRUCTIONAL OBJECTIVES	
1.	Clear conceptual understanding of fundamentals involving all elements and aspects of Pervasive Computing.
2.	Learning design process of Pervasive Computing Environments / Solutions
3.	Understanding hardware, software / services aspects involved
4.	Brief comparative study of protocols, languages, models & technologies involved

UNIT I - INTRODUCTION TO PERVASIVE COMPUTING (9 hours)

Local Area Networks – Wireless LANs - Relationship of Wireless, Internet and Ubiquitous Computing – Pervasive Computing and Ubiquitous Computing - Ambient Computing –Pervasive Web application Architecture – Requirements of computational infrastructure - failure management–security–performance–dependability - Pervasive Computing devices and Interfaces -Device technology trends, Connecting issues and protocols.

UNIT II-WAP & WML (9 hours)

Pervasive Computing and web based Applications - XML and its role in Pervasive Computing - Wireless Application Protocol (WAP) Architecture and Security – Introduction to Wireless Mark-Up language (WML).

UNIT III-PERVASIVE COMPUTING AND SECURITY (9 hours0

Voice Enabling Pervasive Computing - Voice Standards - Speech Applications in Pervasive Computing and security.

UNIT IV-PDA IN PERVASIVE COMPUTING (9 hours)

PDA in Pervasive Computing – Introduction - PDA software Components, Standards, emerging trends - PDA Device characteristics - PDA Based Access Architecture.

UNIT V-ISSUES IN PERVASIVE COMPUTING (9 hours)

User Interface Issues in Pervasive Computing, Architecture - Smart Card- based Authentication Mechanisms - Wearable computing Architecture.

TEXT BOOKS

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec & Klaus Rindtorff, *"Pervasive Computing Technology and Architecture of Mobile Internet Applications",* Addision Wesley, Reading, 2002.
2. Uwe Ha nsman, LothatMerk, Martin S Nicklous & Thomas Stober, *"Principles of Mobile Computing"*, Second Edition, Springer- Verlag, New Delhi, 2003.

REFERENCES

1. Rahul Banerjee, "*Internetworking Technologies: An Engineering Perspective"*, Prentice-Hall of India, New Delhi, 2003. (ISBN 81-203-2185-5)
2. Burkhardt, Henn, Hepper, Rintdorff, Schaeck. *"Pervasive Computing"*, Addison Wesley, 2002.

SE1130 - PERVASIVE COMPUTING												
Course designed by		**Department of Software 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		2,3				4				1
3.	Category	General (G)		Basic Sciences (B)		EngineeringSciences and Technical Arts (E)					Professional Subjects (P)	
											x	
4.	Broad Area	Software Engineering		Computer Engineering							Knowledge Engineering	
				X								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1131	NETWORKS MANAGEMENT	L	T	P	C
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge about Networks				

PURPOSE

This course will provide the student with a working knowledge of the types of communications network management systems and their strengths and weaknesses in solving various information network management problems.

INSTRUCTIONAL OBJECTIVES

1.	Understand the fundamental concepts of network management.
2.	The extent, breadth and depth of a complete network management plan for a moderate to large network enterprise.

UNIT I - FUNDAMENTALS OF COMPUTER NETWORK TECHNOLOGY (9 hours)

Network Topology, LAN, Network node components-Hubs, Bridges, Routers, Gateways, Switches, WAN,ISDN-Transmission Technology, Communications protocols and standards.

UNIT II - OSI NETWORK MANAGEMENT (9 hours)

OSI Network management model-Organizational model-Information model, Communication model.Abstract Syntax Notation – Encoding Structure, Macros Functional Model CMIP/CMIS.

UNIT III - INTERNET MANAGEMENT (SNMP) (9 hours)

SNMP-organizational model-system overview, The information model, communication model-Functional model. SNMP proxy server, Management information, Protocol remote monitoring.

UNIT IV - BROADBAND NETWORK MANAGEMENT (9 hours)

Broadband networks and services, ATM Technology – VP, VC, ATM Packet, Integrated service, ATMLAN emulation, Virtual LAN, ATM Network Management – ATM Network reference model, Integrated local Management Interface. ATM Management Information base, Role of SNMP and ILMI in ATM Management, M1, M2, M3, M4 interface. ATM Digital Exchange Interface Management.

