Curriculum & Syllabus

of

B.E. Electronics and Communication Engineering

(For the batch admitted in 2008-09)

K.S.RANGASAMY COLLEGE OF TECHNOLOGY
TIRUCHENGODE – 637 215

(An Autonomous Institution affiliated to Anna University of Technology Coimbatore and approved by AICTE New Delhi)

K.S.Rangasamy College of Technology - Autonomous Regulation		R 2008
Department	Electronics and Communication Engineering	
Programme Code & Name	13 : B.E. Electronics and Communication Engineering	

K.S.Rangasamy College of Technology , Tiruchengode - 637215	
Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2008
Department	Department of Electronics and Communication Engineering
Programme Code & Name	13 : B.E. Electronics and Communication Engineering

Semester I

Course Code	Course Name	Hours/ Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
	THEORY							
08130101G	Technical English (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100
08130102G	Engineering Mathematics I (Common to all B.E./B.Tech. programmes)	3	1	0	4	50	50	100
08130103G	Applied Physics (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100
08130104G	Applied Chemistry (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100
08130105S	Electron Devices (common to ECE and EEE)	3	1	0	4	50	50	100
08130106S	Basics of Civil and Mechanical Engineering (Common to ECE, EEE and Text)	4	0	0	4	50	50	100
	PRACTICAL							
08130107P	Applied Physics Laboratory	0	0	3	2	50	50	100
08130108P	Electron Devices Laboratory	0	0	3	2	50	50	100
08130109P	Engineering Practices Laboratory	0	0	3	2	50	50	100
Total		19	2	9	27	900		

Semester II

Course Code	Course Name	Hours/ Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
	THEORY							
08130201G	Communication Skills (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100
08130202G	Engineering Mathematics II (Common to all B.E./B.Tech. programmes)	3	1	0	4	50	50	100
08130203G	Materials Science (Common to all B.E./B.Tech. programmes except Nano)	3	0	0	3	50	50	100
08130204G	Environmental Science (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100
08130205S	Fundamentals of Programming (Common to CSE, ECE, EEE and IT)	3	1	0	3	50	50	100
08130206C	Circuit Theory	3	1	0	4	50	50	100
	PRACTICAL							
08130207P	Engineering Graphics Laboratory	1	0	3	3	50	50	100
08130208P	Applied Chemistry Laboratory	0	0	3	2	50	50	100
08130209P	Programming Laboratory	0	0	3	2	50	50	100
08130210P	Circuits Laboratory	0	0	3	2	50	50	100
08130211P	Comprehension I	0	0	3	0	100	00	100
Total		19	3	15	29	1100		

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Semester III

Course Code	Course Name	Hours/ Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
	THEORY							
08130301G	Engineering Mathematics III (Common to all B.E./B.Tech. programmes except Textile)	3	1	0	4	50	50	100
08130302C	Electrical Machines	3	0	0	3	50	50	100
08130303S	Data Structures using C (Common to CSE and ECE)	3	0	0	3	50	50	100
08130304C	Digital Electronics	3	1	0	4	50	50	100
08130305C	Electro Magnetic Fields	3	1	0	4	50	50	100
08130306C	Electronic Circuits I	3	0	0	3	50	50	100
	PRACTICAL							
08130307P	Electrical Machines Laboratory	0	0	3	2	50	50	100
08130308P	Electronics Laboratory I	0	0	3	2	50	50	100
08130309P	Data structures Laboratory	0	0	3	2	50	50	100
08130310P	Comprehension II	0	0	3	0	100	00	100
08130311P	Career Competency Development I	0	0	2	0	100	00	100
Total		18	3	14	27	1100		

Semester IV

Course Code	Course Name	Hours/ Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
	THEORY							
08130401C	Random Processes	3	1	0	4	50	50	100
08130402C	Electronic Circuits II	3	0	0	3	50	50	100
08130403C	Signals and Systems	3	1	0	4	50	50	100
08130404C	Object Oriented Programming with C++ and Java	3	1	0	3	50	50	100
08130405C	Linear Integrated Circuits	3	0	0	3	50	50	100
08130406C	Transmission lines and waveguides	3	1	0	4	50	50	100
	PRACTICAL							
08130407P	Electronics circuits and simulation Laboratory	0	0	3	2	50	50	100
08130408P	Linear Integrated Circuit Laboratory	0	0	3	2	50	50	100
08130409P	Object Oriented Programming Laboratory	0	0	3	2	50	50	100
08130410P	Comprehension III	0	0	3	0	100	00	100
08130411P	Career Competency Development II	0	0	2	0	100	00	100
Total		18	4	14	27	1100		

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Semester V								
Course Code	Course Name	Hours/ Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
	THEORY							
08130501G	Professional Ethics (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100
08130502C	Communication Systems	3	1	0	4	50	50	100
08130503C	Digital Signal Processing	3	1	0	4	50	50	100
08130504C	Microprocessors and Its Applications	3	0	0	3	50	50	100
08130505C	Control Systems	3	1	0	4	50	50	100
08130506C	Computer Networks	3	0	0	3	50	50	100
	PRACTICAL							
08130507P	Digital Signal Processing Laboratory	0	0	3	2	50	50	100
08130508P	Microprocessor and Application Laboratory	0	0	3	2	50	50	100
08130509P	Computer Networks Laboratory	0	0	3	2	50	50	100
08130510P	Career Competency Development III	0	0	2	0	100	00	100
Total		18	3	11	27	1000		
Semester VI								
Course Code	Course Name	Hours/ Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
	THEORY							
08130601G	Principles of Management (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100
08130602C	Digital Communication	3	1	0	4	50	50	100
08130603C	VLSI Design	3	0	0	3	50	50	100
08130604C	Antenna and Wave Propagation	3	1	0	4	50	50	100
08130605C	Measurements and Instrumentation	3	0	0	3	50	50	100
081306**E	Elective I	3	0	0	3	50	50	100
	PRACTICAL							
08130607P	Communication Systems Laboratory	0	0	3	2	50	50	100
08130608P	VLSI Laboratory	0	0	3	2	50	50	100
08130609P	Design Project	0	0	3	2	100	00	100
08130610P	Career Competency Development IV	0	0	2	0	100	00	100
Total		18	2	11	26	1000		

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Semester VII								
Course Code	Course Name	Hours/ Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
	THEORY							
08130701G	Total Quality Management (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100
08130702C	Embedded Systems	3	0	0	3	50	50	100
08130703C	Optical Communication	3	0	0	3	50	50	100
08130704C	Microwave Engineering	3	1	0	4	50	50	100
081307**E	Elective II	3	0	0	3	50	50	100
081307**E	Elective III	3	0	0	3	50	50	100
	PRACTICAL							
08130707P	Embedded Systems Laboratory	0	0	3	2	50	50	100
08130708P	Optical and Microwave Laboratory	0	0	3	2	50	50	100
08130709P	Project Work - Phase I	0	0	4	2	100	00	100
08130710P	Career Competency Development V	0	0	2	0	100	00	100
Total		18	1	12	25	1000		

Semester VIII								
Course Code	Course Name	Hours/ Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
	THEORY							
08130801C	Mobile Communication	3	1	0	4	50	50	100
081308**E	Elective IV	3	0	0	3	50	50	100
081308**E	Elective V	3	0	0	3	50	50	100
	PRACTICAL							
08130804P	Project Work - Phase II	0	0	20	10	50	50	100
Total		9	1	20	20	400		

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Programme Code & Name	13 : B.E. Electronics and Communication Engineering							
Elective I								
Course Code	Course Name	Hours/ Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
	THEORY							
08130641E	Fundamentals of IT	3	0	0	3	50	50	100
08130642E	Operating Systems	3	0	0	3	50	50	100
08130643E	DSP Processor Architecture and programming	3	0	0	3	50	50	100
08130644E	Multimedia Compression Techniques	3	0	0	3	50	50	100
08130645E	Computer Architecture	3	0	0	3	50	50	100
08130646E	Television and Video Engineering	3	0	0	3	50	50	100
08130647E	Advanced Microprocessors	3	0	0	3	50	50	100
08130648E	Numerical Methods	3	0	0	3	50	50	100
Elective II								
08130751E	IT Essentials	3	0	0	3	50	50	100
08130752E	Network Security	3	0	0	3	50	50	100
08130753E	Database Management Systems	3	0	0	3	50	50	100
08130754E	Digital Image Processing	3	0	0	3	50	50	100
08130755E	Medical Electronics	3	0	0	3	50	50	100
08130756E	High Speed Networks	3	0	0	3	50	50	100
08130757E	Electromagnetic Interference and Electromagnetic Compatibility in System Design	3	0	0	3	50	50	100
Elective III								
08130761E	Micro Controller System Design and Applications	3	0	0	3	50	50	100
08130762E	TCP / IP Design and Implementation	3	0	0	3	50	50	100
08130763E	Satellite Communication	3	0	0	3	50	50	100
08130764E	Advanced Digital System Design	3	0	0	3	50	50	100
08130765E	Digital Communication Receivers	3	0	0	3	50	50	100
08130766E	Speech and Audio Signal Processing.	3	0	0	3	50	50	100
08130767E	Operations Research	3	0	0	3	50	50	100
Elective IV								
08130871E	Neural Networks and Applications	3	0	0	3	50	50	100
08130872E	Telecommunication Switching and Networks	3	0	0	3	50	50	100
08130873E	Real Time Operating System	3	0	0	3	50	50	100
08130874E	Broadband Networks	3	0	0	3	50	50	100

Elective V								
08130881E	ASIC Design	3	0	0	3	50	50	100
08130882E	Internet Programming	3	0	0	3	50	50	100
08130883E	Wireless Network Technologies	3	0	0	3	50	50	100
08130884E	Radar and Navigational Aids	3	0	0	3	50	50	100
08130885E	Computer Hardware and Interfacing	3	0	0	3	50	50	100
08130886E	Medical Imaging	3	0	0	3	50	50	100

<table>
<tr><td colspan="7">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="2">R 2008</td></tr>
<tr><td>Department</td><td>Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="4">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="9">Semester I</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130101G</td><td>TECHNICAL ENGLISH
(Common to All B.E, B.Tech programmes)</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">To help learners improve their skills in vocabulary and to enable them to use words appropriately in different academic and professional contexts, familiarize with different rhetorical functions of technical English, develop strategies that could be adopted while reading texts, acquire the ability to speak effectively in English in real life and career related situations and organized academic and professional writing.</td></tr>
<tr><td>1</td><td colspan="4">GRAMMAR AND VOCABULARY</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Word formation with prefixes and suffixes – synonyms and antonyms – verb patterns-subject – verb agreement – tenses (simple and compound tenses) – simple, compound and complex sentences – impersonal passive voice – use of conditionals – comparative adjectives (affirmative and negative) – expanding nominal compounds – articles – use of prepositions - phrasal verbs – commonly mispronounced and misspelt words – British and American vocabulary.</td></tr>
<tr><td>2</td><td colspan="4">LISTENING</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Extensive listening – listening for general content – listening to fill up gapped texts – intensive listening – listening for specific information: retrieval of factual information – listening to identify topic, context, function, speaker’s opinion, attitude, etc. – global understanding skills and ability to infer, extract gist and understand main ideas – note-taking: guided and unguided.</td></tr>
<tr><td>3</td><td colspan="4">SPEAKING</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Verbal and non verbal communication – speech sounds – syllables – word stress (structures and content words) – sentences stress – intonation – Pronunciation drills, tongue twisters – formal and informal English – oral practice – developing confidence – introducing oneself – asking for or eliciting information – describing objects – offering suggestions and recommendations – expressing opinions (agreement / disagreement) – giving instructions.</td></tr>
<tr><td>4</td><td colspan="4">READING</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Exposure to different reading techniques – reading for gist and global meaning – predicting the content – skimming the text – identifying the topic sentence and its role in each paragraph – scanning – inferring / Identifying lexical and contextual meanings – reading for structure and detail – transfer of information / guided note-making – understanding discourse coherence – sequencing of sentences.</td></tr>
<tr><td>5</td><td colspan="4">WRITING</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Introductions to the characteristics of technical style – writing definitions and descriptions – paragraph writing (topic sentence and its role, unity, coherence and use of cohesive expressions) – process description (use of sequencing connectives) – comparison and contrast – classifying the data – analyzing / interpreting the data – formal letter writing (letter to the editor, letter for seeking practical training, and letter for undertaking project works in industries) – editing (punctuation, spelling and grammar).</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="2">45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">Rizvi M Ashraf, “Effective Technical Communication”, 1st Edition, Tata McGraw hill Publishing Company Ltd., New Delhi, 2005.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">Dr.M.Balasubraminian and Dr.G.Anbalagan, “Performance in English” Anuradha Publications, Kumbakonan, 2007.</td></tr>
<tr><td>2</td><td colspan="8">Sharon J. Gerson, Steven M. Gerson, “Technical Writing – Process & Product”. 3rd Edition, Pearson Education (Singapore) (p) Ltd., New Delhi, 2004.</td></tr>
<tr><td>3</td><td colspan="8">Mitra K. Barun, “Effective Technical Communication – A Guide for Scientists and Engineers”, Oxford University Press, New Delhi, 2006.</td></tr>
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<tr><td colspan="8">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="2">R 2008</td></tr>
<tr><td colspan="2">Department</td><td colspan="2">Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="3">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="10">Semester I</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours / Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td colspan="2">08130102G</td><td>ENGINEERING MATHEMATICS I (Common to all B.E./B.Tech. programmes)</td><td>3</td><td>1</td><td>0</td><td>4</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="8">The course is aimed at developing the basic mathematical skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many engineering fields, significantly in fluid mechanics, field theory and communication engineering.</td></tr>
<tr><td>I</td><td colspan="5">MATRICES</td><td colspan="2">Total Hrs</td><td colspan="2">12</td></tr>
<tr><td colspan="10">Column matrix as vector – linear independent and dependent of vector – Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of eigen values and eigenvectors – Cayley – Hamilton theorem (without proof) – Similarity transformation (concept only) – Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.</td></tr>
<tr><td>2</td><td colspan="5">GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS</td><td colspan="2">Total Hrs</td><td colspan="2">12</td></tr>
<tr><td colspan="10">Curvature – Cartesian and polar co-ordinates – Centre and radius of curvature – Circle of curvature – Involutes and evolutes – Envelopes – Properties of envelopes and evolutes –Evolute as envelope of normals</td></tr>
<tr><td>3</td><td colspan="5">FUNCTIONS OF SEVERAL VARIABLES</td><td colspan="2">Total Hrs</td><td colspan="2">12</td></tr>
<tr><td colspan="10">Functions of two variables – Partial derivatives – Total differential – Maxima and minima – Constrained maxima and minima – Lagrange's multiplier method – Jacobians.</td></tr>
<tr><td>4</td><td colspan="5">ORDINARY DIFFERENTIAL EQUATIONS</td><td colspan="2">Total Hrs</td><td colspan="2">12</td></tr>
<tr><td colspan="10">Linear differential equations of Second and higher order with constant coefficient when the R.H.S is e^{ax}, x^n $n > 0, \mathrm{Sin}\, ax$, $\mathrm{Cos}\, ax$, $e^{ax} x^n$, $e^{\alpha x} \mathrm{Sin}\beta x$, $e^{\alpha x} \mathrm{Cos}\beta x$, $x^n \mathrm{Sin}\alpha x$ and $x^n \mathrm{Cos}\, \alpha x$ – Differential Equations with variable coefficients (Cauchy's Form and Legendre's Linear Equation).</td></tr>
<tr><td>5</td><td colspan="5">DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS</td><td colspan="2">Total Hrs</td><td colspan="2">12</td></tr>
<tr><td colspan="10">Simultaneous first order linear equations with constant coefficients – Method of variation of parameters – Solution of specified differential equations connected with electric circuits, bending of beams and simple harmonic motion (Differential equations and associated conditions need be given).</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td colspan="2">60</td></tr>
<tr><td colspan="10">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="9">Veerarajan. T., "Engineering Mathematics (for first year)", Fourth Edition, Tata McGraw- Hill Publishing Company Limited, New Delhi, 2005.</td></tr>
<tr><td colspan="10">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="9">Kandasamy. P, Thilagavathy. K and Gunavathy. K, "Engineering Mathematics" – First Edition 1996, S.Chand and Co. – New Delhi 2007.</td></tr>
<tr><td>2</td><td colspan="9">Grewal. B.S., "Higher Engineering Mathematics", Thirty Eighth Edition, Khanna Publishers, Delhi, 2004.</td></tr>
<tr><td>3</td><td colspan="9">Kreyszig. E., "Advanced Engineering Mathematics," Eighth Edition, John Wiley and Sons (Asia) Limited, Singapore 2001.</td></tr>
<tr><td>4</td><td colspan="9">Venkataraman.M.K, "Engineering Mathematics, Volume I & II Revised Enlarged", Fourth Edition", The National Pub. Co., Chennai, 2004.</td></tr>
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Department	Electronics and Communication Engineering			Programme Code & Name		13 : B.E. Electronics and Communication Engineering			
Semester I									
Course Code	Course Name	Hours / Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130103G	APPLIED PHYSICS (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100	
Objective(s)	Design of acoustically good buildings, Structural identification of engineering materials, Non destructive Techniques, Application of Quantum Physics and Application of Lasers in Engineering and Technology.								

I	LASERS	Total Hrs	9
Introduction – principles of spontaneous emission and stimulated emission - Population inversion, Pumping-Types of Lasers:He-Ne,CO_2,Nd-YAG,Ruby Lasers, Semiconductor Laser- Applications: Lasers in Microelectronics, Welding, Heat Treatment and Cutting-Holography.			
2	FIBER OPTICS AND APPLICATIONS	Total Hrs	9
Principles-Modes of Propagation-Crucible-Crucible Technique-Classification based on materials, refractive index and modes of propagation-Splicing-Losses in Optical fiber-Light Sources for fibre optics-Detectors-Fiber optical Communication Links-Fiber optic Sensors: Temperature and Displacement measurement.			
3	QUANTUM PHYSICS AND APPLICATIONS	Total Hrs	9
Introduction to quantum theory-Dual Nature of Matter and Radiation-De-Broglie wavelength-Uncertainty principle and its applications-Compton effect-Expression for Compton Shift-Experimental Verification-Schrodinger's equation (Time dependent and Time independent) - Particle in a box-Electron microscope-Scanning electron microscope.			
4	ULTRASONICS	Total Hrs	9
Introduction of Ultrasonic Waves - Magnetostriction effect, Magnetostriction generator, Inverse piezoelectric effect, Piezoelectric generator-Detection of ultrasonic waves-Properties- Cavitation -Industrial Applications drilling, welding, soldering and cleaning- Non destructive testing- Pulse echo system, Through transmission and Resonance system.			
5	ACOUSTICS	Total Hrs	9
Introduction-Classification of Sound-Characteristics of musical sound - Loudness-Sound intensity Level(I_L)-Weber-Fechner Law-Decibel-Phon, Sone-Acoustics of building-Reverberation-Reverberation time-Sabine's formula-Absorption coefficient-Determination of absorption co-efficient-Factors affecting the acoustics of buildings and their remedies-Factors to be followed for good acoustic of building.			
Total hours to be taught			45
Text book (s) :			
1	"APPLIED PHYSICS", 1st Edition Authored by Dept. of Physics KSRCT.		
Reference(s) :			
1	Dr.Jayakumar S, "Engineering Physics", R K Publishers,Coimbatore,2003.		
2	Dr.Arumugam.M, "Engineering Physics" , 5th Edition Anuradha Publications,Kumbakonam,2006.		
3	Gaur R.K and Gupta S.L, "Engineering Physics", Dhanpati Rai and Sons, New Delhi,2001.		
4	Charles Kittel,"Introduction to Solid State Physics", Dhanpati Rai and Sons, New Delhi, 2001.		
5	Feynman,"Lecturers in Quantum Mechanics" 4th edition Narosa Publication, New Delhi, 2003.		