UNIT V - NETWORK MANAGEMENT APPLICATIONS (9 hours)

Configuration management, Fault management, performance management, Event Corelation Techniques security management, Accounting management, Report Management, Policy Based Management Services Level Management.

TEXT BOOKS

1. Mani Subramanian, "*Network Management Principles and Practice"*, 2/E, Pearson Education.
2. Salah aiidarons, Thomas Plevayk, "*Telecommunications Network Technologies and Implementations"*, Eastern Economy Edition IEEE press, New Delhi.

REFERENCES

1. Lakshmi G Raman, *"Fundamentals of Telecommunication Network Management",* Eastern Economy Edition IEEE Press, New Delhi.
2. Richard burke J, "*Network Management Concepts and Practice, A Hand-on approach"*, Pearson Education.

SE1131 –NETWORKS MANAGEMENT												
Course designed by		Department of Software 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	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4	Broad Area	Computer Engineering		Software Engineering		Knowledge Engineering						
		x										
7	Approval	23rd Meeting of academic council, May 2013										

SE1132	EMBEDDED SYSTEMS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Microprocessors and computer architecture				

PURPOSE

The course aims at introducing basic concepts in Embedded Systems with focus on Embedded System development, Hardware architecture and Embedded Operating System.

INSTRUCTIONAL OBJECTIVES

1.	Understand the basics of Embedded Systems
2.	Describe the Hardware and Software architecture of any Embedded System
3.	Use basic productivity and development tools commonly used in Embedded design
4.	Understand the various Kernel objects of Embedded operating system.
5.	Understand the basics of Embedded operating system and availability of various Embedded operating system in the market.

UNIT I - INTRODUCTION TO EMBEDDED SYSTEMS (9 hours)

Introduction: What Is An Embedded System- Basic Embedded System Design- Introduction to Embedded System Architecture- The Embedded Systems Model- Overview Of Programming Languages And Examples Of Their Standards- Standards and Networking.

UNIT II-EMBEDDED SYSTEM DEVELOPMENT (9 hours)

Development Process & Requirements Engineering- Design & Implementation- Integration & Testing- Packaging- Configuration Management- Managing Embedded System Development Projects- Embedded System Fiascos. Programming For Embedded Systems: Overview Of ANSI C & GNU Development Tools- Bit Manipulation Using C- Memory Management- Timing Of Programs- Device Drivers & Productivity Tools- Code Optimization &C Coding Guidelines.

UNIT III-HARDWARE ARCHITECTURES FOR EMBEDDED SYSTEM (9 hours)

Introduction: 8051 Micro Controller- Architecture- Instruction Sets- Assembly Language Programming- I/O Port Programming- Timer/ Controller Programming- Serial Communication- Interrupts Programming- Real Word Interfacing.

UNIT IV-EMBEDDED OPERATING SYSTEMS (9 hours)

Architecture of the Kernel- Tasks & Task Scheduler- ISR- Semaphores & Mutex- Mail Boxes & Message Queues- Event Registers, Pipes & Signals- Priority Inversion Problem- Introduction to Non- Real Time, Real Time and Mobile/Handheld Operating System For Embedded Systems.

UNIT V-INTRODUCTION TO EMBEDDED SYSTEMS USING WINDOWS EMBEDDED CE (9 hours)

User Applications- The Kernel- Memory Architecture- Core Operating System (OS) Services- Processes and Threads- Multitasking and Scheduling- Inter Process Communication- Interrupt Processing- Device Manager- Loader- OS Security Features- OS Networking Features- The OS Build System And Platform Builder- Platform Builder Terminology- Building A Run-Time Image- Build System Configuration Files

TEXT BOOKS

1. Tammy Noergaard, "*Embedded Systems Architecture-A comprehensive guide for engineers and programmers"*, Elsevier, 2005.
2. Dr.K.V.K.K.Prasad, *"Embedded/Real-Time Systems: Concepts, Design and Programming-The Ultimate Reference"*, Dream Tech Press, 2004

REFERENCES

Muhammad Ali Mazidi, Janice GillispieMazidi, Rolin D. McKinley, *"The 8051 Microcontroller and Embedded Systems-Using Assembly and C",* second edition, Pearson Education.