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<tr><td colspan="11">Semester I</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours / Week</td><td>Credit</td><td colspan="4">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td colspan="2">Total</td></tr>
<tr><td colspan="2">08130104G</td><td>APPLIED CHEMISTRY (Common to all B.E./B.Tech. programmes)</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td colspan="2">100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="9">The student should be conversant with the principles involved in electro chemistry, corrosion and its inhibition treatment of water for industrial purposes and the concept of energy storage devices knowledge with respect to fuels and combustion polymer and engineering materials.</td></tr>
<tr><td>1</td><td colspan="4">WATER TREATMENT</td><td colspan="2">Total Hrs</td><td colspan="4">9</td></tr>
<tr><td colspan="11">Turbidity, color, acidity, alkalinity, nitrogen, fluoride – (Definition, sources and sanitary significance only) – Water- Hardness- Estimation of hardness by EDTA method- Boiler feed water- scale formation, corrosion, caustic embrittlement, priming and forming- softening of water- lime soda process- zeolite process – demineralization – desalination – electro dialysis and reverse osmosis.</td></tr>
<tr><td>2</td><td colspan="4">ELECTRO CHEMISTRY</td><td colspan="2">Total Hrs</td><td colspan="4">9</td></tr>
<tr><td colspan="11">Electrochemical cells – reversible and irreversible cells – EMF – measurements – Standard Weston Cadmium cell – Nernst equation – problems – Electrodes – Single electrode potential – Types of electrodes – Calomel electrode – Electrochemical series – significance – Potentiometric titrations – Batteries – Lead acid and Ni-Cd batteries.</td></tr>
<tr><td>3</td><td colspan="4">CORROSION AND CORROSION CONTROL</td><td colspan="2">Total Hrs</td><td colspan="4">9</td></tr>
<tr><td colspan="11">Corrosion – Electrochemical and chemical – Mechanism – corrosion reaction – types of corrosion – differential aeration – granular - pitting – corrosion control – Sacrificial anode and Impressed current method – Inhibitors – Protective coatings – Preliminary treatment – Electroplating (Cr & Ni) – Paints – Constituents and their functions – mechanism of drying.</td></tr>
<tr><td>4</td><td colspan="4">FUELS AND COMBUSTION</td><td colspan="2">Total Hrs</td><td colspan="4">9</td></tr>
<tr><td colspan="11">Fuels – Calorific values – Gross and Net – Theoretical air for combustion – flue gas analysis – Orsat method – Coal – proximate and ultimate analysis – their importance – metallurgical coke – Petrol – Straight run, cracked and polymer petrol – Synthetic petrol – Fisher- Tropsch and Bergius method – Octane number – improving octane number by additives – Diesel – Cetane number – Water gas, producer gas and LPG.</td></tr>
<tr><td>5</td><td colspan="4">POLYMERS</td><td colspan="2">Total Hrs</td><td colspan="4">9</td></tr>
<tr><td colspan="11">Polymer structure – Nomenclature – Polymerization – types – mechanism (free radical only) – co-ordination polymerization – mechanism – individual polymers – Polyethylene, Polypropylene, PVC, Teflon, Acrylics, Nylon6-6, Bakelite, Polyester, Epoxy, Polyurethane – Structure, Preparation, Properties and Uses – Compounding and fabrication – Compression, Injection, Extrusion and Blow moulding– Foamed plastics.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="4">45</td></tr>
<tr><td colspan="11">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="10">Applied Chemistry by R.Palanivelu, R.Parimalam, B.Srividhya, K.Tamilarasu and P.Padmanaban</td></tr>
<tr><td colspan="11">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="10">Jain P.C. & Monica Jain, “Engineering Chemistry”, 14th Edition, Dhanpat Rai Publishing Co. New Delhi, 2002.</td></tr>
<tr><td>2</td><td colspan="10">Clair N Sawyer and Perry L Mc Carty,”Chemistry for Environmental Engineering”, 14th Edition TMH Book Company, New Delhi, 2002.</td></tr>
<tr><td>3</td><td colspan="10">Dara S.S. “A text book of Engineering Chemistry”, S.Chand & Co. Ltd., 2003.</td></tr>
<tr><td>4</td><td colspan="10">Uppal M.M. revised by S.C.Bhatia, ”Engineering Chemistry”, 6th Edition Khanna Publishers, New Delhi, , 2001.</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering		Programme Code & Name				13 : B.E. Electronics and Communication Engineering		
Semester I									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130105S	ELECTRON DEVICES (common to ECE and EEE)	3	1	0	4	50	50	100	
Objective(s)	To learn the basics of electron motion in electric field and magnetic field, and passive circuit components , mechanism of current flow in semi-conductors. And to learn Diode operation and switching.								

1	ELECTRON BALLISTICS & SEMICONDUCTOR THEORY	Total Hrs	12
Electron Ballistics: Charged particle, Force on Charged particles in an Electric field, Constant field Potential, Field Intensity, Force in Magnetic field, Motion in a magnetic – Parallel Electric and Magnetic Fields – Perpendicular Electric and Magnetic Fields. Semiconductor Theory: Review of Intrinsic & extrinsic semiconductors – classical theory and Energy Band theory – charge densities in semiconductors – mobility and conductivity – Drift and Diffusion current.			
2	SEMICONDUCTOR DIODES	Total Hrs	12
Construction of PN junction diodes – VI characteristics – Quantitative theory of PN diode,current components Diode resistance Transition and diffusion capacitances – Effect of temperature on PN junction characteristics – Model of diode – Diode specification – Clipping and Clamping Circuits – Voltage multipliers using diodes.			
3	BI-POLAR JUNCTION TRANSISTOR	Total Hrs	12
Construction of a Transistor – Principle of Transistor action - Currents in transistor – Input and output characteristics of a transistor in CE, CB and CC configurations – cut off, active saturation and break down regions – Current gain in CE, CB and CC configurations – h parameter model for BJT – BJT specification.			
4	FIELD EFFECT TRANSITORS AND UJT	Total Hrs	12
Construction and characteristics of JFET – parameters of JFET – MOSFET – Depletion and Enhancement mode – FET in CS, CD and CG Configurations – equivalent circuits of FET at low frequencies – FET model at high frequencies – FET specification, Construction, Theory of operation and characteristics of UJT.			
5	SPECIAL SEMICONDUCTOR DEVICES	Total Hrs	12
Fabrication and Characteristics of Zener Diode – Tunnel Diode – Pin Diode – Varactor Diode – Construction and Characteristics of SCR – Two Transistor Equivalent Circuits – Applications – TRIAC and DIAC – LASCR and CCD – Photodiodes – Photo conductive cell – photo voltaic cell – LED, LCD – photo transistors – solar cell – opto couplers.			
Total hours to be taught			60
Text book (s) :			
1	Salivahanam S, Suresh Kumar N and valluvaraj A, “Electronic Devices and Circuits”, TMH, 1998.		
Reference(s):			
1	Jacob Millman, Christos C.Halkias, ‘Electronic Devices and Circuits’, Tata McGraw Hill Publishing Limited, New Delhi, 2003.		
2	Ben G. Streetman and Sanjay Banerjee, ‘Solid State Electronic Devices’, Pearson Education, 2002.		
3	David A. Bell, ‘Electronic Devices and Circuits’, Prentice Hall of India Private Limited, 4th edition, New Delhi, 2003.		

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering	Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
Semester I									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130106S	BASICS OF CIVIL AND MECHANICAL ENGG(Common to ECE, EEE and Text)	4	0	0	4	50	50	100	
Objective(s)	The subject covers the introduction to Civil Engineering, Basics of Materials and Building Construction and Surveying. To build familiarities in basic Mechanical Engineering. And to understand the concept used in Power plant, IC Engines, Refrigeration and Air conditioning system.								

A - CIVIL ENGINEERING			
1		Total Hrs	10
Introduction – Civil Engineering – Materials – bricks – stones – sand - cement – concrete – steel sections – site for foundations. Bearing capacity – loads – Requirement of good foundations – types.			
2		Total Hrs	10
Superstructure – brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – valuation mechanics – internal and external forces – strain – elasticity – Types of Bridges and Dams – Basics of Interior and Landscaping.			
3		Total Hrs	10
Surveying – Objects – types – classification – principles – measurements of distances – angles – leveling – determination of areas – illustrative examples.			
Total hours to be taught			30
Text book (s) :			
1	Shanmugam G and Palanichamy M S , ″Basic Civil and Mechanical Engg.″, TMH Publishing Co., New Delhi, 1996		
Reference(s):			
1	Ramamrutham.S, ″Basic Civil Engineering ″ Dhanpat Rai Publishing Co. (P) Ltd. 1999		

B - MECHANICAL ENGINEERING			
1	POWER PLANT ENGINEERING	Total Hrs	10
Introduction, Classification of Power Plants - Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear Power plants - Merits and Demerits - Pumps and turbines - working principle of Reciprocating pumps (single acting and double acting) – Centrifugal Pump.			
2	I C ENGINES	Total Hrs	10
Internal combustion engines as automobile power plant - Working principle of Petrol and Diesel Engines- Four stroke and two stroke cycles- Comparison of four stroke and two stroke engines - Boiler as a power plant.			
3	REFRIGERATION AND AIR CONDITIONING SYSTEM	Total Hrs	10
Terminology of Refrigeration and Air conditioning. Principle of vapour compression and absorption system - Layout of typical domestic refrigerator - Window and Split type room Air conditioner.			
Total hours to be taught			30
Text book (s) :			
1	Shanmugam G, ″Basic Mechanical Engg.″,TMH Publishing Co., New Delhi, 2005		
Reference(s):			
1	Venugopal K and Prahu Raja V, ″Basic Mechanical Engineering″, Anuradha Publishers, Kumbakonam, 2000.		
2	Shantha Kumar S R J., ″Basic Mechanical Engineering″, Hi-tech Publications, Mayiladuthurai, 2000		

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering	Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
Semester I									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130107P	APPLIED PHYSICS LABORATORY	0	0	3	2	50	50	100	

LIST OF EXPERIMENTS

1. Determination of rigidity modulus of a wire by torsional pendulum.
2. Determination of Young's modulus of the material of a uniform bar by non-uniform bending method.
3. Determination of Young's modulus of the material of a uniform bar by uniform bending method.
4. Determination of Viscosity of liquid by Poiseuille's method.
5. Determination of acceleration due to gravity by compound (bar) pendulum.
6. Determination of wavelength of mercury spectrum by Spectrometer grating.
7. Determination of thickness of fiber by Air-wedge method
8. Determination of wavelength of laser using grating and particle size determination
9. Determination of velocity of ultrasonic waves and compressibility using ultrasonic interferometer.
10. Determination of band gap energy of a semiconductor.
11. Determination of radius of curvature of a Plano convex lens by Newton rings method.
12. Determination of thermal conductivity of a bad
13. conductor using Lee's disc method.

K.S.Rangasamy College of Technology - Autonomous Regulation										**R 2008**
Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
Semester I										
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130108P	ELECTRON DEVICES LABORATORY		0	0	3	2	50	50	100	
LIST OF EXPERIMENTS										

1. Characteristics of PN Junction Diode and Zener Diode
2. Characteristics of BJT (common emitter configuration)
3. BJT (common base configuration)
4. Characteristics of JFET and MOSFET
5. Characteristics of UJT
6. Characteristics of SCR
7. Characteristics of DIAC and TRIAC
8. Characteristics of Photo Diode and Photo Transistor
9. Measurement of Voltage, frequency and phase angle using CRO
10. Measurement of Hybrid parameters of a Transistor.

K.S.Rangasamy College of Technology - Autonomous Regulation										R 2008
Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
Semester I										
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130109P	ENGINEERING PRACTICES LABORATORY		0	0	3	2	50	50	100	

LIST OF EXPERIMENTS

PLUMBING

1. Safety aspects in Plumbing.
2. Study of tools and equipments - preparation of models
3. Cutting and Threading of G.I. Pipes
4. Study of valves, taps and repairing
5. Measuring and marking practice of PVC & G.I. pipes - connection to service line

SHEET METAL

1. Study of Tools, Equipments and Safety precautions.
2. Drawing of tools and accessories
3. Different types of joints making - knocked up, double grooving joints
4. Model making –Trays, Baskets and Funnels

ELECTRICAL WIRING

1. Safety aspects of Electrical wiring
2. Study of Electrical materials and wiring components
3. Wiring circuit for a lamp using single and Stair case switches.
4. Wiring circuit for fluorescent lamps
5. Calculation of power and energy

WELDING AND SOLDERING

1. Safety aspects of Welding and Soldering
2. Study of Gas and Arc Welding Equipments
3. Welding of Lap, Butt, T-joints & Corner Joints
4. Model making –Trays, Baskets and Funnels.

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Semester II									
Course Code	Course Name		Hours / Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
08130201G	COMMUNICATION SKILLS (Common to all B.E./B.Tech. programmes)		3	0	0	3	50	50	100
Objective(s)	To equip students of engineering and technology with effective speaking and listening in English, help them develop their soft skills and people skills, which will make the transition from college to workplace smoother, help them to excel in their jobs, enhance students performance at placement interviews, group discussion and other recruitment exercises.								
1	LISTENING					Total Hrs	9		
Barriers in Listening, Listening to academic lectures, Listening to announcements at railway stations, airports, etc, Listening to news on the radio / TV, Listening to casual conversation, Listening to live speech.									
2	COMMUNICATION					Total Hrs	9		
What is communication? - What does it involve? - Accuracy - fluency and appropriateness - Levels of formality, Differences between spoken and - written communication, Greeting and introduction - Making requests - Asking for permission - giving / denying permission - Offering help - accepting / declining help - Giving instructions - Giving directions - Art of small talk - Taking part in casual conversation - Making a short formal speech - Describing people - place - things and events.									
3	CONVERSATION SKILLS					Total Hrs	9		
Using the telephone - Preparing for a call - Stages of a call - Handling calls - Identifying self - Asking for repetitions - Spelling out names or words. Giving information on the phone - Making requests - Answering calls -Leaving messages on answering machines - Making / changing appointments - Making complaints – Reminding - Agreeing / disagreeing – Listening - Listening and taking messages - Giving instructions & responding to instructions.									
4	REMEDIAL GRAMMAR & VOCABULARY					Total Hrs	9		
Subject – verb agreement - Tenses - 'Do' forms - Active and Passive voice - Use of negatives - Prepositions - Phrasal verbs - Correct use of words - Use of formal words in informal situations - Indianisms - Commonly - confused words - Common errors & remedial measures									
5	WRITTEN COMMUNICATION & CAREER SKILLS					Total Hrs	9		
Writing e-mails - Writing Reports - Note – taking and Note – making - Preparing curriculum vitae and cover - letters - Facing an interview - Presentation skills - Persuasion skills.									
Total Hours to be taught							60		
Text book(s):									
1	Rizvi M Ashraf, "Effective Technical Communication", 1st Edition, Tata McGrawhil Publishing Company Ltd., New Delhi, 2005.								
Reference(s) :									
1	Kiranmai Dutt P, Geetha Rajeevan and Prakash C L N, "A Course in Communication Skills", by Ebek – Cambridge University Press India Pvt. Ltd.,								
2	Naterop, cup "Telephoning in English – Cambridge University Press India Pvt.Ltd., 2007								
3	Richard, "New Interchange Services (Student's Book)" – Introduction, Level – 1, Level – 2, Level – 3, Cambridge University Press India Pvt.Ltd., 2007.								

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering	Programme Code & Name				13 : B.E. Electronics and Communication Engineering			
Semester II									
Course Code	Course Name	Hours / Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130202G	ENGINEERING MATHEMATICS II (Common to all B.E./B.Tech. programmes)	3	1	0	4	50	50	100	
Objective(s)	The course is aimed at developing the basic mathematical skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many engineering fields, significantly in fluid mechanics, field theory and communication engineering.								
I	MULTIPLE INTEGRALS				Total Hrs	12			
Double integration in Cartesian and Polar coordinates – Change of order of integration – Area between two curves – Area as double integrals – Triple integration in Cartesian coordinates – Volume as Triple integrals (Simple problems only).									
2	VECTOR CALCULUS				Total Hrs	12			
Gradient, divergence and curl – Line, surface and volume integrals – Green's, Gauss divergence and Stoke's theorems (without proof) – Verification of the above theorems and evaluation of integrals using them									
3	ANALYTIC FUNCTIONS				Total Hrs	12			
Function of a complex variable – Analytic function – Necessary conditions – Cauchy – Riemann equations – Sufficient conditions (excluding proof) – Properties of analytic function – Harmonic conjugate – Construction of Analytic functions - Conformal mapping: w= z +a, az 1/z and bilinear transformation									
4	IV COMPLEX INTEGRATION				Total Hrs	12			
Cauchy's theorem (without proof) – Cauchy's integral formula – Taylor and Laurent series (without proof) – Singularities – Classification – Cauchy's residue theorem – Contour integration – circular and semi-circular contours (excluding poles on real axis).									
5	LAPLACE TRANSFORM				Total Hrs	12			
Laplace Transform – Conditions for existence – Transform of elementary functions – Basic properties – Derivatives and integrals of transforms – Transforms of derivatives and integrals – Initial and final value theorems – Transform of unit step function – Transform of periodic functions. Inverse Laplace transform – Convolution theorem – Solution of linear ODE of second order with constant coefficients and first order simultaneous equations with constant coefficients using Laplace transformation									
Total hours to be taught						60			
Text book(s)::									
1	Veerarajan. T., "Engineering Mathematics (for first year)", Fourth Edition Tata McGraw- Hill Publishing Company Limited, New Delhi, 2005.								
Reference(s) :									
1	Kandasamy. P, Thilagavathy. K and Gunavathy. K, "Engineering Mathematics" –S.Chand and Co. – New Delhi 2007.								
2	Grewal. B.S., "Higher Engineering Mathematics", Thirty Eighth Edition, Khanna Publishers, Delhi, 2004.								
3	Kreyszig. E., "Advanced Engineering Mathematics," Eighth Edition, John Wiley and Sons (Asia) Limited, Singapore 2001.								
4	Venkataraman.M.K, "Engineering Mathematics", Volume I & II Revised Enlarged Fourth Edition", The National Pub. Co., Chennai, 2004.								

<table>
<tr><td colspan="7">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="4">R 2008</td></tr>
<tr><td colspan="2">Department</td><td>Electronics and Communication Engineering</td><td colspan="4">Programme Code & Name</td><td colspan="4">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="11">Semester II</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours / Week</td><td>Credit</td><td colspan="4">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td colspan="2">Total</td></tr>
<tr><td colspan="2">08130203G</td><td>MATERIALS SCIENCE (Common to all B.E./B.Tech. programmes except Nano)</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td colspan="2">100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="9">To impart fundamental knowledge in various engineering subject and applications, application of conducting, superconducting and magnetic materials, application of dielectrics, new engineering materials and nanomaterials in modern technology.</td></tr>
<tr><td>I</td><td colspan="4">CONDUCTING AND SUPERCONDUCTING MATERIALS</td><td colspan="2">Total Hrs</td><td colspan="4">9</td></tr>
<tr><td colspan="11">Introduction - Free electron theory - Electrical conductivity - Expression for electrical conductivity - Thermal conductivity - Expression for thermal conductivity - Lorentz number - Widemann Franz law (derivation) - Verification of Ohm’s law - Classical free electron theory - Advantages and drawbacks. Properties of superconductors - Critical field - Meissner’s effect - Isotope effect - BCS theory - Type I and Type II superconductors - Josephson effect (qualitative) - High T_c superconductors - Applications: SQUID, Cryotron, Magnetic levitation.</td></tr>
<tr><td>2</td><td colspan="4">SEMICONDUCTING MATERIALS</td><td colspan="2">Total Hrs</td><td colspan="4">9</td></tr>
<tr><td colspan="11">Elemental and Compound semiconductors - Intrinsic and Extrinsic semiconductors - Properties - Carrier concentration in intrinsic and extrinsic semiconductors (derivation) - Fermi level - Variation of Fermi level with temperature and impurities - Hall effect - Hall coefficient - Experimental determination of Hall coefficient, Applications.</td></tr>
<tr><td>3</td><td colspan="4">MAGNETIC MATERIALS</td><td colspan="2">Total Hrs</td><td colspan="4">9</td></tr>
<tr><td colspan="11">Classification of magnetic materials - Properties - Heisenberg and Domain theory of ferromagnetism - Hystersis - Hard and Soft magnetic materials - Ferrites - Structure, Preparation and Applications - Magnetic recording and readout- Bubble memory - Magnetic tape - Floppy disc and Magnetic hard disc.</td></tr>
<tr><td>4</td><td colspan="4">DIELECTRIC MATERIALS</td><td colspan="2">Total Hrs</td><td colspan="4">9</td></tr>
<tr><td colspan="11">Introduction - Polarization: Electronic , Ionic, Orientational and Space charge – Frequency and temperature dependence of polarization - Active and Passive dielectric - Internal field - Clausius -Mosotti relation (derivation) - Dielectric losses - Dielectric breakdown mechanism - Ferroelectric materials: Properties and Applications.</td></tr>
<tr><td>5</td><td colspan="4">NEW ENGINEERING MATERIALS</td><td colspan="2">Total Hrs</td><td colspan="4">9</td></tr>
<tr><td colspan="11">Shape Memory Alloys (SMA): Characteristics, Properties of NiTi alloy and applications, Metallic glasses: Preparation, Properties and Applications. Nanomaterials: Fabrication methods - Top-down process: Ball Milling and Nanolithography - Bottom-up process: Vapor phase deposition method (PVD and CVD) - Carbon nano tubes: fabrication and applications.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="4">45</td></tr>
<tr><td colspan="11">Text book(s):</td></tr>
<tr><td>1</td><td colspan="10">“Material Science”,1st Editon, Authored by Dept. of Physics KSRCT, 2008.</td></tr>
<tr><td colspan="11">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="10">Raghavan V,”Materials Science and Engineering”, Prentice Hall of India, New Delhi, 2001.</td></tr>
<tr><td>2</td><td colspan="10">Rajendran V., “Materials Science”, Tata McGraw Hill, Newdelhi, 2005.</td></tr>
<tr><td>3</td><td colspan="10">Palanisamy P.K., “Materials Science”, SCITECH Publications, Chennai, 2002.</td></tr>
<tr><td>4</td><td colspan="10">Dr.Arumugam M., “Materials Science”, Anuradha Agencies, Kumbakonam, 2003.</td></tr>
<tr><td>5</td><td colspan="10">Dr. S. Muthukumaran, V. Mohan, S. Masilamani, M. Mani, “Materials Science” 1st Edition, Sri Krishna Publications, Chennai 2007.</td></tr>
</table>

<table>
<tr><td colspan="4">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td>R 2008</td></tr>
<tr><td>Department</td><td>Electronics and Communication Engineering</td><td>Programme Code & Name</td><td colspan="2">13 : B.E. Electronics and Communication Engineering</td></tr>
</table>

Semester II								
Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
08130204G	ENVIRONMENTAL SCIENCE (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100

Objective(s)	The student should be conversant with the evolution of environmentalism and the importance of environmental studies, various natural resources and the current threats to their sustainability, Significance and protection of bio diversity and various forms of environmental degradation and significant international conventions and protocols for the protection of environment.

1	ATMOSPHERE AND ECOSYSTEM	Total Hrs	9

Atmosphere – composition of atmosphere (troposphere, stratosphere, mesosphere and thermosphere) - Ozone and ozone depletion – Air pollution – sources, effects and control – Green house effect - Global warming – Climate change – Acid rain - Planet Earth – Biosphere – Hydrosphere – Lithosphere. Concept of ecosystem – structure and functions of ecosystem- producers, consumers and decomposers - Energy flow – Ecological succession-Food chains-Food webs- Ecological pyramids-Introduction, types, characteristic features-structures and function of forest, grassland and aquatic ecosystems (ponds and rivers) - Case Studies in current scenario.

2	WATER RESOURCES AND ITS TREATMENT	Total Hrs	9

Water – hydrologic cycle – ground water – water shed – water use and quality – point and non-point sources of pollution – Oceans and fisheries – salinity – temperature – density – pressure – light – bioluminescence – Tsunamis – Glaciers – Water pollution – dissolved oxygen – surface water treatment – waste water treatment – Thermal pollution, noise pollution and control - Case Studies in current scenario.

3	LAND RESOURCES AND ITS DEGRADATION	Total Hrs	9

Land – weathering and erosion - types of weathering – types of soil – soil erosion – land slides – Wet land and deforestation- deserts – types – desertification – land degradation – features of desert – geochemical cycling – solid and hazardous waste, chemical waste, radio active waste – non hazardous waste - Case Studies in current scenario.

4	FUTURE POLICY AND ALTERNATIVES	Total Hrs	9

Future policy and alternatives – fossil fuels – nuclear energy – solar energy – wind energy – hydroelectric energy – geothermal energy – tidal energy – sustainability – green power – nano technology – international policy - - Case Studies in current scenario.

5	BIO DIVERSITY AND HUMAN POPULATION	Total Hrs	9

Introduction to Bio diversity-Definition, genetic species and ecosystem diversity.
Biogeographical classification of India – Biodiversity in India – India as mega diversity nation – hotspots of biodiversity in India – threats to biodiversity – endemic and endangered- habitat – conservation of biodiversity – environment protection act – issues and possible solution – population growth - population explosion – environment and human health - Case Studies in current scenario.

Total hours to be taught	45

Text book :

1.	Environmental Science by R.Palanivelu, R.Parimalam, and B.Srividhya.

References :

1.	Linda D. Williams – “Environmental Science Demystified”, Tata McGraHill Publishing Company Limited, 2005.
2.	G. Tyler Miller, JR _ “Environmental Science “, Thomson, 2004
3.	William P. Cunningham – “Principles of Environmental Science”, Tata McGraHill, New Delhi, 2007.
4.	Bharucha Erach –“The Biodiversity of INDIA”, Mapin Publishing Private Limited, Ahamedabad, India.
5.	Trivedi R.K., “Hand Book of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Volume I & II, Environmedia.

K.S.Rangasamy College of Technology - Autonomous Regulation										R 2008
Department	Electronics and Communication Engineering			Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Semester I										
Course Code	Course Name		Hours / Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130205S	FUNDAMENTALS OF PROGRAMMING (Common to CSE, ECE, EEE and IT)		3	1	0	3	50	50	100	
Objective(s)	To impart knowledge in the fundamentals of computer and programming language, storage devices.									

I	COMPUTER BASICS	Total Hrs	8
Evolution of computers- Generations of computers- Applications of computers- - Computer Memory and Storage- Input Output Media - Algorithm- Flowchart- Pseudo code – Program control structures- - Programming languages- - Computer Software- Definition- Categories of Software.			
2	C FUNDAMENTALS	Total Hrs	9
Introduction to C- Constants- Variables- Data types- Operators and Expressions- Managing Input and Output operations- Decision Making and Branching- Looping.			
3	ARRAYS AND FUNCTIONS	Total Hrs	10
Arrays- Character Arrays and Strings- User defined functions- Storage Classes			
4	STRUCTURES AND FILES	Total Hrs	10
Structures- Definition- Initialization- Array of Structures- Structures within structures- Structures and Functions- Unions- File Management.			
5	POINTERS	Total Hrs	8
Pointer Basics – Pointer Arithmetic – Pointers and array Pointers and character string Pointers and functions – Pointers and structures.			
Total hours to be taught			45

Text book (s) :	
1	E.Balagurusamy, “Programming in ANSI C”, Tata McGraw- Hill Publishing Company Limited, New Delhi, 2002.
2	ITL Education Solutions Limited, "Introduction to Information Technology", Pearson Education (India), 2005.
Reference(s) :	
1	ITL Education Solutions Limited, "Introduction to Information Technology", Pearson Education (India), 2005.
2	E.Balagurusamy, “Programming in ANSI C”, Tata McGraw- Hill Publishing Company Limited, New Delhi, 2002.
3	Rajaraman V, “Fundamentals of Computers”, Fourth Edition, Prentice hall India- 2006.
4	Byron Gottfried, "Programming with C", II Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2002.

<table>
<tr><td colspan="8">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="2">R 2008</td></tr>
<tr><td>Department</td><td colspan="2">Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="4">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="10">Semester II</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2" colspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130206C</td><td colspan="2">CIRCUIT THEORY</td><td>3</td><td>1</td><td>0</td><td>4</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="9">The students should appreciate the function of any complex electronic circuits by his understanding of RL, RC, RLC and transformed coupled circuits.</td></tr>
<tr><td>1</td><td colspan="5">BASIC CIRCUIT ANALYSIS</td><td>Total Hrs</td><td colspan="3">12</td></tr>
<tr><td colspan="10">Ohm's law, Kirchoff's laws, DC and AC Circuits, Resistors in series and parallel Circuits, Mesh current and Node voltage method of analysis for both circuits.</td></tr>
<tr><td>2</td><td colspan="5">NETWORK THEOREMS FOR DC AND AC CIRCUITS</td><td>Total Hrs</td><td colspan="3">12</td></tr>
<tr><td colspan="10">Thevenin's and Norton's theorem – Super position theorem – Maximum power transfer theorem – Reciprocity Theorem.</td></tr>
<tr><td>3</td><td colspan="5">RESONANCE AND COUPLED CIRCUITS</td><td>Total Hrs</td><td colspan="3">12</td></tr>
<tr><td colspan="10">Series and parallel Resonance, their frequency response, Quality factor and Bandwidth, Self and Mutual Inductance, coefficient of coupling, Tuned circuits, single tuned circuits.</td></tr>
<tr><td>4</td><td colspan="5">TRANSIENT FOR DC CIRCUITS</td><td>Total Hrs</td><td colspan="3">12</td></tr>
<tr><td colspan="10">Transient response of RL , RC and RLC circuits using Laplace transform for DC input.</td></tr>
<tr><td>5</td><td colspan="5">DUALITY AND TOPOLOGY</td><td>Total Hrs</td><td colspan="3">12</td></tr>
<tr><td colspan="10">Concept of duality, Dual network, Graphs of a network, Trees, Chords and branches, Tie set and cut set of a graph, Application to network analysis.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="3">60</td></tr>
<tr><td colspan="10">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="9">William H.Hayt Jv, Jack E.Kemmerly and Steven M.Durbin, “Engineering Circuit Analysis”, TMH Publishers, 6th edition, New Delhi, 2002.</td></tr>
<tr><td colspan="10">Reference(s):</td></tr>
<tr><td>1</td><td colspan="9">Joseph A.Edminister, Mahmood Nahri, “Electric Circuits”, Schaum's Series, Tata McGraw- Hill, New Delhi 2001</td></tr>
<tr><td>2</td><td colspan="9">Paranjothi S R,” Electric Circuit Analysis”, New Age International Ltd., New Delhi, 1996.</td></tr>
<tr><td>3</td><td colspan="9">Chakrabati A, “Circuit Theory (Analysis and Synthesis)”, Dhanpath Rai & Sons, New Delhi, 1999.</td></tr>
</table>

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Semester II

Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130207P	ENGINEERING GRAPHICS LABORATORY	1	0	3	3	50	50	100

Objective(s)	To develop graphics skills for communicating concepts, ideas and designs of engineering products and to give exposure to national standards relating to technical drawings.

1	CONCEPTS AND CONVENTIONS	Total Hrs	4
Importance of graphics in engineering communication of concepts and ideas in the design of engineering products – conventional and computer methods – layout, orthographic and isometric representation techniques - relative merits and demerits – 2D and 3D modeling - specifications of size and layout of drawing sheets – Lettering and dimensioning – conventions followed.			
2	CURVES AND SHAPES USED IN ENGINEERING PRODUCTS	Total Hrs	4
Primitive and Prismatic shapes - Conics – ellipse, parabola and hyperbola – equations used and parametric interpretations – ellipsoid, paraboloid and hyperboloid – involutes and cycloids – applications - tangents and normals – mathematical requirements - their importance and applications to engineering products.			
3	FREE HAND SKETCHING PRACTICES	Total Hrs	7
Representation of Three Dimensional objects – Need for and importance of multiple views and their orientations – Concept of orthographic projection - Developing skills through free hand sketching of multiple views from pictorial views of objects – isometric (pictorial) representation of objects from multiple views – simple exercises to practice.			
4	DEVELOPMENT OF SURFACES – PRACTICES	Total Hrs	5
Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cones - freehand sketching practices - simple exercises to practice.			
5	2D DRAFTING	Total Hrs	20
Importance of 2D drafting – sketching, mirroring, scaling, copying (simple and multiple) dimensioning - wiring diagram and piping layout drawings - Practice of Computer Aided Drafting and dimensioning using appropriate software packages.			
6	SOLID MODELING	Total Hrs	20
3D modeling techniques - constructive solid geometry (CSG) and boundary representation (BRep) techniques - solid modeling of simple and moderately complex engineering products – table, chair, V-block, flange coupling (one) half, bolts and nuts, computer monitor, slotted angle rack and such other products – Practice.			
Total hours to be taught			60

Text book (s) :	
1	Dhananjay.A. Jolhe, "Engineering Drawing", Tata McGraw Hill Publishing Co., 2007.
Reference(s):	
1	K.V.Nataraajan "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2006.
2	M.B. Shah and B.C. Rana, "Engineering Drawing", Pearson Education, 2005.
3	Luzadder and Duff, "Fundamentals of Engineering Drawing" Prentice Hall of India Pvt Ltd, XI Edition – 2001.

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Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130208P	APPLIED CHEMISTRY LABORATORY	0	0	3	2	50	50	100	
LIST OF EXPERIMENTS									

1. Estimation of hardness of water by EDTA.
2. Estimation of alkalinity of water sample.
3. Estimation of chloride content in water sample.
4. Determination of dissolved oxygen in boiler feed water.
5. Determination of water of crystallization of a crystalline salt.
6. Conductometric titration of strong acid with strong base.
7. Conductometric titration of mixture of acids
8. Precipitation titration by conductometric method.
9. Determination of strength of HCl by pH Meter.
10. Estimation of ferrous ion by potentiometric titration.
11. Determination of sodium and potassium in a water sample by flame photometry (Demo only)
12. Estimation of ferric ion by spectrophotometry (Demo only).

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Semester II										
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130209P	PROGRAMMING LABORATORY		0	0	3	2	50	50	100	

LIST OF EXPERIMENTS

1. Write a C program to print Pascal's triangle
2. Write a C program to print the sine and cosine series.
3. Write a C program to perform Matrix multiplication.
4. Write a C program to prepare and print the sales report
5. Write a C program to perform string manipulation functions like string concatenations, comparison, find the length and string copy without using library functions.
6. Write a C program to arrange names in alphabetical order.
7. Write a C program to calculate the mean, variance and standard deviation using functions.
8. Write a C program to perform sequential search using functions.
9. Write a C program to print the Fibonacci series and to calculate the factorial of the given number using functions.
10. Write a C program to print the mark sheet of n students using structures.
11. Write a C program for mark sheet processing using files.
12. Write a C Program to perform merge the given two files.

Software Requirements :

Operating System : Windows / Unix clone
Compiler : C Compiler

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<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130210P</td><td>CIRCUITS LABORATORY</td><td>0</td><td>0</td><td>3</td><td>2</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td colspan="10">LIST OF EXPERIMENTS</td></tr>
</table>

1. Verification of Ohm’s Laws and Kirchoff’s Laws.
2. Verification of Thevenin’s and Norton’s Theorem
3. Verification of Superposition Theorem
4. Verification of Maximum Power Transfer Theorem
5. Verification of Reciprocity Theorem
6. Verification of Self and Mutual Inductances of a coil-
7. Verification of Mesh and Nodal analysis
8. Transient response of RL and RC circuits
9. Frequency response of Series and Parallel Resonance Circuits
10. Frequency response of Single Tuned coupled Circuits.

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Department	Electronics and Communication Engineering	Programme Code & Name					13 : B.E. Electronics and Communication Engineering			
Semester II										
Course Code	Course Name	Hours / Week			Credit	Maximum Marks				
		L	T	P	C	CA	ES	Total		
08130211P	COMPREHENSION I	0	0	3	0	100	00	100		
Objective(s)	i. To improve the skill level of Engineering, Technology and Applied Science students. ii. To improve the employability of students in placement interviews.									

1	For each subject 200 Keywords/important words or terms (5 units x 40 words) are to be prepared using the students.
2	These 200 Keywords are to be printed in double column (2 x 50 words) and in 2 pages and is to be handled over each student for all the subjects.
3	The staff who handled the subject in the previous semester will handle their discussion period (3 periods / semester) as given below.
4	The staff will question the students using ‘W’ and ‘H’ type questions linking the keywords.
5	In a similar way the students have to prepare themselves for all the keywords.
6	Each test will carry 100 questions and two hours duration. The questions will be of objective type: ‘W’ and ‘H’ type questions by attaching with keywords.
7	Based on Test-I and Test-II, sessional marks (maximum 50 marks) will be awarded.
8	Test-III will be held for all the units and all the subjects. The passing norms will be similar as other subjects (i.e. minimum 50/100 marks)

Schedule for Conduct of Comprehension Subject		
Total No of weeks planned:10	Total No of subjects: 5 to 7	Total duration per week: 3 periods
Week No	Duration: 1½ period Subject No (No of units)	Duration: 1½ period Subject No (No of units)
W1	S1(3)	S2(3)
W2	S3(3)	S4(3)
W3	S5(3)	S6(3)
W4	Test-I (Portion: 3 units in each subject)	
W5	S1(2)	S2(2)
W6	S3(2)	S4(2)
W7	S5(2)	S6(2)
W8	Test-II (Portion: 2 units in each subject)	
W9	Discussion	
W10	Test-III (All 5 units and all the subjects)	

K.S.Rangasamy College of Technology - Autonomous Regulation										R 2008
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Semester III										
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130301G	ENGINEERING MATHEMATICS III		3	1	0	4	50	50	100	
Objective(s)	The course objective is to impact analytical skills to the students in the areas of boundary value problems and transform techniques. This will be necessary for their effective studies in a large number of engineering subjects like heat conduction, communication systems, electro-optics and electromagnetic theory. The course will also serve as a prerequisite for post graduate and specialized studies and research.									
1	PARTIAL DIFFERENTIAL EQUATIONS				Total Hrs		12			
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of standard types of first order partial differential equations – Lagrange's linear equation – Linear partial differential equations of second and higher order with constant coefficients.										
2	FOURIER SERIES				Total Hrs		12			
Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series –Parseval's Identity – Harmonic Analysis.										
3	BOUNDARY VALUE PROBLEMS				Total Hrs		12			
Classification of second order quasi linear partial differential equations – Solutions of one dimensional wave equation – One dimensional heat equation – Fourier series solutions in Cartesian coordinates.										
4	FOURIER TRANSFORM				Total Hrs		12			
Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's Identity – Problems.										
5	Z -TRANSFORM AND DIFFERENCE EQUATIONS				Total Hrs		12			
Z-transform - Elementary properties - Initial and final value theorem – Inverse Z – transform – Partial fraction method – Residue method - Convolution theorem - Solution of difference equations using Z - transform.										
Total hours to be taught							60			
Text book (s) :										
1	Grewal, B.S., "Higher Engineering Mathematics", Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.									
2	T.Veerarajan, "Engineering Mathematics-III", Tata McGraw Hill Publishing Company Limited, New Delhi.									
Reference(s) :										
1	Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics Volume III", S. Chand & Company ltd., New Delhi, 1996									
2	Narayanan, S., Manicavachagom Pillay, T.K. and Ramaniah, G., "Advanced Mathematics for Engineering Students", Volumes II and III, S. Viswanathan (Printers and Publishers) Pvt. Ltd. Chennai, 2002.									

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Semester III								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130302C	ELECTRICAL MACHINES	3	0	0	3	50	50	100
Objective(s)	Constructional details, principle of operation, performance, starters and testing of D.C. machines, transformers, induction motors.							

1	D.C. MACHINES	Total Hrs	12
Constructional details – emf equation – Methods of excitation – Self and separately excited generators – Characteristics of series, shunt and compound generators – Principle of operation of D.C. motor – Back emf and torque equation – Characteristics of series, shunt and compound motors - Starting of D.C. motors – Types of starters - Testing, brake test and Swinburne's test – Speed control of D.C. shunt motors.			
2	TRANSFORMERS	Total Hrs	12
Constructional details – Principle of operation – emf equation – Transformation ratio – Transformer on no load – Parameters referred to HV/LV windings – Equivalent circuit – Transformer on load – Regulation - Testing – Load test, open circuit and short circuit tests.			
3	INDUCTION MOTORS	Total Hrs	12
Construction – Types – Principle of operation of three-phase induction motors – Equivalent circuit – Performance calculation – Starting and speed control – Single-phase induction motors (only qualitative treatment).			
4	SYNCHRONOUS AND SPECIAL MACHINES	Total Hrs	12
Construction of synchronous machines-types – Induced emf – Voltage regulation; emf and mmf methods – Brushless alternators – Reluctance motor – Hysteresis motor – Stepper motor			
5	TRANSMISSION AND DISTRIBUTION	Total Hrs	12
Structure of electric power systems – Generation, transmission, sub-transmission and distribution systems - EHVAC and EHVDC transmission systems – Substation layout – Insulators – cables.			
Total hours to be taught			60
Text book (s) :			
1	D.P.Kothari and I.J.Nagrath, 'Basic Electrical Engineering', Tata McGraw Hill publishing company ltd, second edition, 2002.		
2	C.L. Wadhwa, 'Electrical Power Systems', Wiley eastern ltd India, 1985.		
Reference(s) :			
1	S.K.Bhattacharya, 'Electrical Machines', Tata McGraw Hill Publishing company ltd, second edition, 1998.		
2	V.K.Mehta and Rohit Mehta, 'Principles of Power System', S.Chand and Company Ltd, third edition, 2003.		

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Semester III

Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130303S	DATA STRUCTURES USING C (Common to CSE and ECE)	3	0	0	3	50	50	100

Objective(s)	To learn the systematic way of solving problems, to understand the different methods of organizing large amounts of data. To efficiently implement the different data structures

1	PROBLEM SOLVING	Total Hrs	9
Introduction - Problem solving aspect – Top-down Design – Implementation of algorithms – Efficiency of algorithms – Analysis of Algorithms – Fundamental algorithms			
2	LISTS, STACKS AND QUEUES	Total Hrs	9
Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT			
3	TREES	Total Hrs	9
Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – Hashing – General Idea – Hash Function- Priority Queues (Heaps) – Model – Simple implementations – Binary Heap.			
4	SORTING	Total Hrs	9
Preliminaries – Insertion Sort – Shellsort – Heapsort – Mergesort – Quicksort – External Sorting.			
5	GRAPHS	Total Hrs	9
Definitions – Topological Sort – Shortest-Path Algorithms – Unweighted Shortest Paths – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm, Kruskal's Algorithm – Applications of Depth-First Search – Undirected Graphs – Biconnectivity.			
Total hours to be taught			45

Text book (s) :	
1	Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004
2	M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd ed, Pearson Education Asia, 2002. (chaps 3, 4.1-4.4 (except 4.3.6), 4.6, 5.1-5.4.1, 6.1-6.3.3, 7.1-7.7 (except 7.2.2, 7.4.1, 7.5.1, 7.6.1, 7.7.5, 7.7.6), 7.11, 9.1-9.3.2, 9.5-9.5.1, 9.6-9.6.2, 9.7)

Reference(s) :	
1	Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004
2	Richard F. Gilberg, Behrouz A. Forouzan, "Data Structures – A Pseudo code Approach with C", Thomson Brooks / COLE, 1998

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Semester III								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130304C	DIGITAL ELECTRONICS	3	1	0	4	50	50	100

Objective(s)	To introduce number systems and codes, basic postulates of Boolean algebra and shows the correlation between Boolean expressions. To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits and to introduce the concept of memories and programmable logic devices.

1	NUMBER SYSTEMS	Total Hrs	9

Binary, Octal, Decimal, Hexadecimal-Number base conversions – complements – signed Binary numbers. Binary Arithmetic- Binary codes: Weighted –BCD-2421-Gray code-Excess 3 code-ASCII –Error detecting code – conversion from one code to another-Boolean postulates and laws –De-Morgan's Theorem- Principle of Duality- Boolean expression – Boolean function- Minimization of Boolean expressions – Sum of Products (SOP) –Product of Sums (POS)-Minterm- Maxterm- Canonical forms – Conversion between canonical forms – Karnaugh map Minimization – Don't care conditions.

2	LOGIC GATES & COMBINATIONAL CIRCUITS	Total Hrs	9

LOGIC GATES: AND, OR, NOT, NAND, NOR, Exclusive – OR and Exclusive – NOR- Implementations of Logic Functions using gates, NAND –NOR implementations –Multi level gate implementations- Multi output gate implementations. TTL and CMOS Logic and their characteristics –Tristate gates.
COMBINATIONAL CIRCUITS:
Design procedure – Adders-Subtractors – Serial adder/ Subtractor - Parallel adder/ Subtractor- Carry look ahead adder- BCD adder- Magnitude Comparator- Multiplexer/ Demultiplexer- encoder / decoder – parity checker – code converters. Implementation of combinational logic using MUX, ROM, PAL and PLA.

3	SEQUENTIAL CIRCUIT	Total Hrs	9

Flip flops SR, JK, T, D and Master slave – Characteristic table and equation –Application table – Edge triggering –Level Triggering –Realization of one flip flop using other flip flops –Asynchronous / Ripple counters – Synchronous counters –Modulo – n counter –Classification of sequential circuits – Moore and Mealy -Design of Synchronous counters: state diagram- State table –State minimization –State assignment- ASM-Excitation table and maps-Circuit implementation - Register – shift registers- Universal shift register – Shift counters – Ring counters.