SE1132 - EMBEDDED SYSTEMS												
Course designed by		Department of Software Engineering										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x		x	x		x				x
2.	Mapping of instructional objectives with student outcome	1,2	2		2	3		1				2
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Software Engineering		Computer Science Engineering			Knowledge Engineering					
		x		x								
5.	Approval	23rd Meeting of academic council, May 2013										

SE1133	ENTERPRISE RESOURCE PLANNING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge in Data Base Management System				

PURPOSE

To analyze, design and propose IT solutions for the integration of business process throughout the enterprise.

INSTRUCTIONAL OBJECTIVES

1.	Analyze a business' enterprise activities, workflow and process to identify problems, weaknesses, strengths, threats, opportunities, stakeholders and entities interacting with the enterprise.
2.	Propose reengineered enterprise processes that optimize the enterprise's performance.
3.	Design integrated organizational structures and business processes that optimize the enterprise's performance, overcome problems.

UNIT I - INTRODUCTION (9 hours)

ERP as Integrated Management Information System - Evolution of ERP - Benefits of ERP. ERP vs Traditional Information Systems.

UNIT II - BUSINESS PROCESS REENGINEERING (9 hours)

Business Process Reengineering- need and challenges, - Management concerns about BPR. - BPR to build business Model for ERP. ERP & Competitive advantage, - Basic Constituents of ERP, Selection criteria for ERP Packages. Procurement process for ERP Package.

UNIT III - ERP PACKAGES **(9 hours)**

Overview of ERP packages – PEOPLE SOFT, SAP-R/3, BAAN IV, MFG/PRO, IFS/AVALON, ORACLE- FINANCIAL, Survey of Indian ERP Packages regarding their Coverage, performance & cost.

UNIT IV - ERP IMPLEMENTATION **(9 hours)**

ERP Implementation- issues, Role of Consultants, Vendors, Users, - Need for training, customization. ERP implementation methodology and post implementation issues and options.

UNIT V - ERP CASE STUDIES **(9 hours)**

ERP Case Studies In Hrm, Finance, Production, Product Database, Materials, Sales & Distribution.

TEXT BOOKS

1. Bret Wagner, Ellen Monk, "*Concepts in Enterprise Resource Planning",* 2012.
2. Bret Wagner, Ellen Monk, *"Enterprise Resource Planning",* Third Edition Cengage Learning, 2008.

REFERENCES

Ashu Gupta, Rajesh Verma, Jatindar kumar, *"Enterprise Resource Planning: Concepts and Applications"*, 2012.

<table>
<tr><th colspan="13">SE1133 – ENTERPRISE RESOURCE PLANNING</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Software 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</td><td>2</td><td></td><td></td><td>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="3">General (G)</td><td colspan="3">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 rowspan="2">4.</td><td rowspan="2">Broad Area</td><td colspan="3">Software Engineering</td><td colspan="3">Computer Science Engineering</td><td colspan="6">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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SE1134	DECISION SUPPORT SYSTEMS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge in Database Management System, data Warehousing				

PURPOSE

The purpose of this course is to impart concepts of decision making, decision processes and its implementation in a Development Environment.

INSTRUCTIONAL OBJECTIVES

1.	To appreciate and understand DSS and its Characteristics.
2.	To apply the Decision Makers and styles.
3.	To educate about Knowledge management.
4.	To emphasize on Intelligent DSS.
5.	To provide a modest experience in Implementation of DSS.

UNIT I - INTRODUCTION TO DSS (9 hours)

DSS – Intro, Uses, Decision Making – Rational, Managers, Decision Support, Group Decision, Intuitions and Business Intelligence.

UNIT II - DSS COMPONENTS (9 hours)

DSS Components –Characteristics, Databases, Data Warehouses. Model Components – Model and Analytics, Options and Problems for Models, Data Mining, Model-Based Management Systems. Intelligence and DSS, User Interface.

UNIT III - DESIGN ISSUES (9 hours)

International DSS – Standards, Cross-Culture Modeling, Effects, Designing a DSS – Designing, Development Tools, Benefits of Object Oriented Technologies, Implementation and Evaluation.