4	ASYNCHRONOUS SEQUENTIAL CIRCUITS	Total Hrs	9

Design of fundamental mode and pulse mode circuits – primitive state / flow table – Minimization of primitive state table –state assignment – Excitation table – Excitation map- cycles – Races –Hazards: Static –Dynamic – Essential –Hazards elimination.

5	MEMORY DEVICES	Total Hrs	9

Classification of memories –RAM organization – Write operation –Read operation – Memory cycle - Timing wave forms – Memory decoding – memory expansion – Static RAM Cell-Bipolar RAM cell – MOSFET RAM cell –Dynamic RAM cell –ROM organization - PROM –EPROM –EEPROM –EAPROM –Programmable Logic Devices –Programmable Logic Array (PLA)- Programmable Array Logic (PAL)-Field Programmable Gate Arrays (FPGA).

Total hours to be taught	45

Text Book(s) :

1.	M. Morris Mano, Digital Design, 3.ed., Prentice Hall of India Pvt. Ltd., New Delhi, 2003/Pearson Education, 2003.
2.	John .M Yarbrough, Digital Logic Applications and Design, Thomson- Vikas publishing house, New Delhi, 2002.

Reference(s) :

1.	S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, 2nd ed., Vikas Publishing House Pvt. Ltd, New Delhi, 2004.
2.	Charles H.Roth. "Fundamentals of Logic Design", Thomson Publication Company, 2003.
3.	Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 5 ed., Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
4.	R.P.Jain, Modern Digital Electronics, 3 ed., Tata McGraw–Hill publishing company limited, New Delhi, 2003.
5.	John F.Wakerly, Digital Design, Pearson Education, 2002.

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Semester III									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130305C	ELECTRO MAGNETIC FIELDS	3	1	0	4	50	50	100	
Objective(s)	To analyze fields and potentials due to static charges. To understand how materials affect electric and magnetic fields , the relation between the fields under time varying situations. To evaluate static magnetic fields, and understand the principles of propagation of uniform plane waves.								

1	STATIC ELECTRIC FIELDS	Total Hrs	12
Introduction to Co-ordinate System – Rectangular – Cylindrical and Spherical Co-ordinate System – Introduction to line, Surface and Volume Integrals – Definition of Curl, Divergence and Gradient – Meaning of Strokes theorem and Divergence theorem Coulomb's Law in Vector Form – Definition of Electric Field Intensity – Principle of Superposition – Electric Field due to discrete charges – Electric field due to continuous charge distribution - Electric Field due to charges distributed uniformly on an infinite and finite line – Electric Field on the axis of a uniformly charged circular disc – Electric Field due to an infinite uniformly charged sheet.Electric Scalar Potential – Relationship between potential and electric field - Potential due to infinite uniformly charged line – Potential due to electrical dipole - Electric Flux Density – Gauss Law – Proof of Gauss Law – Applications.			
2	STATIC MAGNETIC FIELD	Total Hrs	12
The Biot-Savart Law in vector form – Magnetic Field intensity due to a finite and infinite wire carrying a current I – Magnetic field intensity on the axis of a circular and rectangular loop carrying a current I – Ampere's circuital law and simple applications. Magnetic flux density – The Lorentz force equation for a moving charge and applications – Force on a wire carrying a current I placed in a magnetic field – Torque on a loop carrying a current I – Magnetic moment – Magnetic Vector Potential.			
3	ELECTRIC AND MAGNETIC FIELDS IN MATERIALS	Total Hrs	12
Nature of dielectric materials– Electric Polarization – Boundary conditions for electric fields - Definition of Capacitance – Poisson's and Laplace's equation - Capacitance of Parallel plate capacitor, Concentric sphere and Coaxial cable using Laplace's equation – Electrostatic energy and energy density – Electric current – Current density – point form of ohm's law – continuity equation for current. Nature of magnetic materials – magnetization and permeability - magnetic boundary conditions- Definition of Inductance – Inductance of solenoid, Toroid and Coaxial cable – Definition of mutual inductance. Energy density in magnetic fields.			
4	TIME VARYING ELECTRIC AND MAGNETIC FIELDS	Total Hrs	12
Faraday's law – Maxwell's Second Equation in integral form from Faraday's Law – Equation expressed in point form. Displacement current – Ampere's circuital law in integral form – Modified form of Ampere's circuital law as Maxwell's first equation in integral form – Equation expressed in point form. Maxwell's four equations in integral form and differential form.Poynting Vector and the flow of power – Power flow in a co-axial cable – Instantaneous Average and Complex Poynting Vector.			
5	ELECTROMAGNETIC WAVES	Total Hrs	12
Derivation of Wave Equation – Uniform Plane Waves – Maxwell's equation in Phasor form – Wave equation in Phasor form – Plane waves in free space and in a homogenous material.Wave equation for a conducting medium – Plane waves in lossy dielectrics – Propagation in good conductors – Skin effect. Linear, Elliptical and circular polarization – Reflection of Plane Wave from a conductor – normal incidence – Reflection of Plane Waves by a perfect dielectric – normal and oblique incidence. Dependence on Polarization. Brewster angle.			
Total hours to be taught			60

Text Book(s) :	
1	William H.Hayt , John.A.Buck : "Engineering Electromagnetics" TATA McGRAW-HILL , Seventh Edition (UnitI,II,III)
2	E.C. Jordan & K.G. Balmain "Electromagnetic Waves and Radiating Systems." Prentice Hall of India 2nd edition 2003. (Unit IV, V). McGraw-Hill, 9th reprint
Reference(s) :	
1	John D.Kraus "Electromagnetics" McGraw-Hill international edition (4th edition 1991).
2	Ramo, Whinnery and Van Duzer: "Fields and Waves in Communications Electronics" John Wiley & Sons (3rd edition 2003).
3	K.A.Gangadhar "Field Theory" Khanna Publishers, New Delhi.
4	Narayana Rao, N : "Elements of Engineering Electromagnetics" 4th edition, Prentice Hall of India, New Delhi, 1998.

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Semester III									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130306C	ELECTRONIC CIRCUITS I	3	0	0	3	50	50	100	

Objective(s)	The methods of biasing transistors and Design of simple amplifier circuits. The Mid – band analysis of amplifier circuits using small - signal equivalent circuits to determine gain input impedance and output impedance.

1	TRANSISTOR BIASING	Total Hrs	9
BJT – Need for biasing - Fixed bias circuit, Load line and quiescent point. Variation of quiescent point due to h_{FE} variation within manufacturers tolerance. Stability factors. Different types of biasing circuits. Method of stabilizing the Q point to the extent possible. Advantage of Self bias (voltage divider bias) over other types of biasing. Use of Self bias circuit as a constant current circuit. Source self bias and voltage divider bias for FET. Use of JFET as a voltage variable resistor.			
2	MIDBAND ANALYSIS OF SMALL SIGNAL AMPLIFIERS	Total Hrs	9
CE, CB and CC amplifiers. Method of drawing small-signal equivalent circuit. Midband analysis of various types of single stage amplifiers to obtain gain, input impedance and output impedance. Miller's theorem. Comparison of CB, CE and CC amplifiers and their uses. Darlington connection using similar and Complementary transistors. Methods of increasing input impedance using Darlington connection and bootstrapping. CS, CG and CD (FET) amplifiers			
3	MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIERS	Total Hrs	9
Multistage amplifiers – Direct coupled, RC coupled and Transformer coupled amplifiers. Cascade and cascode amplifiers Basic emitter coupled differential amplifier circuit. Bisection theorem. Differential gain. CMRR. Use of constant current circuit to improve CMRR. Derivation of transfer characteristic, Transconductance. Use as Linear amplifier, limiter, amplitude modulator.			
4	FREQUENCY RESPONSE OF AMPLIFIERS	Total Hrs	9
General shape of frequency response of amplifiers. Definition of cut off frequencies and bandwidth. Low frequency analysis of amplifiers to obtain lower cut off frequency Hybrid – pi equivalent circuit of BJTs. High frequency analysis of BJT amplifiers to obtain upper cut off frequency. High frequency equivalent circuit of FETs. High frequency analysis of FET amplifiers. Gain-bandwidth product of FETs. General expression for frequency response of multistage amplifiers. Calculation of overall upper and lower cut off frequencies of multistage amplifiers. Amplifier rise time and sag and their relation to cut off frequencies.			
5	RECTIFIERS AND POWER SUPPLIES	Total Hrs	9
Half-wave, full-wave and bridge rectifiers with resistive load. Analysis for Vdc and ripple voltage with C, CL, L-C and C-L-C filters. Voltage multipliers Zenerdiode regulator. Electronically regulated d.c power supplies. Line regulation, output resistance and temperature coefficient. Switched mode power supplies. Power control using SCR.			
Total hours to be taught			45
Text Book(s) :			
1	Millman J. and Halkias .C., " Integrated Electronics ", Tata McGraw-Hill, 1991.		
2	Robert L. Boylestad and Louis Nashelsky, Electronic Devices & Circuit Theory, 8^{th} edn., PHI, 2002.		
Reference(s) :			
1	S.Salivahanan, N.Suresh kumar and A.Vallavaraj "Electronic Devices and Circuits", TMH, 1998.		
2	Floyd, Electronic Devices, Sixth edition, Pearson Education, 2003.		
3	I.J. Nagrath, Electronics – Analog and Digital, PHI, 1999.		

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2008
Department	Electronics and Communication Engineering	Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Semester III								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130307P	ELECTRICAL MACHINES LABORATORY	0	0	3	2	50	50	100

LIST OF EXPERIMENTS

1. Open circuit and load characteristics of separately excited and self excited D.C. generator.
2. Load test on D.C. shunt motor.
3. Load test on D.C. series motor.
4. Swinburne's test and speed control of D.C. shunt motor.
5. Load test on single phase transformer and open circuit and short circuit test on single phase transformer
6. Regulation of three phase alternator by EMF and MMF methods.
7. Load test on three phase induction motor.
8. No load and blocked rotor tests on three phase induction motor (Determination of equivalent circuit parameters)
9. Load test on single-phase induction motor.
10. Study of D.C. motor and induction motor starters.

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2008
Department	Electronics and Communication Engineering	Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Semester III								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130308P	ELECTRONICS LABORATORY I	0	0	3	2	50	50	100

LIST OF EXPERIMENTS

1. BJT Amplifier using voltage divider bias (self bias) with unbypassed emitter resistor.
   (i) Measurement of input resistance and gain
   (ii) Comparison with calculated values.
   (iii) Plot of DC collector current as a function of collector resistance (application as constant current circuit).
2. Source follower with Bootstrapped gate resistance and Emitter follower
   (i) Measurement of gain, input resistance and output resistance with and without Bootstrapping .
   (ii) Comparison with calculated values.
3. Frequency response of Common Emitter and Common Source amplifiers
4. Differential amplifier using BJT.
   1. Construction of the circuit.
   2. Measurement of DC collector current of individual transistors.
   3. Equalization of DC current using individual emitter resistance (50 – 100 Ohms)
   4. Measurement of CMRR.
5. Power supply Full wave rectifier with simple capacitor filter.
   (i) Measurement of DC voltage under load and ripple factor, Comparison with calculated values.
   (ii) Measurement of load regulation characteristics (Vout vs Iout). Comparison with calculated values.
6. Frequency response of two stage RC coupled amplifier.
7. Series voltage regulator
8. 1) Design and implementation of Adders and Subtractors using logic gates.
   2) Design and implementation of 4 bit binary Adder/ subtractor and BCD adder using IC 7483
9. Design and implementation of 16 bit odd/even parity checker generator using IC74180.
10. Design and implementation of Multiplexer and De-multiplexer using logic gates and study of IC74150 and IC 74154
11. Design and implementation of encoder and decoder using logic gates and study of IC7445 and IC74147
12. Construction and verification of 4 bit ripple counter and Mod-10 / Mod-12 Ripple counters
13. Design and implementation of 3-bit synchronous up/down counter

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Department	Electronics and Communication Engineering	Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
Semester III									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130309P	DATA STRUCTURES LABORATORY	0	0	3	2	50	50	100	
LIST OF EXPERIMENTS									

1. Array implementation of List Abstract Data Type (ADT)
2. Linked list implementation of List ADT
3. Cursor implementation of List ADT
4. Array implementations of Stack ADT
5. Linked list implementations of Stack ADT
6. Implementation of stack applications :
   (a) program for 'Balanced Paranthesis
   (b) Program for 'evaluating Postfix Expressions'
7. Queue ADT
8. Search Tree ADT – Binary Search Tree
9. Heap Sort
10. Quick Sort

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Department	Electronics and Communication Engineering	Programme Code & Name				13 : B.E. Electronics and Communication Engineering			
Semester III									
Course Code	Course Name	Hours / Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130310P	COMPREHENSION II	0	0	3	0	100	00	100	
Objective(s)	To comprehend the semester subjects studies, to improve the technical knowledge of the students.								
Methodology	1. For each subject 200 Keywords / important words or terms (5 units x 40 words) are to be prepared. 2. These 200 Keywords are to be printed in double column (2 x 50 words) and in 2 pages and is to be handed over to each student for the subject. 3. The staff who is handling the subject in the current semester will handle the respective discussion period (3 periods / semester) as given below. 4. The staff will explain and question the students using 'W' and 'H' type questions linking the keywords. 5. In a similar way the students have to prepare themselves for all the keywords.								

Execution

The Schedule for Conduct of Comprehension Subject.

Week	Activity		
	First 1½ Period Subject (No. of units)	Next 1½ Period Subject (No. of units)	Hours
W1	S1 (2)	S2 (2)	3
W2	S3 (2)	S4 (2)	3
W3	S5 (2)	S6 (2)	3
W4	Test – I (Portion : 2 units in each subject)		1
W5	S1 (3)	S2 (3)	3
W6	S3 (3)	S4 (3)	3
W7	S5 (3)	S6 (3)	3
W8	Test – II (Portion : 3 units in each subject)		1
W9	Discussion		3
W10	Test – III (All 5 units and all the subjects)		1
		Total	24

Evaluation

- It is a two credit (3 hours / week) Laboratory type course
- Only Continuous Assessment (CA) and No End Semester examination.
- Each test will carry 100 questions distributed among the subjects in respective units.

Component	Weight age
Test – I	25
Test – II	25
Test – III	50
Total	100

S1	08130301G- Engineering Mathematics III
S2	08130302C - Electrical Machines
S3	08130303S- Data Structures using C
S4	08130304S- Digital Electronics
S5	08130305C- Electro Magnetic Fields
S6	08130306C- Electronic Circuits I

K.S.Rangasamy College of Technology - Autonomous Regulation			**R 2008**
Department	Electronics and Communication Engineering	Programme Code & Name	13 : B.E. Electronics and Communication Engineering

Semester III								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130311P	CAREER COMPETENCY DEVELOPMENT I	0	0	2	0	100	0	100

Objective(s)
i. To improve the skill level of Engineering, Technology and Applied Science students.
ii. To improve the employability of students in placement interviews

Skills sets to be improved

a. Aptitude skills
- Arithmetic ability
- Verbal Reasoning
- Non verbal Reasoning

b. Programming skills
- C language (All Branches)
- OOPS concepts and C++ (Circuit Branches - EEE, ECE,CSE,IT and BT)
- Data Structures (Circuit Branches - EEE,ECE,CSE,IT and BT))

c. Written Communication Skills
- Comprehension
- Grammar
- Essay Writing
- Technical Report Writing
- Technical paper Writing

d. Oral Communication Skills
- News Reading
- Informing a News item
- Self introduction
- 2 minutes talk – Informed
- 2 minutes talk - Extempore

e. Technical Paper Presentation
- Presenting a paper on recent topics

f. Group Interaction
- Debate
- Group Discussion – Informed Topic
- Group Discussion – Topic on the spot

g. Technical Interview Skills
- Basic MPC knowledge
- Broad Knowledge of the branch
- Indepth knowledge on specific subjects of interest

h. HR Interview Skills
- Adoptability
- Creativity
- Flexibility
- Achievement orientation
- Continuous learning
- Hardworking nature
- Decisiveness

viii. Self development
ix. Questioning

Focus
The focus of CCD is to develop these in three semesters (CCD-I, II and III) and reinforce them in another two semesters (CCD IV and V).

Execution
Total No. of weeks : 12
3 Hrs/week and 2 credits
Only Continuous Assessment and No End Semester examination.
Evaluation based on written test, oral test and technical paper presentation.
Every 20 students should be engaged by a staff member during communication hour and oral test
Every 30 students should be monitored by a staff member to conduct written test.

Schedule	Week	Activity

	1	Training
	2	Training
	3	Evaluation I - Written
	4	Evaluation I -
	5	Training
	6	Evaluation II - Written
	7	Evaluation II - Oral
	8	Training
	9	Evaluation III - Written
	10 - 12	Evaluation III - Oral
Evaluation	Evaluation I	60 marks(average of 3 tests)
	Evaluation II	20 marks
	Evaluation III	20 marks
	Total	100 marks

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Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
Semester IV										
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130401C	RANDOM PROCESSES		3	1	0	4	50	50	100	
Objective(s)	To have a fundamental knowledge of the basic probability concepts and have a well – founded knowledge of standard distributions which can describe real life phenomena. The Acquire skills in handling situations involving more than one random variable and functions of random variables.									
1	PROBABILITY AND RANDOM VARIABLE					Total Hrs		12		
Axioms of probability - Conditional probability - Total probability – Baye's theorem - Random variable - Probability mass function - Probability density functions- Properties –Moments - Moment generating functions and their properties.										
2	STANDARD DISTRIBUTIONS					Total Hrs		12		
Binomial, Poisson, Geometric, Negative Binomial, Uniform, Exponential, Gamma, Weibull and Normal distributions and their properties - Functions of a random variable.										
3	TWO DIMENSIONAL RANDOM VARIABLES					Total Hrs		12		
Joint distributions - Marginal and conditional distributions – Covariance - Correlation and regression - Transformation of random variables - Central limit theorem.										
4	CLASSIFICATION OF RANDOM PROCESSES					Total Hrs		12		
Definition and examples - first order, second order, strictly stationary, wide – sense stationary and Ergodic processes - Markov process - Binomial, Poisson and Normal processes - Sine wave process.										
5	CORRELATION AND SPECTRAL DENSITIES					Total Hrs		12		
Auto correlation - Cross correlation - Properties – Power spectral density – Cross spectral density - Properties – Wiener-Khintchine relation – Relationship between cross power spectrum and cross correlation function - Linear time invariant system - System transfer function –Linear systems with random inputs – Auto correlation and cross correlation functions of input and output.										
Total hours to be taught								60		
Text book (s) :										
1	Ross, S., "A First Course in Probability", Fifth edition, Pearson Education, Delhi, 2002.									
2	Peebles Jr. P.Z., "Probability Random Variables and Random Signal Principles", Tata McGraw-Hill Publishers, Fourth Edition, New Delhi, 2002. (Chapters 6, 7 and 8).									
Reference(s) :										
1	Henry Stark and John W. Woods "Probability and Random Processes with Applications to Signal Processing", Pearson Education, Third edition, Delhi, 2002									
2	Veerarajan. T., "Probability, Statistics and Random process", Tata McGraw-Hill Publications, Second Edition, New Delhi, 2002.									

K.S.Rangasamy College of Technology - Autonomous Regulation								**R 2008**
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Semester IV								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130402C	ELECTRONIC CIRCUITS II	3	0	0	3	50	50	100
Objective(s)	The advantages and method of analysis of feedback amplifiers. Analysis and design of RC and LC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, blocking oscillators and time based generators.							

1	LARGE SIGNAL AMPLIFIERS	Total Hrs	9
Classification of amplifiers (Class A, B, AB, C&D), Efficiency of class A, RC coupled and transformer-coupled power amplifiers. Class B complementary-symmetry, push-pull power amplifiers. Calculation of power output, efficiency and power dissipation. Crossover distortion and methods of eliminating it.Heat flow calculations using analogous circuit. Calculation of actual power handling capacity of transistors with and without heat sink. Heat sink design.			
2	FEEDBACK AMPLIFIERS	Total Hrs	9
Block diagram. Loop gain. Gain with feedback. Desensitivity of gain. Distortion and cut off frequencies with feedback. The four basic feedback topologies and the type of gain stabilized by each type of feedback. Input and Output resistances with feedback. Method of identifying feedback topology, feedback factor and basic amplifier configuration with loading effect of feedback network taken into account. Analysis of feedback amplifiers. Nyquist criterion for stability of feedback amplifiers.			
3	OSCILLATORS	Total Hrs	9
Barkhausen Criterion. Mechanism for start of oscillation and stabilization of amplitude. Analysis of Oscillator using Cascade connection of one RC and one CR filters. RC phase shift Oscillator. Wienbridge Oscillator and twin-T Oscillators. Analysis of LC Oscillators, Colpitts, Hartley, Clapp, Miller and Pierce oscillators. Frequency range of RC and LC Oscillators. Quartz Crystal Construction. Electrical equivalent circuit of Crystal. Crystal Oscillator circuits			
4	TUNED AMPLIFIERS	Total Hrs	9
Coil losses, unloaded and loaded Q of tank circuits. Analysis of single tuned and synchronously tuned amplifiers. Instability of tuned amplifiers. Stabilization techniques. Narrow band neutralization using coil. Broad banding using Hazeltine neutralization. Class C tuned amplifiers and their applications. Efficiency of Class C tuned Amplifier.			
5	WAVE SHAPING AND MULTIVIBRATOR CIRCUITS	Total Hrs	9
RL & RC Integrator and Differentiator circuits. Diode clippers, clampers and slicers. Collector coupled and Emitter coupled Astable multivibrator. Monostable multivibrator. Bistable multivibrators. Triggering methods. Storage delay and calculation of switching times. Speed up capacitors. Schmitt trigger circuit.			
Total hours to be taught			45

Text book (s) :	
1	Millman and Halkias. C., “Integrated Electronics”, Tata McGraw-Hill 1991,(I,II).
2	Schilling and Belove, "Electronic Circuits", TMH, Third Edition, 2002 (Unit - III)
3	Robert L.Boylestad and Louis Nashelsky , Electronic Devices & Circuit Theory, 8th Edition PHI, 2002
Reference(s) :	
1	Sedra / Smith, “Micro Electronic Circuits” Oxford university Press, 2004.
2	David A. Bell, " Solid State Pulse Circuits ", Prentice Hall of India, 1992.

<table>
<tr><td colspan="8">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="2">R 2008</td></tr>
<tr><td>Department</td><td>Electronics and Communication Engineering</td><td colspan="4">Programme Code & Name</td><td colspan="4">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="10">Semester IV</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130403C</td><td>SIGNALS AND SYSTEMS</td><td>3</td><td>1</td><td>0</td><td>4</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="9">To study the properties and representation of discrete and continuous signals and also the sampling process and analysis of discrete systems using z-transforms. To study the analysis and synthesis of discrete time systems.</td></tr>
<tr><td>1</td><td colspan="4">REPRESENTATION OF SIGNALS</td><td colspan="2">Total Hrs</td><td colspan="3">12</td></tr>
<tr><td colspan="10">Continuous and discrete time signals: Classification of Signals – Periodic a periodic even – odd – energy and power signals – Deterministic and random signals – complex exponential and sinusoidal signals – periodicity – properties of discrete time complex exponential unit impulse – unit step impulse functions – Transformation in independent variable of signals: time scaling, time shifting.Determination of Fourier series representation of continuous time and discrete time periodic signals – Explanation of properties of continuous time and discrete time Fourier series.</td></tr>
<tr><td>2</td><td colspan="4">ANALYSIS OF CONTINUOUS TIME SIGNALS AND SYSTEMS</td><td colspan="2">Total Hrs</td><td colspan="3">12</td></tr>
<tr><td colspan="10">Continuous time Fourier Transform and Laplace Transform analysis with examples – properties of the Continuous time Fourier Transform and Laplace Transform basic properties, Parseval's relation, and convolution in time and frequency domains.Basic properties of continuous time systems: Linearity, Causality, time invariance, stability, magnitude and Phase representations of frequency response of LTI systems - Analysis and characterization of LTI systems using Laplace transform: Computation of impulse response and transfer function using Laplace transform.</td></tr>
<tr><td>3</td><td colspan="4">SAMPLING THEOREM AND z-TRANSFORMS</td><td colspan="2">Total Hrs</td><td colspan="3">12</td></tr>
<tr><td colspan="10">Representation of continuous time signals by its sample - Sampling theorem – Reconstruction of a Signal from its samples, aliasing – discrete time processing of continuous time signals, sampling of band pass signals. Basic principles of z-transform - z-transform definition – region of convergence – properties of ROC – Properties of z-transform – Poles and Zeros – inverse z-transform using Contour integration - Residue Theorem, Power Series expansion and Partial fraction expansion, Relationship between z-transform and Fourier transform.</td></tr>
<tr><td>4</td><td colspan="4">DISCRETE TIME SYSTEMS</td><td colspan="2">Total Hrs</td><td colspan="3">12</td></tr>
<tr><td colspan="10">Computation of Impulse & response & Transfer function using Z Transform. DTFT Properties and examples – LTI-DT systems -Characterization using difference equation – Block diagram representation – Properties of convolution and the interconnection of LTI Systems – Causality and stability of LTI Systems.</td></tr>
<tr><td>5</td><td colspan="4">SYSTEMS WITH FINITE AND INFINITE DURATION IMPULSE RESPONSE</td><td colspan="2">Total Hrs</td><td colspan="3">12</td></tr>
<tr><td colspan="10">Systems with finite duration and infinite duration impulse response – recursive and non-recursive discrete time system – realization structures – direct form – I, direct form – II, Transpose, cascade and parallel forms.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="3">60</td></tr>
<tr><td colspan="10">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="9">AlanV.Oppenheim, Alan S.Willsky with S.Hamid Nawab, Signals & Systems, 2nd edn., Pearson Education, 1997.</td></tr>
<tr><td colspan="10">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="9">John G.Proakis and Dimitris G.Manolakis, Digital Signal Processing, Principles, Algorithms and Applications, 3rd edn., PHI, 2000.</td></tr>
<tr><td>2</td><td colspan="9">M.J.Roberts, Signals and Systems Analysis using Transform method and MATLAB, TMH 2003.</td></tr>
<tr><td>3</td><td colspan="9">Simon Haykin and Barry Van Veen, Signals and Systems, John Wiley, 1999.</td></tr>
<tr><td>4</td><td colspan="9">B.P.Lathi, Linear systems and signals , 2nd Edition Oxford University Press. 2005.</td></tr>
</table>

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<tr><td>08130404C</td><td>OBJECT ORIENTED PROGRAMMING WITH C++ AND JAVA</td><td>3</td><td>1</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">To study the object oriented programming principles, tokens, expressions, control structures and functions. To introduce the classes, objects, constructors and Destructors and the operator overloading, inheritance and polymorphism concepts in C++.</td></tr>
</table>

1	OBJECT ORIENTED PROGRAMMING AND BASICS OF C++	Total Hrs	12
Software crisis – Software evolution – A look at procedure oriented programming – Object oriented programming paradigm – Basic concepts of object oriented programming – Benefits of OOP – Object-oriented languages – Applications of OOP - What is C++? – A simple C++ program – More C++ statements – Structure of C++ Program. Tokens – Keywords – Identifiers and constants – Basic data types – User defined data types – Derived data types – Symbolic constants – Declaration of variables – Dynamic initialization of variables – Reference variables – Operators in C++ – Scope resolution operator – Manipulators – Type cast operator – Expressions and their types – Special assignment expressions – Control structures - The main function – Function prototyping – Call by reference – Return by reference – Inline functions – Default arguments – Function overloading.			
2	CLASSES AND OBJECTS	Total Hrs	12
Specifying a class – Defining member functions – Private member functions –Arrays within a class – Memory allocation for objects – Static data members – Static member functions – Arrays of objects – Objects as function arguments –Friendly functions – Returning objects. Constructors: Parameterized constructors – Multiple constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Dynamic constructors Destructors.			
3	OPERATOR OVERLOADING, INHERITANCE AND POLYMORPHISM	Total Hrs	12
Defining operator overloading: Overloading unary, binary operators. Manipulation of strings using operators – Rules for overloading operators – Type Conversions - Defining derived classes – Single inheritance – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance – Virtual base classes – Abstract classes - Introduction to pointers to objects: This pointer – Pointers to derived classes – Virtual functions – Pure virtual functions.			
4	JAVA EVOLUTION, CONSTANTS, VARIABLES, DATA TYPES, OPERATORS, CLASSES, OBJECTS, METHODS, ARRAYS AND STRINGS	Total Hrs	12
Java features: How Java differs from C and C++ - Simple Java program – Java program structures – Java tokens – Java statements – Implementing a Java program – Java virtual machine – Command line arguments - Constants – Variables – Data types – Scope of variables – Operators in Java. Defining a class – Adding variables and methods – Creating objects – Accessing class members – Constructors – Method overloading – Static members – Inheritance: Extending a class – Overriding methods – Final variables and methods – Final classes – Abstract methods and classes – Visibility control - Arrays – One dimensional array – Creating an array – Two-dimensional arrays – Strings – Vectors.			
5	PROGRAMMING USING INTERFACES, PACKAGES, MULTITHREADING, MANAGING ERRORS AND EXCEPTIONS AND APPLETS	Total Hrs	12
Defining interfaces – Extending interfaces – Implementing interfaces – Accessing interface variables – Java API packages – Using system packages – Creating, accessing and using a package – Adding a class to a package - Creating threads – Extending the thread class – Stopping and blocking a thread – Thread exceptions – Thread priority – Synchronization – Life cycle of a thread – Using thread methods.Types of errors: Exceptions – Syntax of exception handling code – Multiple catch statements – Using finally statements – Throwing our own exceptions – Using exceptions for debugging. Preparing to write applets – Applet lifecycle – Creating an executable applet – Designing a web page – Applet tag – Adding applet to HTML file – Running the Applet.			
Total hours to be taught			60

Text Book(s) :	
1	E.Balagurusamy, ‘Object Oriented Programming with C++’, Second edition, Tata McGraw Hill, 2003.
2	E.Balagurusamy, ‘Programming with JAVA – A Primer’, Second edition, Tata McGraw Hill, 2003
Reference(s) :	
1	Herbert Schildt, ‘C++ - The Complete Reference’, Tata McGraw Hill, 1997.
2	Bjarne Stroustrup, ‘The C++ Programming Language’, Addison Wesley, 2000.
3	John .R .Hubbard, ‘Schaums Outline Programming with C++’, Tata McGraw Hill, 2003.

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008	
Department	Electronics and Communication Engineering	Programme Code & Name				13 : B.E. Electronics and Communication Engineering				
Semester IV										
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks				
		L	T	P	C	CA	ES	Total		
08130405C	LINEAR INTEGRATED CIRCUITS	3	0	0	3	50	50	100		
Objective(s)	To introduce the basic building blocks of linear integrated circuits and theory and applications of analog multipliers and PLL. To teach the linear and non-linear applications of operational amplifiers.									

1	INTRODUCTION	Total Hrs	9
Basis of Differential Amplifier, Need for ICs, IC classification based on application and fabrication, operational amplifier – circuit symbol, Packages and Power Supply Connection, Ideal Op Amp – Block Diagram, Properties, Ideal Voltage Transfer Curve, Voltage Series Feedback amplifier, Voltage Shunt Feedback Amplifier, DC Characteristics, AC Characteristics – Frequency response, Compensation Technique, Slew rate, Differentiator, Integrator, Summing Amplifier, Scale Changer, Instrumentation Amplifier, Voltage to Current Converter, Current to Voltage Converter.			
2	COMPARATORS AND ACTIVE FILTERS	Total Hrs	9
Basic Comparator, Zero Crossing Detector, Schmitt Trigger, Comparator Characteristics OP amp with diodes – Clippers, Clampers, Precision rectifier – Half Wave and Full Wave rectifiers , Peak detectors, Sample and hold circuit, Log and Antilog Amplifier, Power Amplifier, Low Pass, high pass and Band Pass filters.			
3	WAVE FORM GENERATORS	Total Hrs	9
Astable Multivibrator, Monostable Multivibrator using opamp, Sine Wave Generators – Wien Bridge Oscillator, RC phase Shift Oscillator, Traingular Wave Generator, Saw tooth Wave Generator, 555 Timer- Block diagram, Astable Multivibrator, Monostable multivibrator using 555 timer, Applications			
4	PLL AND MULTIPLIER	Total Hrs	9
PLL Block diagram, Closed Loop analysis of PLL Applications – Frequency Multiplier, Divider, FSK Modulator, Frequency translation, AM detection, FM detection, Analog Multipliers – Basic Multiplier and its Characteristics. Voltage Divider, Squaring Circuit, Square Rooting Circuit, Frequency Doubler Using Multiplier, Gilbert cell Multiplier			
5	DAC / ADC , REGULATORS	Total Hrs	9
ADC / DAC Specification – Resolution, Linearity, Accuracy, Monotonicity, Settling time, Stability DAC – Weighted Resistor DAC, R – 2R Ladder type DAC, Inverted R-2R Ladder type DAC, ADC – Single Slope ADC, Dual Slope ADC, Successive Approximation ADC, Flash type ADC, Delta Modulation , Adaptive Delta Modulation, Voltage Regulators – Linear and Switched Mode Types			
Total hours to be taught			45
Text book (s) :			
1	Ramakant A . Gayakwad, ‘OP – AMP and Linear IC’s’ Prentice Hall / Pearson Education 1994.		
2	D.Roy Choudry , Shail Jain , ‘ Liner integrated Circuits’, New Age International Pvt Ltd 2000.		
Reference(s) :			
1	Gray and Meyer, ‘Analysis and Design of Analog Integrated Circuits’, Wiley International, 1995.		
2	J.Michael Jacob, ‘Applications and Design with Analog Integrated Circuits’, Prentice Hall of India, 1996.		
3	K.R.Botkar, ‘Integrated Circuits’. Khanna Publishers, 1996.		

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Semester IV

Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130406C	TRANSMISSION LINES AND WAVEGUIDES	3	1	0	4	50	50	100

Objective(s)	To become familiar with propagation of signals through lines. To Understand signal propagation at Radio frequencies and radio propagation in guided systems. To become familiar with resonators.

1	TRANSMISSION LINE THEORY	Total Hrs	12

Different types of transmission lines – Definition of Characteristic impedance - Definition of Propagation Constant.
General Solution of the transmission line – physical significance of the equation and the infinite line –meaning of reflection coefficient – Wavelength and velocity of propagation-Waveform distortion – distortion less transmission line – The telephone cable – Inductance loading of telephone cables-Input impedance of lossless lines – reflection on a line not terminated by Zo - Transfer impedance – reflection factor and reflection loss.

2	THE LINE AT RADIO FREQUENCIES	Total Hrs	12

Constants for the line zero dissipation – voltages and currents on the dissipationless line. Input impedance of the dissipationless line. Standing waves and standing wave ratio on a line – One eighth wave line – The quarter wave line and impedance matching – the half wave line – Single stub impedance matching on a line.
The circle diagram for the dissipationless line – The Smith Chart – Application of the Smith Chart – Conversion from impedance to reflection coefficient and vice-versa. Impedance to Admittance conversion and vice versa – single stub matching with the smith chart and double stub matching.

3	GUIDED WAVES	Total Hrs	12

Waves between parallel planes of perfect conductors – Transverse electric and transverse magnetic waves – characteristics of TE and TM Waves – Transverse Electromagnetic waves – Velocities of propagation – Attenuation of TE, TM and TEM waves in parallel plane guides – Wave impedances.

4	RECTANGULAR WAVEGUIDES	Total Hrs	12

Transverse Magnetic Waves in Rectangular Wave guides – Transverse Electric Waves in Rectangular Waveguides – characteristic of TE and TM Waves – Cutoff wavelength and phase velocity – Impossibility of TEM waves in waveguides – Dominant mode in rectangular waveguide – Attenuation of TE_{10} and TM_{11} modes in rectangular waveguides – Wave impedances – characteristic impedance – Excitation of modes.

5	CIRCULAR WAVE GUIDES AND RESONATORS	Total Hrs	12

Bessel functions – Solution of field equations in cylindrical co-ordinates – TM and TE waves in circular guides – wave impedances and characteristic impedance – Dominant mode in circular waveguide – excitation of modes – Microwave Resonators - , Rectangular cavity resonators, circular cavity resonator, Q factor of a cavity resonator for TE101 mode.

Total hours to be taught	60

Text book (s) :

1	J.D.Ryder "Networks, Lines and Fields", PHI, New Delhi, 2003.
2	E.C. Jordan and K.G.Balmain "Electro Magnetic Waves and Radiating System, PHI, New Delhi, 2003.

Reference(s) :

1	Ramo, Whineery and Van Duzer: "Fields and Waves in Communication Electronics" John Wiley, 2003.
2	David M.Pozar: Microwave Engineering – 2nd Edition – John Wiley.
3	David K.Cheng,Field and Waves in Electromagnetism, Pearson Education, 1989.
4	Annapurna Das Sisir Das : "Microwave Engineering " – Tata Mc Graw Hill.

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Semester IV								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130407P	ELECTRONICS CIRCUITS AND SIMULATION LABORATORY	0	0	3	2	50	50	100

LIST OF EXPERIMENTS

1. Class B Complementary symmetry power amplifier
   1. Observation of the output wave form with cross over distortion
   2. Modification of the circuit to avoid cross over distortion
   3. Measurement of maximum power output
   4. Determination of Efficiency
   5. Comparison with calculated values.
2. Series and Shunt feedback amplifiers:
   Frequency response, Input and output impedance calculation
3. Design of RC Phase shift oscillator: Design Wein Bridge Oscillator
4. Design of Hartley and Colpitts Oscillator
5. Tuned Class C
6. Integrators, Differentiators, Clippers and Clampers
7. Design of Astable and Monostable and Bistable multivibrators

SIMULATION USING PSPICE:

1. Differentiate amplifier
2. Active filter : Butterworth IInd order LPF
3. Astable, Monostable and Bistable multivibrator - Transistor bias
4. D/A and A/D converter (Successive approximation)
5. Analog multiplier
6. CMOS Inventor, NAND and NOR

<table>
<tr><th colspan="8">K.S.Rangasamy College of Technology - Autonomous Regulation</th><th colspan="2">R 2008</th></tr>
<tr><td>Department</td><td>Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="5">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="10">Semester IV</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="4">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td colspan="2">ES</td><td>Total</td></tr>
<tr><td>08130408P</td><td>LINEAR INTEGRATED CIRCUIT LABORATORY</td><td>0</td><td>0</td><td>3</td><td>2</td><td>50</td><td colspan="2">50</td><td>100</td></tr>
<tr><td colspan="10">LIST OF EXPERIMENTS</td></tr>
<tr><td colspan="10">Design and testing of:
1. Inverting, Non inverting and Differential amplifiers.
2. Integrator and Differentiator.
3. Instrumentation amplifier.
4. Active lowpass and bandpass filter.
5. Astable, Monostable multivibrators and Schmitt Trigger using op-amp.
6. Phase shift and Wien bridge oscillator using op-amp.
7. Astable and monostable using NE555 Timer.
8. PLL characteristics and Frequency Multiplier using PLL.
9. DC power supply using LM317 and LM723.
10. Study of SMPS control IC SG3524 / SG3525.</td></tr>
</table>

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Semester IV									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130409P	OBJECT ORIENTED PROGRAMMING LABORATORY	0	0	3	2	50	50	100	

LIST OF EXPERIMENTS

C++

1. Programs Using Functions
   - Functions with default arguments
   - Implementation of Call by Value, Call by Address and Call by Reference
2. Simple Classes for understanding objects, member functions and Constructors
   - Classes with primitive data members
   - Classes with arrays as data members
   - Classes with pointers as data members – String Class
   - Classes with constant data members
   - Classes with static member functions
3. Compile time Polymorphism
   - Operator Overloading including Unary and Binary Operators.
   - Function Overloading
4. Runtime Polymorphism
   - Inheritance
   - Virtual functions
   - Virtual Base Classes
   - Templates
5. File Handling
   - Sequential access
   - Random access

JAVA

6. Simple Java applications
   - for understanding reference to an instance of a class (object), methods
   - Handling Strings in Java
7. Simple Package creation.
   - Developing user defined packages in Java
8. Interfaces
   - Developing user-defined interfaces and implementation
   - Use of predefined interfaces
9. Threading
   - Creation of thread in Java applications
   - Multithreading
10. Exception Handling Mechanism in Java
    - Handling pre-defined exceptions
    - Handling user-defined exceptions

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Course Code	Course Name	Hours / Week			Credit	Maximum Marks				
		L	T	P	C	CA	ES	Total		
08130410P	COMPREHENSION III	0	0	3	0	100	00	100		
Objective(s)	To comprehend the semester subjects studies, to improve the technical knowledge of the students.									
Methodology	1. For each subject 200 Keywords / important words or terms (5 units x 40 words) are to be prepared. 2. These 200 Keywords are to be printed in double column (2 x 50 words) and in 2 pages and is to be handed over to each student for the subject. 3. The staff who is handling the subject in the current semester will handle the respective discussion period (3 periods / semester) as given below. 4. The staff will explain and question the students using 'W' and 'H' type questions linking the keywords. 5. In a similar way the students have to prepare themselves for all the keywords.									

Execution

The Schedule for Conduct of Comprehension Subject.

Week	Activity: First 1½ Period Subject (No. of units)	Activity: Next 1½ Period Subject (No. of units)	Hours
W1	S1 (2)	S2 (2)	3
W2	S3 (2)	S4 (2)	3
W3	S5 (2)	S6 (2)	3
W4	Test – I (Portion : 2 units in each subject)		1
W5	S1 (3)	S2 (3)	3
W6	S3 (3)	S4 (3)	3
W7	S5 (3)	S6 (3)	3
W8	Test – II (Portion : 3 units in each subject)		1
W9	Discussion		3
W10	Test – III (All 5 units and all the subjects)		1
		Total	24

Evaluation

- It is a two credit (3 hours / week) Laboratory type course
- Only Continuous Assessment (CA) and No End Semester examination.
- Each test will carry 100 questions distributed among the subjects in respective units.

Component	Weight age
Test – I	25
Test – II	25
Test – III	50
Total	100

S1	08130401C – Random Processes
S2	08130402C – Electronic Circuits II
S3	08130403C – Signals and Systems
S4	08130404C – Object Oriented Programming with C++ and Java
S5	08130405C - Linear Integrated Circuits
S6	08130406C – Transmission Lines and Waveguides

<table>
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<tr><td colspan="7">Semester IV</td></tr>
</table>

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130411P	CAREER COMPETENCY DEVELOPMENT II	0	0	2	0	100	0	100

Objective(s)

i. To improve the skill level of Engineering, Technology and Applied Science students.
ii. To improve the employability of students in placement interviews

Skills sets to be improved

a. Aptitude skills
- Arithmetic ability
- Verbal Reasoning
- Non verbal Reasoning

b. Programming skills
- C language (All Branches)
- OOPS concepts and C++ (Circuit Branches - EEE, ECE,CSE,IT and BT)
- Data Structures (Circuit Branches - EEE,ECE,CSE,IT and BT))

c. Written Communication Skills
- Comprehension
- Grammar
- Essay Writing
- Technical Report Writing
- Technical paper Writing

d. Oral Communication Skills
- News Reading
- Informing a News item
- Self introduction
- 2 minutes talk – Informed
- 2 minutes talk - Extempore

e. Technical Paper Presentation
- Presenting a paper on recent topics

f. Group Interaction
- Debate
- Group Discussion – Informed Topic
- Group Discussion – Topic on the spot

g. Technical Interview Skills
- Basic MPC knowledge
- Broad Knowledge of the branch
- Indepth knowledge on specific subjects of interest

h. HR Interview Skills
- Adoptability
- Creativity
- Flexibility
- Achievement orientation
- Continuous learning
- Hardworking nature
- Decisiveness

viii. Self development
ix. Questioning

Focus

The focus of CCD is to develop these in three semesters (CCD-I, II and III) and reinforce them in another two semesters (CCD IV and V).