UNIT IV - EXTENSION OF DSS (9 hours)

Executive Information and Dashboard – KPI and Balanced Scoreboards, Dashboard - EIS, Requirements, Appliances and Value. Group DDS – Groupware, GDSS, Features of Support – Decision Making, Process, GDSS and Reengineering.

UNIT V - IMPLEMENTING IN THE E-BUSINESS ERA (9 hours)

Electronic Commerce - Integration, Impacts, and the Future of the Management-Support Systems.

TEXT BOOKS

1. Vicki L. Sauter, "*Decision Support Systems for Business Intelligence"*, 2nd Edition, Wiley, 2011.
2. George M.Marakas, "*Decision Support Systems in the 21st century"*, 2nd Edition, PHI, 2009.

REFERENCES

1. Janakiraman V.S, Sarukesi K, *"Decision Support Systems"*, PHI, 2009.
2. Efraim Turban, Jay E.Aronson, Ting-Peng Liang, "*Decision Support Systems and Intelligent Systems"*, 7th Edition, Pearson Education, 2006.
3. Daniel J Power, *"Decision Support Systems: Concept and Resources for Managers"*, Praeger, April 2002.

SE1134 -DECISION SUPPORT SYSTEMS												
Course designed by		Department of Software Engineering										
1.		a	b	c	d	e	f	g	h	l	j	k
		x	x	x		x					x	
2.	Mapping of instructional objectives with student outcome	2	5	1		1					5	
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Software Engineering		Computer Engineering			Knowledge Engineering					
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

SE1135	DATA MINING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge in Database Management System				

PURPOSE

This course provides a complete overview of Data mining techniques.

INSTRUCTIONAL OBJECTIVES

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

1.	To understand the concepts of Data Mining.
2.	Classification and prediction and cluster analysis techniques.
3.	Applications of Data and knowledge mining.

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

Introduction,Data Mining Functionalities,Data Preprocessing,Data Cube Computation and Data Generalization-Efficient Methods for Data Cube Computation,Star-cubing.

UNIT II- PATTERNS & ASSOCIATION **(9 hours)**

Mining Frequent Patterns, Associations, Correlations,Classification and Prediction-Bayesian Classification, Bayes Theorem-Naïve Bayesian Classification-Rule-Based Classification- *k*-Nearest-Neighbor Classifiers- Prediction.

UNIT III – CLUSTER ANALYSIS **(9 hours)**

Cluster Analysis-Partitioning Methods-*k*-Means and *k*-Medoids- BIRCH: Balanced Iterative Reducing and Clustering- ROCK-DBSCAN-OPTICS-DENCLUE, Mining Stream, Time-Series, and Sequence Data, Graph Mining, Social Network Analysis, and Multirelational Data Mining.

UNIT IV- APPLICATIONS OF DATA MINING **(9 hours)**

Applications and Trends in Data Mining- Theoretical Foundations of Data Mining-Statistical Data Mining- Social Impacts of Data Mining.

UNIT V – DATA MINING TRENDS **(9 hours)**

Ubiquitous and Invisible Data Mining -Data Mining, Privacy, and Data Security-Trends in Data Mining,Microsoft's OLE DB-Model Creation-Model Training-Model Prediction and Browsing.

TEXT BOOKS

1. Jiawei Han and Micheline Kamber, *" Data Mining – Concepts and Techniques",* Third Edition, Morgan Kaufmann Publishers, 2011.
2. Dunham M. H., *"Data Mining: Introductory and Advanced Topics".* Pearson Education, 2001.

REFERENCES

1. Hand D, Mannila H, and Smyth P, "*Principles of Data Mining"* Prentice-Hall, 2001.
2. Witten H, and Frank E, *"Data Mining: Practical Machine Learning Tools and Techniques",* Morgan Kaufmann, 2000.

SE1135 - DATA MINING												
Course designed by		Department of Software 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						
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Computer Engineering		Software Engineering							Knowledge Engineering	
											x	
5.	Approval	23rd Meeting of academic council, May 2013										

SE1136	GENETIC ALGORITHM AND MACHINE LEARNING	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Knowledge in Data Structures Probability and statistical methods				

PURPOSE

This course provides sound knowledge to students about the Basic concepts of Genetic Algorithms, Implementation and applications of Genetic Algorithms.

INSTRUCTIONAL OBJECTIVES

1.	By the end of the course, students will be able to understand the basic concepts and mathematical foundation of Genetic Algorithms and machine learning.
2.	Implement and observe the results of Genetic Algorithm based applications
3.	Emphasize the Genetic based machine learning and its applications

UNIT I - INTRODUCTION & MATHEMATICAL FOUNDATION (9 hours)

What are genetic algorithms – Robustness of traditional optimization and search methods – The goals of optimization – How are genetic algorithms different from traditional methods – A simple genetic algorithm – Genetic algorithms at work – A simulation by hand – Grist for the search mill – Important similarities – Similarity templates (Schemata). Who shall live and who shall die - The fundamental theorem – Schema processing at work: An example by hand revisited – The two armed and k-armed problem – How many schemata are processed usefully? – The building block hypothesis – Another perspective: The minimal deceptive problem – Schemata revisited: Similarity templates as hyper planes.

UNIT II - IMPLEMENTATION AND APPLICATIONS OF GENETIC ALGORITHM (9 hours)

Data structure – Reproduction, Crossover, and Mutation – A time to reproduce, a time to cross – Get with the main program – Mapping objective functions to fitness form - fitness scaling – Coding – A multiparameter, Mapped, Fixed-point coding – Discretization – Constraints. The rise of genetic algorithms – Genetic algorithms applications of historical interest – De Jong and function optimization – improvements in basic technique – Current applications of genetic algorithms.

UNIT III - ADVANCED CONCEPTS IN GENETIC RESEARCH (9 hours)

Dominance, Diploidy, and Abeyance – Inversion and other recording operators – Other Micro-operators – Niche and speciation – Multiobjective optimization – Knowledge-based techniques – Genetic algorithms and parallel processors.

UNIT IV - MACHINE LEARNING (9 hours)

Introduction to unsupervised learning – Introduction to supervised learning general concepts – General definition – Model evaluation – Data organization - Bases rule for classification. Genetics-based Machine learning: What is a classifier system – Rule and message system – Apportionment of credit: The bucket brigade – Genetic algorithm – A simple classifier system in Pascal – Result using the simple classifier system.

UNIT V-APPLICATIONS OF GENETICS-BASED MACHINE LEARNING (9 hours)

The rise of GBML – Development of CS-1, The first classifier system – Smith's Poker player – Other Early GBML Efforts – A Potpourri of current applications.

TEXT BOOKS

1. David E. Goldberg *"Genetic Algorithms in Search, Optimization and Machine Learning"* Pearson Education, 2009.
2. Zheng Rong Yang, *"Machine Learning Approches to Bio informatics"* World Scientific publishing co.pte.ltd, 2010.

REFERENCES

1. John J. Grefenstette, *"Genetic Algorithm for Machine Learning"* Springer science plus business media, LLC, 1994.
2. Riccardo Poli, William B. Langdon, Nicholas F. Mcphee *"A Field Guide to Genetic Programming"* amazon publications, 2008.

SE1136 - GENETIC ALGORITHM AND MACHINE LEARNING												
Course designed by		**Department of Software Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X		X	X		X				x
2.	Mapping of instructional objectives with student outcome	1,2			2	3		1				2
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)				Professional Subjects (P)		
										x		
4.	Broad Area	Software Engineering				ComputerEngineering				Knowledge Engineering		
										X		
5.	Approval	23rd Meeting of academic council, May 2013										

SE1137	EVOLUTIONARY COMPUTING	L	T	P	C
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Knowledge in Genetic Algorithm				

PURPOSE

This course provides a way to understand the concepts of Genetic Algorithms, Genetic programming and its applications.