Execution

Total No. of weeks : 12
3 Hrs/week and 2 credits
Only Continuous Assessment and No End Semester examination.
Evaluation based on written test, oral test and technical paper presentation.
Every 20 students should be engaged by a staff member during communication hour and oral test
Every 30 students should be monitored by a staff member to conduct written test.

Schedule	Week	Activity

	1	Training
	2	Training
	3	Evaluation I - Written
	4	Evaluation I – Oral
	5	Training
	6	Evaluation II - Written
	7	Evaluation II – Oral
	8	Training
	9	Evaluation III – Written
	10 - 12	Evaluation III – Oral
Evaluation	Evaluation I	60 marks(average of 3 tests)
	Evaluation II	20 marks
	Evaluation III	20 marks
	Total	100 marks

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Semester V										
Course Code	Course Name		Hours / Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130501G	PROFESSIONAL ETHICS (Common to all B.E./B.Tech. programmes)		3	0	0	3	50	50	100	
Objectives	To create an awareness on Ethics and Human Values and instill Moral and Social Values in Students.									
1	INTRODUCTION					Total Hrs	9			
Ethics defined – Engineering as a profession – Core qualities of professional practitioners – Theories of right action – Major ethical issues – Three types of inquiry – Kohlberg's stages of moral development – Carol Gilligan theory – Moral dilemmas – Moral autonomy – Value based ethics										
2	ENGINEERING AS SOCIAL EXPERIMENTATION					Total Hrs	9			
Comparison with standard experiments – Relevant information – Learning from the past – Engineers as managers, consultants and leaders – Accountability – Role of codes – Code of ethics for engineers; introduction, rules of practice and professional obligations – The space shuttle challenger case study.										
3	ENGINEERS RESPONSIBILITY FOR SAFETY AND RISK					Total Hrs	9			
Safety and Risk – Types of risks – Safety and the engineer – Designing for safety – Risk Benefit analysis – Accidents - The three mile Island disaster case study – The Chernobyl disaster case study.										
4	RESPONSIBILITIES AND RIGHTS					Total Hrs	9			
Collegiality – Two senses of loyalty – Professional rights and responsibilities – Conflict of Interest – Collective Bargaining – Confidentiality – Acceptance of bribes / gifts – Occupational crimes – Whistle Blowing										
5	GLOBAL ISSUES					Total Hrs	9			
Gloabalization – Cross Cultural Issues – The Bhopal gas tragedy case study – Computer ethics – Weapons development – Intellectual property rights (IPR)										
Total hours to be taught							45			
Text book :										
1	Govindarajan M, Natarajan S, Senthil Kumar V.S, "Engineering Ethics", Prentice Hall of India (P) Ltd, New Delhi, 2005.									
References:										
1	Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw-Hill Publishing Company Limited, New Delhi, 2007.									
2	Govindan K.R., and Sendhil Kumar S., "Professional Ethics and Human Values", Anuradha Publications, Chennai, 2007.									

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Semester V										
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks				
		L	T	P	C	CA	ES	Total		
08130502C	COMMUNICATION SYSTEMS	3	1	0	4	50	50	100		
Objective(s)	To provide various Amplitude modulation and demodulation systems ,to provide various Angle modulation and demodulation systems, to Provide some depth analysis in noise performance of various receivers, to study some basic information theory with channel coding theorem.									

1	AMPLITUDE MODULATIONS	Total Hrs	12
Generation of AM - Linear modulators and nonlinear modulators. DSB-SC - Product modulator and Ring modulator. SSB-SC - Filter method, Phase shift method and Modified phase shift method. Generation of VSB Signals. Demodulation of AM - Envelope detection and coherent detection. Comparison of Amplitude modulation systems, Frequency translation, Frequency Division multiplexing, Super heterodyne receiver.			
2	ANGLE MODULATION	Total Hrs	12
Phase modulation, Frequency modulation, Narrowband and wideband FM, transmission bandwidth of FM signals, Generation of FM signal – Direct FM – indirect FM, Demodulation of FM signals - Phase discriminator method and ratio detector method. FM stereo multiplexing, PLL – Nonlinear model and linear model of PLL.			
3	NOISE PERFORMANCE OF DSB, SSB RECEIVER	Total Hrs	12
Noise – Narrow Band Noise – Representation of narrow band noise in terms of in phase and Quadrature Components – Representation of narrow band noise in terms of envelope and phase components – sine wave plus narrowband noise, Receiver model, Noise in DSB-SC receiver, Noise in SSB receiver.			
4	NOISE PERFORMANCE OF AM AND FM RECEIVERS	Total Hrs	12
Noise in AM receiver, threshold effect – Noise in FM receiver, capture effect, FM threshold effect – Pre-emphasis and de-emphasis in FM – Comparison of performance of AM and FM systems.			
5	INFORMATION THEORY	Total Hrs	12
Uncertainty, Information and entropy, Source coding theorem, Data compaction, Discrete memory less channels, mutual information, channel capacity, channel coding theorem, Differential entropy, and mutual information for continuous ensembles, information capacity theorem, implication of the information capacity theorem.			
Total hours to be taught			60

Text book (s) :	
1	Simon Haykin, Communication Systems, John Wiley & sons, NY, 5th Edition, 2009.
2.	Anokh Singh, Principles of Communication Engineering, S.Chand Pvt.Ltd, 1st edition (reprint 2006)
Reference(s) :	
1	Roddy and Coolen, Electronic communications, PHI, New Delhi, 4th Edition, 2003.
2	Taub and Schilling, Principles of communication systems, TMH, New Delhi, 1995.
3	Bruce Carlson et al, Communication systems, McGraw-Hill Int., 4th Edition, 2002.

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Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering		
Semester V								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130503C	DIGITAL SIGNAL PROCESSING	3	1	0	4	50	50	100
Objective(s)	To study DFT and its computation, the design techniques for digital filters and the finite word length effects in signal processing. To study the fundamentals of multirate signal processing and fundamentals of digital signal processors.							

1	FFT	Total Hrs	12
Introduction to DFT – Efficient computation of DFT Properties of DFT – FFT algorithms – Radix-2 FFT algorithms – Decimation in Time – Decimation in Frequency algorithms –Use of FFT algorithms in Linear Filtering and correlation.			
2	DIGITAL FILTERS DESIGN	Total Hrs	12
Design of linear phase FIR filters using window methods – Rectangular, Hamming and Hanning, windows-frequency sampling techniques – IIR filters – magnitude response – Phase response – Group delay – Design of low pass Butterworth filters (low pass) – Bilinear transformation – Prewarping, impulse invariant transformation.			
3	FINITE WORD LENGTH EFFECTS	Total Hrs	12
Quantization noise – derivation for quantization noise power – Fixed point and binary floating point number representation – comparison – over flow error – truncation error – co-efficient quantization error - limit cycle oscillation – signal scaling.			
4	MULTIRATE SIGNAL PROCESSING	Total Hrs	12
Introduction – Basic Multirate operations – Decimation and Interpolation – Fractional Sampling Rate Alteration – Interconnection of building blocks – The Noble Identities – The Poly phase representation – Efficient structures for Decimation and Interpolation filters – Efficient structures for fractional decimation – Some applications of multirate systems – Digital audio systems – Sub band coding of speech and image signals.			
5	DIGITAL SIGNAL PROCESSORS	Total Hrs	12
Introduction to DSP architecture – Harvard architecture - Dedicated MAC unit - Multiple ALUs, Advanced addressing modes, Pipelining, Overview of instruction set of TMS320C54 – application programming			
Total hours to be taught			60

Text book (s) :	
1	John G Proakis, Dimitris G Manolakis, “Digital Signal Processing Principles, Algorithms and Application”, PHI, 3rd Edition, 2000.
2	B.Venkataramani & M. Bhaskar, “Digital Signal Processor Architecture, Programming and Application”, TMH 2002.
Reference(s) :	
1	Alan V Oppenheim, Ronald W Schafer, John R Back, “Discrete Time Signal Processing”, PHI, 2nd Edition 2000.
2	Johnny R. Johnson,” Introduction to Digital Signal Processing”, PHI, 2002.
3	S.K.Mitra, “Digital Signal Processing- A Computer based approach”, Tata McGraw-Hill, 1998, New Delhi.
4	S.Salivahanan, A.Vallavaraj, Gnanapriya, “Digital Signal Processing”, McGraw-Hill / TMH, 2000
5	P.P.Vaidyanathan, “Multirate Systems and Filter Banks”, Pearson Education, 1992
6	Avtar singh, S.Srinivasan,“DSP Implementation using DSP microprocessor with Examples from TMS32C54XX” -Thamson / Brooks cole Publishers, 2003
7	Sen M.Kuo, Woon –Seng Gan, “Digital Signal Processing Architectures, Implementations, and Applications”, Pearson Education. 2005

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Semester V										
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks				
		L	T	P	C	CA	ES	Total		
08130504C	MICROPROCESSORS AND ITS APPLICATIONS	3	0	0	3	50	50	100		
Objective(s)	To introduce the architecture and programming of 8085 microprocessor, interfacing of peripheral devices with 8085 microprocessor and architecture and programming of 8086 microprocessor. To introduce the advanced microprocessors.									

1	8085 CPU ARCHITECTURE AND MEMORY INTERFACE	Total Hrs	9
Microprocessors-Microprocessor Instruction set and computer languages-8085 Architecture and its operations– Memory-Memory classifications-Input and output devices-Interfacing memory and I/O devices with 8085 CPU-Introduction to 8085 Instructions-Data transfer operations-Arithmetic operations-Logical operations-Branch operations-Addressing modes of 8085- Assembly language programming – Timing diagram.			
2	PERIPHERALS INTERFACING	Total Hrs	9
Counter & Time delays – Interrupts – Programmable Peripheral Interface(PPI 8255) –Programmable Interval Timer(PIT 8253) – 8259 Programmable Interrupt Controller – keyboard & display controller (8279)- Interfacing serial I /O (8251)- stepper motor interfacing – Traffic light controller.			
3	THE 8086 MICROPROCESSOR	Total Hrs	9
8086 Internal Architecture -Introduction to programming the 8086-Program Development steps-Constructing the machine codes for 8086 Instructions-Writing programs for use with Assembler- Assembly language program Development Tools-8086 Instruction Descriptions and Assembler Directives-8086 ALP programming.			
4	SYSTEM DESIGN USING 8086	Total Hrs	9
A basic 8086 microcomputer system-8086 Interrupts and Interrupt responses-Hardware Interrupt Applications-software Interrupt Applications-The 8086 Minimum mode –The 8086 Maximum mode – The 8087 Math coprocessor-Interfacing Microcomputer Ports to High power devices.			
5	INTRODUCTION TO ADVANCED PROCESSORS	Total Hrs	9
Intel 80286 microprocessor –Architecture-Real addressing mode-protected virtual addressing mode-protection-Introduction to 80386 and 80486 processors –Architecture-segmentation-paging- PENTIUM -System architecture-Over view of Pentium pro- Pentium II- Pentium III.			
Total hours to be taught			45

Text book (s) :	
1	Ramesh S Gaonkar," Microprocessor Architecture, Programming and application with 8085", 5th Edition, Penram International Publishing, New Delhi,2002.
2	Douglas V.Hall,"Microprocessors and Interfacing Programming and Hardware", Tata McGraw-Hill publishing company Limited, New Delhi. Fifteenth reprint 2002
Reference(s) :	
1	A.K. Ray and K.M.Burchandi, "Intel Microprocessors Architecture Programming and Interfacing", McGraw Hill International Edition.
2	M.Rafiquizzaman " Microprocessor - Theory and applications" Prentice Hall of India Pvt Ltd., 2005
3	John Uffenbeck, "The 80x86 Family, Design, Programming and Interfacing", Third Edition. Pearson Education, 2002.
4	James L.Antonakos, "An introduction to the Intel family of microprocessors", Third Edition, Pearson Education, 1998.

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Semester V									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130505C	CONTROL SYSTEMS	3	1	0	4	50	50	100	
Objective(s)	To understand the open loop and closed loop (feedback) systems, time domain and frequency domain analysis of control systems required for stability analysis. To understand the compensation technique that can be used to stabilize control systems.								
1	CONTROL SYSTEM MODELLING				Total Hrs	12			
System concept, differential equations and transfer functions. Modelling of electric systems, translational and rotational mechanical systems, Simple electromechanical systems. Block diagram representation of systems – Block diagram reduction methods – Closed loop transfer function, determination of signal flow graph. Mason's gain formula – Examples.									
2	TIME DOMAIN ANALYSIS				Total Hrs	12			
Test signals – time response of first order and second order systems – time domain specifications – types and order of systems – generalised error co-efficients – steady state errors – concepts of stability – Routh-Hurwitz stability – root locus.									
3	FREQUENCY DOMAIN ANALYSIS				Total Hrs	12			
Introduction – correlation between time and frequency response – stability analysis using Bode plots, Polar plots, Nichols chart and Nyquist stability criterion – Gain margin – phase margin.									
4	COMPENSATORS				Total Hrs	12			
Realization of basic compensators – cascade compensation and feedback compensation – design of lag, lead, lag-lead compensator using Bode plot. Introduction to P, PI and PID controllers.									
5	CONTROL SYSTEM COMPONENTS AND APPLICATION OF CONTROL SYSTEMS				Total Hrs	12			
Stepper motors – AC servo motor – DC servo motor – Synchros – sensors and encoders – DC tacho generator – AC tacho generator – Hydraulic controller – Pneumatic controller – "Typical applications of control systems: Traffic light control, Temperature control".									
Total hours to be taught						60			
Text book (s) :									
1	Ogata.K," Modern Control Engineering", Prentice Hall of India, 4th Edition, 2003.								
2	Nagrath & Gopal, "Control System Engineering", 3rd Edition, New Age International Edition, 2002.								
Reference(s) :									
1	Benjamin.C.Kuo, "Automatic Control Systems", 7th Edition – Prentice Hall of India, 2002.								
2	M.Gopal," Control Systems", Tata McGraw-Hill, 1997.								

K.S.Rangasamy College of Technology - Autonomous Regulation										**R 2008**
Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
Semester V										
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks				
		L	T	P	C	CA	ES	Total		
08130506C	COMPUTER NETWORKS	3	0	0	3	50	50	100		
Objective(s)	To introduce the students the functions of different layers and IEEE standard employed in computer networking. To make students to get familiarized with different protocols and network components.									
1	DATA COMMUNICATIONS				Total Hrs		9			
Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Guided unguided media – Line Coding – Dialup Modems.										
2	DATA LINK LAYER				Total Hrs		9			
Error – detection and correction: – Introduction –Block coding – CRC – Flow Control and Error control: stop and wait – go back N ARQ – selective repeat ARQ- sliding window techniques – HDLC. LAN: Ethernet IEEE 802.3 Random access, – IEEE 802.11–Bluetooth, Repeaters, SONET – Bridges.										
3	NETWORK LAYER				Total Hrs		9			
Internetworking – IP addressing methods (IPv4 and Ipv6) – Subnetting – Routing – Distance Vector Routing – Link State Routing – Routers.										
4	TRANSPORT LAYER				Total Hrs		9			
Process to Process Delivery – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services.										
5	APPLICATION LAYER				Total Hrs		9			
Domain Name Space (DNS) – Simple Mail Transfer Protocol (SMTP) – File Transfer Protocol (FTP) – Hyper Text Transfer Protocol (HTTP) – World Wide Web (WWW) – Security – Cryptography.										
Total hours to be taught							45			
Text book (s) :										
1	Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 4th Edition 2006.									
Reference(s) :										
1	James .F. Kurouse & W. Rouse, “Computer Networking: A Top down Approach Featuring”, Pearson Education, 5th Edition, 2009.									
2	Larry L.Peterson & Bruce S. Davie, “Computer Networks”, Harcourt Asia Pvt. Ltd., 4th Edition, 2007.									
3	Andrew S. Tanenbaum, “Computer Networks”, PHI, 4th Edition, 2002.									
4	William Stallings, “Data and Computer Communication”, 7th Edition, Pearson Education, 2004.									

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Department	Electronics and Communication Engineering		Programme Code & Name		13 : B.E. Electronics and Communication Engineering			
Semester V								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130507P	DIGITAL SIGNAL PROCESSING LABORATORY	0	0	3	2	50	50	100

LIST OF EXPERIMENTS

USING MATLAB

1. Generation of Signals
   - i) Unit Impulse
   - ii) Unit Step
   - iii) Sinc
   - iv) Sinusoidal & Exponential
2. Linear and circular convolution of two sequences
3. Sampling and effect of aliasing
4. Design of FIR & IIR filters (Low pass & High pass)
5. Calculation of FFT of the following signal
   - i) Unit Impulse
   - ii) Rectangular sequence
   - iii) Sinc
   - iv) DC
   - v) Sinusoidal
6. Decimation & Interpolation

USING TMS320C54

1. Study of basic programs (Addition , Subtraction, Multiplication & Division)
2. Convolution & Correlation of sequences
3. Waveform Generation
4. Study of Sampling Theorem
5. Calculation of FFT
6. Implementation of FIR filter
7. Implementation of IIR filter

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Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering		
Semester V								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130508P	MICROPROCESSOR AND APPLICATION LABORATORY	0	0	3	2	50	50	100

LIST OF EXPERIMENTS

1. Programs for 8 bit Arithmetic operations (Using 8085).
2. Programs for 16 bit Arithmetic operations (Using 8085 & 8086).
3. Code conversion (using 8085 & 8086)
4. Programs for sorting and searching (Using 8085 & 8086).
5. Interfacing ADC and DAC with 8085 microprocessor.
6. Interfacing and programming of keyboard & display controller (Using 8279)
7. Interfacing and programming of interrupt controller (Using 8259)
8. Interfacing and programming of Timer (Using 8253)
9. Interfacing and Programming of Traffic light controller.
10. Parallel Communication between two microprocessor Kits using Mode 1 and Mode 2 of 8255.
11. Serial Communication between two MP Kits using 8251.
12. Interfacing, Programming of Stepper Motor & DC Motor Speed control.

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Department	Electronics and Communication Engineering	Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
Semester V									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130509P	COMPUTER NETWORKS LABORATORY	0	0	3	2	50	50	100	

LIST OF EXPERIMENTS

1. PC to PC Communication
   Parallel Communication using 8 bit parallel cable
   Serial communication using RS 232C
2. Ethernet LAN protocol
   To create scenario and study the performance of CSMA/CD protocol through simulation
3. Token bus and token ring protocols
   To create scenario and study the performance of token bus and token ring protocols through simulation
4. Wireless LAN protocols
   To create scenario and study the performance of network with CSMA / CA protocol and compare with CSMA/CD protocols.
5. Implementation and study of stop and wait protocol
6. Implementation and study of Goback-N and selective repeat protocols
7. Implementation of distance vector routing algorithm
8. Implementation of Link state routing algorithm
9. Implementation of Data encryption and decryption
10. Transfer of files from PC to PC using Windows / Unix socket programming

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Department	Electronics and Communication Engineering		Programme Code & Name			13: B.E. Electronics and Communication Engineering			
Semester V									
Course Code	Course Name	Hours/Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130510P	CAREER COMPETENCY DEVELOPMENT III	0	0	2	0	100	00	100	
Objective(s)	i. To improve the skill level of students. ii. To improve the employability of students								

1	Aptitude Skills	Hrs
a. Arithmetic ability : Partnership - Chain rule – Calendar – Permutation - Data Interpretation – Probability - Heights and Distance b. Verbal Reasoning : Logical Venn Diagrams - Logical Sequence of Words - Arithmetical reasoning - Data Sufficiency - Statement – Conclusion - Deriving condition from passages c. Nonverbal Reasoning : Rule detection - Cube and dice		8
2	Programming Skills	6
Data Structures : Tree - Graph Object Oriented Programming : Introduction to C++ - Classes and Objects – Constructors - Operator Overloading – Inheritance – Templates - File I/O		
3	Written Communication Skills	
Error correction in the usage of degrees of comparison, conditional clauses, numerical expressions and system international (SI) units. - Paragraph Writing. Evaluation I – Written Test		4 2
4	Oral Communication Skills	
Group Discussion Demo - Listening comprehension Lab Evaluation II – Group Discussion		2 2
5	Interview Skills (Association Session)	
Evaluation III - Technical Interview - Technical Interview I (Objective type questions from V th semester subjects) Evaluation IV - HR Interview - HR Interview I - Adaptability, Self development, Creativity		4 4
	Total	32

Reference(s):	
1	R.S.Aggarwal , "Quantitative Aptitude", S.Chand & Company Ltd., New Delhi, Reprint 2007 (Twice) (Ch – 13, 14, 27, 30, 31, 34, 36, 37, 38, & 39) (unit – I)
2	R.S.Aggarwal , "A Modern Approach to verbal & Non–verbal Reasoning", S.Chand & Company Ltd, New Delhi, 2008, Part I – Section I (Ch - 9,14,15 & 17) Part I–Section II (Ch – 5 & 6) Part II (Ch 12 & 14) (unit – I)
3	Mark Allen Weiss , "Data Structures and Algorithm Analysis in C", Pearson Education 2002, Ch – 4, 9 (unit – II)
4	Herbert Schildt , "The Complete Reference C++" Tata MacGraw Hill, 2002 (Ch - 11, 12, 14, 15, 16,17, 18, 21)
5	CCD Guide by English Department of KSRCT, 2008 (Unit – III, IV & V)
6	HR Interview Guide by Training Cell, KSRCT, 2008.