INSTRUCTIONAL OBJECTIVES

1.	Understanding of various evolutionary computation techniques
2.	Identify algorithms suitable for solving certain evolutionary-computation problems
3.	Apply evolutionary computation techniques to optimization, learning, and design
4.	Implement at least one algorithm from each of the following groups: generic algorithms, representations, selections, and search operators

UNIT I - EVOLUTIONARY ALGORITHMS (9 hours)

Introduction to evolutionary computing– Possible applications- pros and cons – principles of Evolutionary processes and genetics- brief history of evolutionary computation- introduction to Evolutionary algorithms - Evolutional strategies- Evolutionary programming.

UNIT II-GENETIC ALGORITHMS (9 hours)

Genetic algorithm (GA) - steps in GA-Genome (individual) representation- fitness-selection methods- Operators in GA- GA parameters- Schemata theorem and problems- GA applications - Travelling salesman problem- sequence alignment in Bioinformatics

UNIT III-GENETIC PROGRAMMING (9 hours)

Genetic programming (GP) - Steps in GP- individual representation- initial population- tree creation methods-fitness assessment- individual selection methods- GP operators- GP parameters.

UNIT IV-PARALLEL AND DISTRIBUTED GP (9 hours)

Introduction to parallel genetic programming- distributed genetic programming-parallel distributed GP.

UNIT V-APPLICATIONS OF GP (9 hours)

GP applications - symbolic regression- multiplexer- artificial ant- keep- away soccer- wall-following behavior – Introduction to Ant colony optimization – Introduction to Particle Swarm Optimization.

TEXT BOOKS

1. Back T, "*Evolutionary Computation 1 : Basic Algorithms and Operators"*, Institute of Physics Publishing, Bristol, 2000.
2. Fogel D.B*, "Evolutionary Computation: Toward a New Philosophy of Machine Intelligence* ", 2nd edition, Wiley-IEEE Press, 1999.

REFERENCES

1. Jacob C, "*Illustrating Evolutionary Computation with Mathematica",* Morgan Kaufnam, 2001.
2. David E. Goldberg, "*Genetic algorithm in search, optimization and machine learning".*
3. Wolfgangbanzhaf, et.al, "*Genetic programming : An introduction: On the automatic evolution of computer programs and its applications*", MIT press.
4. John Koza, "*Genetic programming: On the programming of computers bymeans of natural section",* MIT press, 1992.
5. John Koza, *"Genetic programming II : Automatic discovery of reusable programs"*, MIT press, 1994.
6. John Koza, *"Genetic programming III : Darwinian invention and problem solving"*, Morgan kaugmann publisher, 1999.
7. John Koza, *"Genetic programming IV : Routine human competitive machineintelligence"*, Kluwer academic publisher3, 2003.

SE1137 - EVOLUTIONARY COMPUTING												
Course designed by		Department of Software 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				3,4				1
3.	Category	General (G)		Basic Sciences (B)			Engineering Sciences and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Software Engineering		Computer Engineering							Knowledge Engineering	
											x	
5.	Approval	23rd Meeting of academic council, May 2013										

SE1138	SOFTWARE AGENTS	L	T	P	C
	Total Contact Hours - 45	**3**	**0**	**0**	**3**
	Prerequisite				
	Software Engineering Principles				

PURPOSE

This course provides a thorough understanding of agent related system development

INSTRUCTIONAL OBJECTIVES

1.	Agent development
2.	Multi agent and Intelligent agents
3.	Agents and security
4.	Agent Applications

UNIT I - INTRODUCTION (9 hours)

The agent landscape – The smart agent framework: Introduction – Initial concepts – Entities-Objects – Agents – Autonomy – Tropistic agent – Specification structure of SMART. – Agent relationships – An operational analysis of Agent relationships.

UNIT II-SOCIOLOGICAL AGENTS (9 hours)

Sociological Agents - Autonomous Interaction - Contract Net as a global directed system – Computational Architecture for BDI agents – Evaluating social dependence networks – Normative agents.

UNIT III-INTELLIGENT AUTONOMOUS AGENTS AND COMMUNICATION

(9 hours)

Intelligent Agents –Deductive Reasoning Agents – Practical reasoning agents - Reactive agents – Hybrid Agents – Understanding Each other – Communicating – Methodologies.

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

Modeling multi agent system with AML – JADE:Java Agent development frame work –wireless sensor networks and software Agents – Multi agent Planning Security and anonymity in agent systems.

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

Multi Agent system :Theory approaches and NASA applications – Agent based control for multi-UAV information collection- Agent based decision support system for Glider pilots – Multi agent system in E- Health Territorial Emergencies – Software Agents for computer network security- Multi-Agent Systems, Ontologies and Negotiation for Dynamic Service Composition in Multi-Organizational Environmental Management.

TEXT BOOKS

1. Mohammad Essaaidi, Maria Ganzha, Marcin Paprzycki, "*Software Agents, Agent Systems and Their Applications",*IOS Press, 2012.
2. Mark d'Inverno and Michael Luck, "*Understanding AgentSystems, Springer"*, 2010**.**

REFERENCES

1. Michael Wooldridge, "*An Introduction to Multi Agent Systems",* John Wiley & Sons Ltd., 2009.
2. Lin Padgham, Michael Winikoff, "*Developing Intelligent Agent Systems: A Practical Guide"*, John Wiley & Sons Ltd., 2004.
3. Bradshaw, *"Software Agents"*, MIT Press, 1997.
4. Richard Murch, Tony Johnson, *"Intelligent Software Agents",* Prentice Hall, 2000.

SE1138 - SOFTWARE AGENTS												
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 and Technical Arts (E)				Professional Subjects (P)	
											x	
4.	Broad Area	Computer Engineering		Software Engineering			Knowledge Engineering					
				x								
5.	Approval	23rd Meeting of academic council, May 2013										

	ANDROID PROGRAMMING	L	T	P	C
SE1139	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Programming in JAVA				

PURPOSE

To study how to develop an own android application and how to publish that android application for use.

INSTRUCTIONAL OBJECTIVES

1.	To study about the android architecture and the tools for developing android applications
2.	To create an android application
3.	To learn about the user interfaces used in android applications
4.	To learn about how to handle and share android data
5.	To learn about how to develop an android sevices and to publish android application for use.

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

Android - Android Versions - Features of Android - Architecture of Android - Obtaining the Required Tools - Android SDK - Installing the Android SDK Tools - Configuring the Android SDK Manager – Eclipse - Android Development Tools (ADT) - Creating Android Virtual Devices (AVDs) - Creating Your First Android Application – Types of Android Application - Anatomy of an Android Application

UNIT II-ACTIVITIES, FRAGMENTS AND INTENTS (9 hours)

Understanding Activities - Creating Activities - Linking Activities Using Intents – Resolving Intent Filter Collision - Returning Results from an Intent - Passing Data Using an Intent Object - Fragments - Adding Fragments Dynamically - Life Cycle of a Fragment - Interactions between Fragments - Calling Built-In Applications Using Intents - Understanding the Intent Object - Using Intent Filters - Adding Categories - Displaying Notifi cations.

UNIT III-ANDROID USER INTERFACE (9 hours)

Understanding the Components of a Screen - Adapting to Display Orientation - Managing Changes to Screen Orientation - Utilizing the Action Bar - Creating the User Interface Programmatically - Listening for UI Notifications - Designing Your User Interface With Views - Using Basic Views - Using Picker Views - Using List Views to Display Long Lists - Understanding Specialized Fragments - Displaying Pictures And Menus With Views - Using Image Views to Display Pictures - Using Menus with Views - Additional Views.

UNIT IV-DATABASES, CONTENT PROVIDERS AND MESSAGING (9 hours)

Saving and Loading User Preferences - Persisting Data to Files - Creating and Using Databases - Content Providers - Sharing Data in Android - Using a Content Provider - Creating Your Own Content Providers - Using the Content Provider – Messaging - SMS Messaging - Sending E-mail.

UNIT V-LOCATION BASED SERVICES, NETWORKING AND ANDROID SEVICES (9 hours)

Location-Based Services - Displaying Maps - Getting Location Data - Monitoring a Location - Project — Building a Location Tracker – Networking - Consuming Web Services Using HTTP - Consuming JSON Services - Sockets Programming - Developing Android Services - Creating Your Own Services - Establishing Communication between a Service and an Activity - Binding Activities to Services - Understanding Threading - Publishing Android Applications - Preparing for Publishing - Deploying APK Files

TEXT BOOKS

1. Wei - Meng Lee, "*Beginning Android 4 Application Development*" , John Wiley & Sons, Inc, 2012.
2. Reto Meier, "*Professional Android 4 Application Development*" , John Wiley & Sons, Inc, 2012.