EVALUATION CRITERIA

S.No.	Particular	Test Portion	Marks
1	Evaluation I Written Test	Unit I – OQ – 50, Unit II – OQ – 30 Unit III – OQ 20	50
2	Evaluation II - Group discussion	P – 5 Marks, C – 5 Marks, TS – 5 Marks	15
3	Evaluation III - Technical Interview	6 questions each 2½ Marks	15
4	Evaluation IV HR Interview	Creativity – 6 Marks (Adoptability – 7 Marks, Self development – 7 marks)	20
P–Presentation C–Content Q–Queries OQ–Objective type question T–Total TS–Team Skills			T = 100
Note :			

1. Question paper and keys will be supplied by the training cell for written test for Evaluation I
2. Respective Departments will conduct Evaluation I, II, III & IV, correct and submit the marks obtained by the students to the Training Cell.
3. HODs will display about 50 topics for oral communication.
4. All training & tests will be conducted on odd Saturdays, Session of 2 periods in FN & Session of 2 periods in AN & Association Session.
5. 66 students may be divided into 10 groups of 6 each. Each group may be evaluated in 10 Minutes for GD.
6. 60 objective type questions, 10 questions from each of 6 subjects are to be prepared. 1 question from each subject at random to be asked carrying 2½ marks each (6 x 2½ = 15 marks) for Technical Interview. Each section is divided into 3 groups of 22 each.

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Semester VI									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130601G	PRINCIPLES OF MANAGEMENT (Common to all B.E./B.Tech. programmes)	3	0	0	3	50	50	100	
Objective(s)	Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations. After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling. Students will also gain some basic knowledge in international aspect of management.								
1	HISTORICAL DEVELOPMENT				Total Hrs	9			
Definition of Management – Science or Art – Management and Administration – Development of Management Thought – Contribution of Taylor and Fayol – Functions of Management – Types of Business Organisation.									
2	PLANNING				Total Hrs	9			
Nature & Purpose – Types of Plans – Steps involved in Planning – Objectives – Setting Objectives – process of Management by Objectives – Strategies, Policies & Planning Premises – Forecasting – Decision making.									
3	ORGANISING				Total Hrs	9			
Nature and purpose – Formal and informal organization – Organization Chart – Structure and Process – Departmentation by difference strategies – Line and Staff authority – Benefits and limitations – De-Centralization and Delegation of Authority – Staffing – Selection process – Techniques – HRD – Managerial Effectiveness.									
4	DIRECTING				Total Hrs	9			
Scope – Human Factors – Leadership – Types of Leadership – Motivation – Hierarchy of needs – Motivation Theories – Motivational Techniques – Job Enrichment – Communication – process of Communication – Barriers and Breakdown – Effective Communication – Electronic media in Communication.									
5	CONTROLLING				Total Hrs	9			
System and process of Controlling – Requirements for effective control – the Budget as Control Technique – Information Technology in Controlling – Use of computers in handling the information – Productivity – Problems and Management – Control of Overall Performance – Direct and preventive Control – Reporting – The Global Environment – Globalization and Liberalization – International Management and Global theory of Management.									
Total hours to be taught						45			
Text book (s) :									
1	Harold Kooritz & Heinz Weihrich, “Essentials of Management”, Tata McGraw-Hill, 1998.								
2	Joseph L Massie, “Essentials of Management”, Prentice Hall of India, (Pearson) Fourth Edition, 2003.								
Reference(s) :									
1	Tripathy PC And Reddy PN, “Principles of Management”, Tata McGraw Hill, 1999.								
2	Decenzo David, Robbin Stephen A, “Personnel and Human Reasons Management”, Prentice Hall of India, 1996.								
3	JAF Stomer, Freeman R. E and Daniel R “Gilbert Management”, Pearson Education, Sixth Edition, 2004.								
4	Fraidoon Mazda, “Engineering Management”, Addison Wesley, 2000.								
5	Prasad L.M, “Principles of Management”, Sultan Chand & Sons Ltd, 2003.								

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Department	Electronics and Communication Engineering	Programme Code & Name				13 : B.E. Electronics and Communication Engineering		
Semester VI								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130602C	DIGITAL COMMUNICATION	3	1	0	4	50	50	100
Objective(s)	To study pulse modulation and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals. To learn base band pulse transmission, which deals with the transmission of pulse-amplitude, modulated signals in their base band form and to learn error control coding which encompasses techniques for the encoding and decoding of digital data streams for their reliable transmission over noisy channels.							

1	PULSE MODULATION	Total Hrs	9
Sampling process –PAM other forms of pulse modulation –Bandwidth –Noise trade off –Quantization – PCM Noise considerations in PCM Systems- TDM Digital multiplexers-Virtues, Limitations and modifications of PCM-Delta modulation –Linear prediction –differential pulse code modulation – Adaptive Delta Modulation.			
2	BASEBAND PULSE TRANSMISSION	Total Hrs	9
Matched Filter- Error Rate due to noise –Intersymbol Interference- Nyquist's criterion for Distortionless Base band Binary Transmission- Correlative level coding –Base band M-ary PAM transmission –Adaptive Equalization –Eye patterns.			
3	PASSBAND DATA TRANSMISSION	Total Hrs	9
Introduction – Pass band Transmission model- Generation, Detection, Signal space diagram, bit error probability and Power spectra of BPSK, QPSK, FSK and MSK schemes –Differential phase shift keying – Comparison of Digital modulation systems using a single carrier – Carrier and symbol synchronization.			
4	ERROR CONTROL CODING	Total Hrs	9
Discrete memory less channels – Linear block codes - Cyclic codes - Convolutional codes – Maximum likelihood decoding of convolutional codes-Viterbi Algorithm, Trellis coded Modulation, Turbo codes.			
5	SPREAD SPECTRUM MODULATION	Total Hrs	9
Pseudo- noise sequences –a notion of spread spectrum – Direct sequence spread spectrum with coherent binary phase shift keying – Signal space Dimensionality and processing gain –Probability of error – Frequency –hop spread spectrum –Maximum length and Gold codes.			
Total hours to be taught			45

Text book (s) :	
1	Simon Haykin, "Communication Systems" Wiley, 4th Edition, 2001.
2	John G.Proakis, "Digital Communication" McGraw Hill 3rd Edition, 1995.
Reference(s) :	
1	Sam K.Shanmugam "Analog & Digital Communication" Wiley.
2	Taub & Schilling, "Principles of Digital Communication "Tata McGraw-Hill" 28th reprints, 2003.
3	Bernard Sklar, "Digital Communications" Prentice Hall of India 2nd Edition, 2001.

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Department	Electronics and Communication Engineering	Programme Code & Name				13 : B.E. Electronics and Communication Engineering			
Semester VI									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130603C	VLSI DESIGN	3	0	0	3	50	50	100	
Objective(s)	To learn the basic CMOS circuits, To learn the CMOS process technology. To learn the concepts of modeling a digital system using Hardware Description Language.								

1	INTRODUCTION TO MOS TRANSISTOR THEORY	Total Hrs	9
MOS Transistors, CMOS Logic, Ideal I-V Characteristics, Simple MOS Capacitance Models, Detailed MOS Gate Capacitance Model, Non-ideal I-V effects, DC Transfer Characteristics			
2	CMOS PROCESSING TECHNOLOGY:	Total Hrs	9
VLSI Design Flow, CMOS Fabrication and Layout, CMOS Technologies, Layout Design Rules, CMOS Process Enhancements. Technology Related CAD Issues, Fabrication & Packaging.			
3	DIGITAL DESIGN USING VERILOG HDL:	Total Hrs	9
Typical Design Flow, Hierarchical Modeling Concepts, Modules and Ports, Gate Level Modeling, Dataflow Modeling, Behavioral Modeling Styles.			
4	VLSI CIRCUIT DESIGN AND CHARACTERISTION	Total Hrs	9
HDL Design of Decoder Encoder, Equaling Detector, Comparator, Priority Encoder, D-Latch, D-ff, Half Adder, Full Adder and Ripple Carry Adder. Circuit Families, Conventional CMOS Latches and Flip-Flops, Power Dissipation, Design Margin.			
5	TESTING AND VERIFICATION OF VLSI CIRCUITS.	Total Hrs	9
Logic Verification Principles, Silicon Debug Principles, Manufacturing Test Principles, Design for Testability, Boundary Scan, Testing in an University Environment.			
Total hours to be taught			45

Text book (s) :	
1	Neil.H Weste & David Harris and Array Banerjee; "CMOS VLSI Design" A Circuits and Systems Perspective, Third Edition, Pearson Education 2007.
2	Samir Palnitkar; Verilog HDL – A Guide to Digital Design and Synthesis, II Edition, Pearson Education, 2010.
Reference(s) :	
1	Neil.H Weste & Kamran Eshraghian; "Principles of CMOS VLSI Design "; Second Edition, Addison Wesley, Nov 2000.
2	M.J.S.Smith : Application Specific Integrated Circuits, Pearson Education, 2008.
3	Douglas A.Pucknell and Kamaran Eshranghian, Basic VLSI Design, Prentice Hall of India Publication, 2001.
4	Wayne Wolf, Modern VLSI Design, Pearson Education 2003.
5	John P.Uyemura: Introduction To VLSI Circuits and Systems, John Wiley and Sons 2006.
6	J . Bhaskar : Verilog HDL Primer, BS Publications, 2002.

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Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Semester VI									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130604C	ANTENNA AND WAVE PROPAGATION	3	1	0	4	50	50	100	
Objective(s)	To study radiation from a current element, to study antenna arrays, to study aperture antennas								
1	RADIATION FIELDS OF WIRE ANTENNAS				Total Hrs	12			
Concept of vector potential. Modification for time varying, retarded case. Fields associated with Hertzian dipole. Power radiated and radiation resistance of current element. Radiation resistance of elementary dipole with linear current distribution. Radiation from half-wave dipole and quarter-wave monopole. Assumed current distribution for wire antennas.									
2	ANTENNA FUNDAMENTALS AND ANTENNA ARRAYS				Total Hrs	12			
Definitions: Radiation intensity. Directive gain. Directivity. Power gain. Beam Width. Band Width. Gain and radiation resistance of current element. Half-wave dipole and folded dipole. Reciprocity principle. Effective length and Effective area. Relation between gain effective length and radiation resistance. Loop Antennas: Radiation from small loop and its radiation resistance. Radiation from a loop with circumference equal to a wavelength and resultant circular polarization on axis. Helical antenna. Normal mode and axial mode operation. Antenna Arrays: Expression for electric field from two and three element arrays. Uniform linear array. Method of pattern multiplication. Binomial array.									
3	TRAVELLING WAVE (WIDEBAND) ANTENNAS				Total Hrs	12			
Radiation from a traveling wave on a wire. Analysis of Rhombic antenna. Design of Rhombic antennas. Coupled Antennas: Self and mutual impedance of antennas. Two and three element Yagi antennas. Log periodic antenna. Reason for feeding from end with shorter dipoles and need for transposing the lines. Effects of decreasing α.									
4	APERTURE AND LENS ANTENNAS				Total Hrs	12			
Radiation from an elemental area of a plane wave (Huygen's Source). Radiation from a rectangular aperture treated as an array of Huygen's sources. Equivalence of fields of a slot and complementary dipole. Relation between dipole and slot impedances. Method of feeding slot antennas. Thin slot in an infinite cylinder. Field on the axis of an E-Plane sectoral horn. Radiation from circular aperture. Reflector type of antennas (dish antennas). Dielectric lens and metal plane lens antennas. Lumeberg lens.									
5	PROPAGATION				Total Hrs	12			
Sky wave propagation: Structure of the ionosphere. Effective dielectric constant of ionized region. Reflection and refraction waves by Ionosphere. Effect of earth's magnetic field. Fading and Diversity reception. Space wave propagation: Reflection from ground for vertically and horizontally polarized waves. Reflection characteristics of earth. Resultant of direct and reflected ray at the receiver. Duct propagation. Ground wave propagation: Attenuation characteristics for ground wave propagation. Calculation of field strength at a distance.									
Total hours to be taught						60			
Text book (s) :									
1	E.C.Jordan and Balmain, "Electro Magnetic Waves and Radiating Systems", PHI, 1968, Reprint 2003.								
2	John D.Kraus and Ronalatory Marhefka, "Antennas", Tata McGraw-Hill Book Company, 2002								
Reference(s):									
1	. Ballany , "Antenna Theory " , John Wiley & Sons, second edition , 2003.								

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Semester VI									
Subject Code	Subject Name	Hours / Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130605C	MEASUREMENTS AND INSTRUMENTATION	3	0	0	3	50	50	100	

Objective(s)	To learn Basic measurement concepts and electronics measurements. And also learn to importance of signal generators and signal analysers in measurements.		
1.	BASIC MEASUREMENT CONCEPTS	Total Hrs	9
Measurement systems- Static and dynamic characteristics – units and standards of measurements - error analysis – moving iron meters – multimeters – True RMS meters – Bridge measurements – Maxwell, Hay, Schering, Anderson and Wien bridge.			
2.	BASIC ELECTRONIC MEASUREMENTS	Total Hrs	9
Electronic multimeters – Cathode ray oscilloscopes – block schematic – applications – special oscilloscopes – Q meters – vector meters – RF voltage and power measurements			
3.	SIGNAL GENERATORS AND ANALYZERS	Total Hrs	9
Function generators-RF signal generators – Sweep generators – Frequency synthesizer – wave analyzer – Harmonic distortion analyzer – spectrum analyzer.			
4.	DIGITAL INSTRUMENTS	Total Hrs	9
Comparison of analog and digital techniques – digital voltmeter – multimeters – frequency counters – measurement of frequency and time interval – extension of frequency range-measurement errors.			
5.	DATA ACQUISITION SYSTMES AND FIBER OPTIC MEASUREMENTS	Total Hrs	9
Elements of a digital data acquisition system – interfacing of transducers – multiplexing – computer controlled instrumentation – IEEE 488 bus – fiber optic measurements for power and system loss – optical time domains reflectometer.			
Total hours to be taught			45
Text book (s):			
1.	Albert D.Helfrick and William D.Cooper – Modern Electronic Instrumentation and Measurement Techniques, Prentice Hall of India, 2003		
Reference(s):			
1.	Joseph J.Carr, Elements of Electronics Instrumentation and Measurement, Pearson education 2003		
2.	Alan, S.Mooris, Principles of Measurements and Instrumentation, Prentice Hall of India, 2nd edn, 2003.		
3.	Ernest O.Doebelin, Measurement systems – Application and Design- Tata McGraw-Hill-2004.		

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Semester VI									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130607P	COMMUNICATION SYSTEMS LABORATORY	0	0	3	2	50	50	100	

LIST OF EXPERIMENTS

1. Radiation pattern of Halfwave dipole Antenna
2. Radiation pattern of yagi Antenna
3. Radiation pattern of loop Antenna
4. Amplitude Modulation and Demodulation
5. Frequency Modulation and Demodulation
6. Sampling & Time Division Multiplexing
7. Pulse Modulation and Demodulation (PAM / PWM/ PPM)
8. Pulse Code Modulation and Demodulation
9. Line Coding and Decoding (RZ, NRZ, Manchester & AMI)
10. Delta Modulation and Demodulation
11. Differential Pulse Code Modulation and Demodulation
12. ASK and FSK Digital Modulation
13. PSK and QPSK Digital Modulation

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Semester VI									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130608P	VLSI LABORATORY	0	0	3	2	50	50	100	
LIST OF EXPERIMENTS									

1. Simulation of Combinational Logic Circuits
2. Simulation of Sequential Logic Circuits
3. Synthesis, Place & Route of Combinational Logic Circuits for PLD
4. Synthesis, Place & Route of Sequential Logic Circuits for PLD
5. Schematic Design of Digital Logic Circuits
6. Design of Pipelined Serial and Parallel Adder
7. Design of Signed 8 bit 2's Complement Pipelined Multiplier
8. Implementation of ALU in FPGA
9. Implementation of Traffic Light Controller in FPGA
10. Transient Analysis of Logic Circuits Using T Spice.

<table>
<tr><td colspan="8">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="2">R 2008</td></tr>
<tr><td>Department</td><td>Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="5">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="10">Semester VI</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours / Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130609P</td><td>DESIGN PROJECT</td><td>0</td><td>0</td><td>3</td><td>2</td><td>100</td><td>00</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">The objective of design project is to provide opportunity for the students to implement their skills acquired in the yester semester to the real – life problems.</td></tr>
</table>

The design project should be on hardware design and / or fabrication in any of the areas in Electronics and Communication Engineering. Microcontroller / DSP /PLD based hardware design is also permitted.

Project work can be carried out individually or by a group of maximum of three students under the guidance of a faculty from ECE department. A Committee of faculty will evaluate the projects during the sixth semester.

List of Examples:

Design and Implementation of

- Alarm Clock
- Echo Generator
- Elevator Control
- Monitoring of Temperature
- Home Security System
- RF based voice controlled home applications
- Wireless Lift Controller
- Process Control Timer
- Wireless data Modem

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Department	Electronics and Communication Engineering	Programme Code & Name	13: B.E. Electronics and Communication Engineering

Semester VI

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130610P	CAREER COMPETENCY DEVELOPMENT IV	0	0	2	0	100	00	100

Objective(s)	i. To improve the skill level of students. ii. To improve the employability of students.

1	Company type written test in Aptitude, Written Communication Skills	Hrs
	Company based questions – Questions from Aptitude, Written communication and Comprehension. Evaluation I Written Test	6 2
2	Company type written test in Verbal and Non-verbal Reasoning Skills	
	Company based questions – Questions from Verbal and Non-verbal reasoning. Evaluation II Written Test	6 2
3	Programming Skills	
	Company based questions from C language, Data structures and Object Oriented Programming. Evaluation III Written Test	6 2
4	Interview Skills(Association Session)	
	Technical Interview – Questions from core subjects HR Interview - Flexibility, Achievement orientation, Decisiveness Evaluation IV – Technical & HR Interview.	4+4
	Total	32

Reference(s):

1	R.S.Aggarwal , "Quantitative Aptitude", S.Chand & Company Ltd., New Delhi, Reprint 2007 (Twice) (unit – I)
2	CCD Guide by English Department of KSRCT, 2008 (Unit – I)
3	R.S.Aggarwal , "A Modern Approach to verbal & Non – verbal Reasoning", S.Chand & Company Ltd, New Delhi, 2008, (unit – II)
4	Yashwant Kanetkar, " Let us 'C' ", BPB Publications, New Delhi, 2002 (unit – III)
5	Herbert Schildt, " The Complete Reference C++ ", TMH, 2003 (unit – III)
6	Mark Allen Weiss , "Data Structures and Algorithm Analysis in C", Pearson Education 2002.(unit – III)
7	Company question papers(Unit I-III)
6	HR Interview Guide by Training cell (unit IV)

EVALUATION CRITERIA

S.No.	Particular	Test Portion	Marks
1	Evaluation I, Written Test	Unit 1 – Aptitude – 50 OQs, Written Communication & Comprehension – 50 OQs	25
2	Evaluation II Written Test	Unit II – Verbal Reasoning – 50 OQs, Non-verbal Reasoning – 50OQs	25
3	Evaluation III Written Test	Unit III – C Language-50OQs, Data Structures – 25 OQs, OOPs – 25 OQs	20
4	Evaluation IV Technical & HR Interview	Unit IV Technical Interview - 6 questions (each question 2.5 marks) HR Interview – Flexibility(5 marks), Achievement orientation(5 marks), Decisiveness(5 marks).	15 15
P – Presentation C – Content OQ – Objective type question T – Total			T = 100

Note :
1. Question paper and keys will be supplied by the training cell for written test for Evaluation I, II & III
2. Respective Departments will conduct Evaluation I, II, III & IV, correct and submit the marks obtained by the students to the Training Cell.
3. All training & Evaluation tests will be conducted on odd Saturdays, Session of 2 periods in FN & Session of 2 periods in AN & Association Session.
4. 60 Interview type questions, 10 questions from each of 6 subjects of VIth Semester are to be prepared.
1 question from each subject at random to be asked carrying 2½ marks each (6 x 2½ = 15 marks) for Technical Interview. Each section is divided into 3 groups of 22 each.

<table>
<tr><td colspan="5">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="4">R 2008</td></tr>
<tr><td>Department</td><td>Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="4">13 : Electronics and Communication Engineering</td></tr>
<tr><td colspan="9">Semester VII</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours / Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130701G</td><td>TOTAL QUALITY MANAGEMENT</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">To understand the Total Quality Management concept and principles and the various tools available to achieve Total Quality Management, statistical approach for quality control, ISO and QS certification process and its need for the industries.</td></tr>
</table>

1	INTRODUCTION	Total Hrs	9
Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs - Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Principles of TQM, Quality Council, Quality Statements, Deming Philosophy, Barriers to TQM Implementation.			
2	TQM PRINCIPLES	Total Hrs	9
Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement, Juran Trilogy, PDSA Cycle, 5S, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures-Basic Concepts, Strategy.			
3	STATISTICAL PROCESS CONTROL (SPC)	Total Hrs	9
The tools of quality, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New Management tools.			
4	TQM TOOLS	Total Hrs	9
Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages, Types.			
5	QUALITY SYSTEMS	Total Hrs	9
Need for ISO 9000 Quality Systems, ISO 9000:2000 ISO 14000 Quality Systems – Elements Concepts, Implementation, Documentation, Quality Auditing, – Requirements and Benefits, Non Conformance report.			
Total hours to be taught			45
Text book (s) :			
1	Dale H.Besterfiled, et al., “Total Quality Management”, Pearson Education Asia, 1999. (Indian reprint 2002).		
Reference(s) :			
1	James R.Evans & William M.Lidsay, “The Management and Control of Quality”, (5th Edition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).		
2	Feigenbaum.A.V. “Total Quality Management”, McGraw Hill, 1991.		
3	Jayakumar.V, Total Quality Management-Lakshmi Publications, 2006.		
4	Suburaj, Ramasamy-TMH, 2005.		