REFERENCES

Zigurd Mednieks, Laird Dornin, Blake Meike G, and Masumi Nakamura, "*Programming Android*", O'Reilly books, 2011.

SE1139 - ANDROID PROGRAMMING												
Course designed by		**Department of Software Engineering**										
1.	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		x	x		x	x		x				x
2.	Mapping of instructional objectives with student outcome	1,2	2		2	3		1				2
3.	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
									x			
4.	Broad Area	Software Engineering		Computer Engineering		Knowledge Engineering						
		x										
5.	Approval	23rd Meeting of academic council, May 2013										

	SOFTWARE RELIABILITY	L	T	P	C
SE1140	Total Contact Hours – 45	**3**	**0**	**2**	**4**
	Prerequisite				
	Knowledge in Software Engineering				

PURPOSE

This course will look at professional techniques for understanding, assessing and applying the software reliability models in software development systems.

INSTRUCTIONAL OBJECTIVES

1.	To appreciate and understand scientific concepts of Software and Hardware Reliability
2.	To apply Software Reliability Growth Models in Software Development
3.	To emphasize the Application of Software Reliability Models

UNIT I - INTRODUCTION TO SYSTEM RELIABILITY (12 hours)

Review of Reliability Mathematics – Random Experiment, Probability distributions-Binomial, Poisson, Exponential, Weibull, and Generalized Exponential distributions; System Reliability -Reliability Block diagram — Repairable and Non Repairable systems; Maintainability and Availability — MTBF — MTTF, MDT – MTTR; Designing for higher reliability — Redundancy— k out of n systems

UNIT II-SYSTEM RELIABILITY CONCEPTS (12 hours)

Software and hardware reliability; Basic Concepts – Errors, faults and Failures; Reliability Model classification – Operational Reliability, Testing Reliability; Introduction to Software Reliability Growth Models (SRGMs) - General Model Characteristic – Historical Development of models – Model Classification scheme –white box and black box models; Markovian models – Jelinski –Moranda model

UNIT III-NON-HOMOGENOUS POISSON PROCESS MODELS (12 hours)

NHPP models- Musa models- Basic Execution time, Logarithmic Poisson Execution time models- Goel – Okumoto model, Yamada delayed S-shaped model, Imperfect debuggingmodels –Kapur- Garg model, Subburaj-Gopal model for the learning phenomenon, Subburaj-Gopap-Kapur versatile debugging model

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UNIT IV-COMPARISON OF SOFTWARE RELIABILITY MODELS (12 hours)

Bayesian models- Littlewood –Verall model; Discrete models; Efforts based models; Execution time, Testing time and Calendar Time modeling; Comparison Criteria – Goodness of fit - Predictive Validity of Models – short term and long term

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UNIT V-ADVANCED TOPICS IN SOFTWARE RELIABILITY (12 hours)

Engineering "just right reliability"- Test case generation-operational profile; setting system failure intensity objectives; preparing, executing and guiding test; Release Time determination – criteria – cost, failure intensity, reliability;

TEXT BOOKS

1. John D. Musa, Anthony Iannino, Kazuhira Okumoto, *"Software Reliability – Measurement, Prediction, Application, Series in Software Engineering and Technology",* McGraw Hill, 1987.
2. Michael Lyu, "*Handbook of Software Reliability Engineering"*, IEEE Computer Society Press, ISBN: 0-07-039400-8, 1996.

REFERENCES

1. John D. Musa, *"Software Reliability Engineering"*, Tata McGraw Hill, 1999.
2. Patric D. T.O connor*," Practical Reliability Engineering"* , 4th Edition, John Wesley & sons, 2003.
3. Xie M, *"Software Reliability Modelling"*, World Scientific, Singapore, 1991.
4. Research papers published in relevant international journals.

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<tr><th colspan="13">SE1140 - SOFTWARE RELIABILITY</th></tr>
<tr><td colspan="2">Course designed by</td><td colspan="11">Department of Software 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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