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Semester VII								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130702C	EMBEDDED SYSTEMS	3	0	0	3	50	50	100
Objective(s)	To introduce the architecture, programming and interfacing 8051 microcontroller, PIC microcontroller. To introduce the concept of RTOS.							
1	INTRODUCTION TO EMBEDDED HARDWARE				Total Hrs		9	
Gates – Timing diagram – Memory –Memory Architecture – Microprocessors Buses – Direct Memory Access – Interrupts – Built-in functions on the Microprocessor – Conventions used on Schematic – schematic. Interrupts Microprocessor Architecture – Interrupt basics – Shared data Problem – Interrupt latency. 8051 Microcontroller Hardware I/O pins, Ports & Circuits – External Memory – Interfacing to external memory & 8255.								
2	8051 PROGRAMMING AND APPLICATIONS				Total Hrs		9	
8051 instruction set – Addressing modes – Assembly language programming – I/O port programming -Timer and counter programming – Serial Communication – Interrupt programming –8051 Interfacing: LCD, ADC, Sensors, Stepper Motors, Keyboard and DAC.								
3	MICROCHIP PIC MICROCONTROLLER -16F877				Total Hrs		9	
PIC Microcontrollers 16F877 -PIC development tools-CPU Architecture and pipelining-program memory considerations-register file structure and addressing modes-CPU Registers-Instruction set-Loop Time subroutine-Interrupts-Timers-Capture mode-compare mode and PWM mode.								
4	PIC MICROCONTROLLER PERIPHERAL FEATURES				Total Hrs		9	
I/O Port Expansion-Synchronous serial Port (SSP)-Serial Peripheral Interface (SPI)-, I^2C Bus for peripheral chip access- Analog to Digital converter- UART – Baud Rate – Data Handling – Initialization, special features-Serial Programming – Parallel Slave Port.								
5	SOFTWARE DEVELOPMENT & RTOS				Total Hrs		9	
Round Robin, Round robin with Interrupts, Function Queue Scheduling Architecture, Algorithms- Task and Task States, Tasks and Data, Semaphores and Shared Data Operating System services – Message Queues – Timer function – Events – Memory Management, Interrupt Routines in an RTOS environment, Basic design using RTOS.								
Total hours to be taught							45	
Text book (s) :								
1	David E. Simon, “An Embedded Software Primer”, Pearson Education Asia, 2001.							
2	Mohammed Ali Mazidi and Janice Gilli Spil Mazidi, The 8051 microcontroller, Prentice Hall of India							
3	John B Pitman, “Design with PIC Micro controllers”, Pearson Education Asia, fourteenth reprint 2004.							
Reference(s) :								
1	Burns, Alan and Wellings, “Real – Time Systems and Programming Languages”, second edition. Harlow: Addison Wesley – Longman.							
2	Heath Steve, “Embedded Systems Design”, Newnes.							
3	Kenneth J Ayala, The 8051 Microcontroller Architecture Programming and Application, 2^{nd} Edition, Penram International Publishers (India), New Delhi.							
4	Raj kamal ”Embedded System Architecture, Programming and Design”, Second edition ,Tata McGraw-Hill, 2008.							

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Semester VII								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130703C	OPTICAL COMMUNICATION	3	0	0	3	50	50	100
Objective(s)	To learn the basic elements of optical fiber transmission link, fiber modes, configurations and structures. To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors. To learn the design optimization of SM fibers, RI profile and cut-off wave length. To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes and different fiber amplifiers. To learn the fiber optical detectors such as PIN, APD diodes, noise performance in photo detector, receiver operation and configuration. To learn fiber slicing and connectors, noise effects on system performance, operational principles of WDM and Solitons.							
1	INTRODUCTION TO OPTICAL FIBERS				Total Hrs	9		
Evolution of fiber optic system – Element of an Optical Fiber Transmission link – Ray Optics – Optical Fiber Modes and Configurations – Mode theory of Circular Wave guides – Overview of Modes – Key Modal concepts – Linearly Polarized Modes – Single Mode Fibers – Graded Index fiber structure.								
2	SIGNAL DEGRADATION IN OPTICAL FIBERS				Total Hrs	9		
Attenuation – Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides – Information Capacity determination – Group Delay - Material Dispersion, Wave guide Dispersion, Signal distortion in SM fibers – Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers – Mode Coupling – Design Optimization of SM fibers – RI profile and cut – off wavelength.								
3	FIBER OPTICAL SOURCES AND COUPLING				Total Hrs	9		
Direct And indirect Band gap materials – LED structures – Light source materials – Quantum efficiency and LED power, Modulation of a LED, laser Diodes – Modes and Threshold condition – Rate equations – External Quantum efficiency – Resonant frequencies – Laser Diode structures and Radiation Patterns-Temperature effects, Introduction to Quantum laser, Fiber amplifiers – Power Launching and coupling, Lencing schemes, Fiber joints, Fiber splicing.								
4	FIBER OPTICAL RECEIVERS				Total Hrs	9		
PIN and APD diodes – photo detector noise, SNR, Detector Response time, Avalanche Multiplication Noise – Comparison of Photo detectors – Fundamental Receiver Operation – preamplifiers - High impedance, Trans impedance amplifiers, Error Sources – Receiver configuration – Probability of Error – Quantum Limit.								
5	DIGITAL TRANSMISSION SYSTEM				Total Hrs	9		
Point –to-Point links, System considerations – Link Power budget – Rise – time budget – Noise Effects on System Performance-Operational Principles of WDM, Solitons – Erbium-doped Amplifiers. Basic on concepts of SONET/SDH Network.								
Total hours to be taught						45		
Text Book(s):								
1	Gerd Kaiser, “Optical Fiber Communications”, Fourth Edition, Tata McGraw –Hill Publishers, 2008.							
Reference(s):								
1	John. M. Senior, ”Optical Fiber Communications- Principles And Practice”, Prentice-Hall Of India, Second Edition. August 2003							
2	John.Gowar, ”Optical Communication Systems ”, Prentice-Hall Of India. 2001							

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Semester VII										
Course Code	Course Name		Hours / Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130704C	MICROWAVE ENGINEERING		3	1	0	4	50	50	100	
Objective(s)	To study passive microwave components and their S- Parameters, to study Microwave semiconductor devices & applications and to study Microwave sources and amplifiers.									

1.	INTRODUCTION	Total Hrs	12
Microwave Frequencies, Microwave Devices, Microwave Systems, Microwave Units of Measure, Microwave Hybrid Circuits, Waveguide Tees, Magic Tees (Hybrid Trees), Hybrid Rings (Rat-Race Circuits), Waveguide Corners, Bends and Twists, Directional Couplers, Two-Hole Directional Couplers, Introduction to S parameters, properties of S Matrix, relationship between Y-Z & ABCD Parameters with S parameters, S Matrix of a Directional Coupler, Hybrid Couplers, Circulators and Isolators, Microwave Circulators, Microwave Isolators.			
2.	MICROWAVE VACCUM TUBES	Total Hrs	12
Introduction, Klystrons, Reentrant Cavities, Velocity-Modulation Process, Bunching Process, Output Power and Beam Loading, Multicavity Klystron Amplifiers, Beam-Current Density, Output Current Output Power of Two-Cavity Klystron, Output Power of Four-Cavity Klystron, Reflex Klystrons, Velocity Modulation, Power Output and Efficiency, Electronic Admittance, Helix Traveling-Wave Tubes (TWTs), Slow-Wave structures, Amplification Process, Convection Current, Axial Electric Field, Wave Modes, Gain Consideration, MICROWAVE CROSSED-FIELD TUBES: Magnetron Oscillators, Cylindrical Magnetron, Coaxial Magnetron, Tunable Magnetron, Ricke diagram.			
3.	MICROWAVE SOLID STATE DEVICES AND CIRCUITS	Total Hrs	12
Introduction, transit time limitations in transistors, microwave transistors, power frequency limitations, microwave field effect transistors, HEMT, Gunn diodes - Two-Valley Model Theory, Modes of Operation, LSA Diodes, InP Diodes, CdTe Diodes, Microwave Generation and Amplification, Microwave Generation, Microwave Amplification, AVALANCHE TRANSIT-TIME DEVICES: Introduction, Read Diode, Avalanche Multiplication, Carrier Current $I_o(t)$ and External Current $I_e(t)$, Output Power and Quality Factor, IMPATT Diodes, Principles of Operation, Power Output and Efficiency, TRAPATT Diodes, Principles of Operation, Power Output and Efficiency, BARITT Diodes, Principles of Operation, Parametric Amplifiers, Applications.			
4.	STRIP LINES and MONOLITHIC MICROWAVE INTEGRATED CIRCUITS	Total Hrs	12
Introduction, Microstrip Lines, Characteristic Impedance of Microstrip Lines, Losses in Microstrip Lines, Quality Factor Q of Microstrip Lines, Parallel Strip Lines, Distributed Lines, Characteristic Impedance, Attenuation Losses, Coplanar Strip Lines, Shielded Strip Lines, MONOLITHIC MICROWAVE INTEGRATED CIRCUITS: Introduction, Materials, Substrate Materials, Conductor Materials, Dielectric Materials, Resistive Materials, Monolithic Microwave Integrated-Circuit Growth, MMIC Fabrication Techniques, Fabrication Example.			
5.	MICROWAVE MEASUREMENTS	Total Hrs	12
Slotted line VSWR measurement, VSWR through return loss measurements, frequency measurement, power measurement, impedance measurement, insertion loss and attenuation measurements, measurement of cavity Q, dielectric constant measurement of a solid using waveguide.			
Total hours to be taught			60
Text book (s):			
1.	Samuel Y.LIAO : Microwave Devices and Circuits – Prentice Hall of India – 3rd Edition (2003)		
2.	Annapurna Das and Sisir K.Das: Microwave Engineering – Tata McGraw-Hill (2000)		
Reference(s):			
1.	R.E. Collin: Foundations for Microwave Engg. – IEEE Press Second Edition (2002)		
2.	David M.POZAR : Microwave Engg. – John Wiley & Sons – 2nd Edition (2003)		
3.	P.A.RIZZI – Microwave Engg. (Passive ckts) – PHI		

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Semester VII									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130707P	EMBEDDED SYSTEMS LABORATORY	0	0	3	2	50	50	100	
LIST OF EXPERIMENTS									

1. Programs for 8 bit and 16bit Arithmetic operations Using 8051 KEIL IDE.
2. Programs for sorting and searching Using 8051 KEIL IDE.
3. Interfacing ADC and DAC with 8051 microcontroller.
4. Serial and Parallel interface with 8051 microcontroller.
5. Interfacing and Programming of digital clock using timer.
6. Read the key and display the key via ports using PIC microcontroller
7. ADC and DAC Interface using embedded microcontroller.
8. I^2C RTC interface using embedded microcontroller.
9. 4 Seven segment LED display using I^2C based 16 bit Expander.
10. LED and LCD Interface using embedded micro controller.
11. Flash controller programming- Data flash with erase, verify, fusing through ATMEL/INTEL tools
12. Testing RTOS Environment and system programming using KEIL tools

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Semester VII								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130708P	OPTICAL AND MICROWAVE LABORATORY	0	0	3	2	50	50	100
LIST OF EXPERIMENTS								

Experiments pertaining to Fiber optics, Optical Communication and Fiber optic sensors:

1. Numerical aperture determination for fibers and Attenuation Measurement in Fibers.
2. Mode Characteristics of Fibers – SM Fibers.
3. Coupling Fibers to Semi-Conductor Sources – Connectors & Splices.
4. Fiber optic communication links.
5. LED & Photo Diode Characteristics.

Microwave experiments

1. Determination of guide wavelength, frequency.
2. Radiation Pattern of Horn antenna.
3. Power Measurement.
4. Characteristics of Gunn diode Oscillator.
5. Mode characteristics of Reflex Klystron
6. VSWR Measurements – Determination of terminated impedance

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Semester VII									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130709P	PROJECT WORK - PHASE I	0	0	4	2	100	00	100	
Objective(s)	To impart practical knowledge to the students and also to make them to carry out the technical procedures in their project work. To provide an exposure to the students to refer, read and review the research articles, journals and conference proceedings relevant to their project work and placing this as their beginning stage for their final presentation								
Methodology	• A committee is constituted with the project coordinator, project guide and HOD/Senior professor in the department • Three reviews have to be conducted by the committee • Problem should be selected by every batch of students • Students must do a literature survey collecting a minimum of 10 papers related to their work • Report has to be prepared by the students as per the format • Preliminary implementation can be done if possible • Internal evaluation has to be done based on the three reviews for 100 marks								

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Semester VII

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130710P	CAREER COMPETENCY DEVELOPMENT V	0	0	2	0	100	00	100

Objective(s)	i. To encourage the all round development of students by focusing on soft skills. ii.To improve the employability of students.	
1	Company type written test in Aptitude, Written Communication Skills	Hrs
	Software and Core company based questions - Questions from Quantitative Ability, Analytical reasoning, Logical reasoning, Written communication, Programming and Technical Skills. Evaluation I Written Test	6 2
2	Group Discussion	
	Strategies in GD – Team work – Body Language – Mock GDs – Video Samples Evaluation II – Group Discussion	6 2
3	Interview Skills(Technical Interview)	
	Keyword discussions on core subjects -Complex problem solving in programming and core subjects - Mock Technical Interviews Evaluation III Technical Interview	6 2
4	Interview Skills(HR Interview)	
	Kinds of HR Interviews – Corporate culture – Mock Interviews – Video Samples Evaluation IV – HR Interview.	6 2
	Total	32

Reference(s):

1	R.S.Aggarwal , “Quantitative Aptitude”, S.Chand & Company Ltd., New Delhi, Reprint 2007 (Twice) (unit – I)
2	CCD Guide by English Department of KSRCT, 2008 (Unit – I)
3	R.S.Aggarwal , “A Modern Approach to verbal & Non – verbal Reasoning”, S.Chand & Company Ltd, New Delhi, 2008, (unit – I)
4	Company question papers(unit I)
5	Yashavant Kanetkar, “ Let us ‘C’ ”, BPB Publications, New Delhi, 2002 (unit – I)
6	Herbert Schildt, “ The Complete Reference C++ “, TMH, 2003 (unit – I)
7	HR Interview Guide by Training cell (unit IV)

EVALUATION CRITERIA

S.No.	Particular	Test Portion	Marks
1	Evaluation I Written Test	Unit I – Questions from Software and core companies	40
2	Evaluation II	Unit II - Group Discussion	20
3	Evaluation III	Unit III – Technical Interview	20
4	Evaluation IV	Unit IV - HR Interview	20
Total			T = 100

Note :

1. Question papers and keys will be supplied by the training cell for written test for Evaluation I
2. Respective Departments will conduct Evaluation II, III & IV, correct and submit the marks obtained by the students to the Training Cell.
3. All training & Evaluation tests will be conducted on odd Saturdays, Session of 2 periods in FN & Session of 2 periods in AN & Association Session.
4. Each section is divided into groups and conduct Aptitude test, mock group discussions, interviews in every alternate Saturdays.

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
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Semester VIII									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130801C	MOBILE COMMUNICATION	3	1	0	4	50	50	100	
Objective(s)	To study the basic concepts in cellular networks. To study modulation techniques and radio propagation. To understand the different multiple access concepts. To study the different wireless standards.								

1	CELLULAR CONCEPT AND SYSTEM DESIGN FUNDAMENTALS	Total Hrs	9
Introduction to wireless communication: Evolution of mobile communications, mobile radio systems- Examples, trends in cellular radio and personal communications. Cellular Concept: Frequency reuse, channel assignment, hand off, Interference and system capacity, tracking and grade of service, Improving Coverage and capacity in Cellular systems.			
2	MOBILE RADIO PROPAGATION	Total Hrs	9
Free space propagation model, reflection, diffraction, scattering, link budget design, Outdoor Propagation models, Indoor propagation models, Small scale Multipath propagation, Impulse model, Small scale Multipath measurements, parameters of Mobile multipath channels, types of small scale fading, statistical models for multipath fading channels.			
3	MODULATION TECHNIQUES AND EQUALIZATION	Total Hrs	9
Modulation Techniques: Minimum Shift Keying, Gaussion MSK, M-ary QAM, M-ary FSK, Orthogonal Frequency Division Multiplexing, Performance of Digital Modulation in Slow-Flat Fading Channels and Frequency Selective Mobile Channels. Equalization: Survey of Equalization Techniques, Linear Equalization, Non-linear Equalization, Algorithms for Adaptive Equalization. Diversity Techniques, RAKE receiver.			
4	CODING AND MULTIPLE ACCESS TECHNIQUES	Total Hrs	9
Coding: Vocoders, Linear Predictive Coders, Selection of Speech Coders for Mobile Communication, GSM Codec, RS codes for CDPD. Multiple Access Techniques: FDMA, TDMA, CDMA, SDMA, Capacity of Cellular CDMA and SDMA.			
5	WIRELESS SYSTEMS AND STANDARDS	Total Hrs	9
Second Generation and Third Generation Wireless Networks and Standards, WLL, Blue tooth. AMPS, GSM, IS-95 and DECT			
Total hours to be taught			45

Text Book(s) :	
1	T.S.Rappaport, “Wireless Communications: Principles and Practice, Second Edition, Pearson Education/ Prentice Hall of India, Third Indian Reprint 2003.
Reference(s) :	
1	R. Blake, “Wireless Communication Technology”, Thomson Delmar, 2003.
2	W.C.Y.Lee, "Mobile Communications Engineering: Theory and applications, Second Edition, McGraw-Hill International, 1998.
3	Stephen G. Wilson, “Digital Modulation and Coding”, Pearson Education, 2003.

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Semester VIII									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130804P	PROJECT WORK - PHASE II	0	0	20	10	50	50	100	
Objective(s)	To improve the academic and technical skills of the students, choosing the project in one of the technical areas, they have learnt during the course. To make the students learn to work in teams, gain confidence to solve real world problems related to their area, make presentations and manage a project.								
Methodology	• A committee is constituted with the project coordinator, project guide and HOD/Senior professor in the department. • Three reviews have to be conducted by the committee • Each review has to be evaluated for 100 marks. • Attendance is compulsory for all reviews. If a student fails to attend review for some valid reason, one or more chance may be given. • A senior professor from other departments may be included in the committee for final review • The report should be submitted as per the format by the students during the first week of April.								

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Department	Electronics and Communication Engineering	Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
ELECTIVE - I									
Course Code	Course Name	Hours / Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130641E	FUNDAMENTALS OF IT	3	0	0	3	50	50	100	
Objective(s)	To introduce the fundamentals of computer hardware and system software and to introduce basic RDBMS concepts.								

1	COMPUTER ARCHITECTURE AND SYSTEM SOFTWARE	Total Hrs	9
Fundamentals of Computer Architecture – Organization of a Small Computer – Execution of the Instructions – Input/output Devices – Measure of CPU Performance – Addressing modes – System Software – Assemblers – Loaders and linkers – Compilers and interpreters.			
2	OPERATING SYSTEMS AND COMPUTER NETWORKS	Total Hrs	9
Operating system – memory management – Process management – File System Management – File Permissions – New Technology File System – Device Management –Computer Networks – Motivation and need for Computer Networks – Network topology – The OSI model – Important Routing devices – Types of Networks.			
3	RDBMS AND DATABASE DESIGN	Total Hrs	9
Introduction to DBMS – data processing – the database technology – data models – RDBMS – ER modeling concept – Notations – Normalization – Need for Normalization – Process of Normalization – Types of Normal forms.			
4	SQL	Total Hrs	9
SQL – The purpose of SQL – History of SQL – Data types – Statement Types - DDL statements – DML statements – Views – DCL statements – Embedded SQL – Best Practices.			
5	OLTP CONCEPTS	Total Hrs	9
OLTP – Purpose – Transaction – Transaction Systems – Transaction Properties – Requirements for an OLTP System – Locks – Granularity of Locking – Intent Locking – Dead Lock – Time stamping – Security & Recovery Transaction log.			
Total hours to be taught			45
Text book (s) :			
1	Foundation Program Books Vol-1 and Vol-2, Infosys.		
Reference(s)			
1	Andrew S. Tanenbaum, Structured Computer Organization, PHI, 3rd ed., 1991		
2	Silberschatz and Galvin, Operating System Concepts, 4th ed., Addision-Wesley, 1995		
3	Henry F Korth, Abraham Silberschatz, Database System Concept, 2nd ed. McGraw-Hill International editions, 1991		

K.S.Rangasamy College of Technology Autonomous Regulation										**R 2008**
Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
ELECTIVE - I										
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130642E	OPERATING SYSTEMS		3	0	0	3	50	50	100	
Objective(s)	To have an overview of different types of operating systems, thorough knowledge of process management. To know the concepts of I/O and file systems.									
1	OVERVIEW OF OS					Total Hrs		9		
Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication.										
2	PROCESS MANAGEMENT					Total Hrs		9		
Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors.										
3	PROCESS AND STORAGE MANAGEMENT					Total Hrs		9		
System Model – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.										
4	MEMEORY MANAGEMENT					Total Hrs		9		
Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection										
5	FILE SYSTEM					Total Hrs		9		
File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management.- Design principles - Case Study Linux System Kernel Model.										
Total hours to be taught								45		
Text book (s) :										
1	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, Sixth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2003.									
Reference(s) :										
1	Harvey M. Deitel, “Operating Systems”, Second Edition, Pearson Education Pvt. Ltd, 2002.									
2	Andrew S. Tanenbaum, “Modern Operating Systems”, Prentice Hall of India Pvt. Ltd, 2003.									
3	William Stallings, “Operating System”, Prentice Hall of India, 4^{th} Edition, 2003.									

<table>
<tr><td colspan="9">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td>R 2008</td></tr>
<tr><td>Department</td><td colspan="2">Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="4">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="10">ELECTIVE - I</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2" colspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130643E</td><td colspan="2">DSP PROCESSOR ARCHITECTURE AND PROGRAMMING</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="9">Introduction to DSP Processors, Architecture of TMS320C5X and TMS320C3X Processor and introduction about DSP family processors.</td></tr>
<tr><td>1</td><td colspan="4">FUNDAMENTALS OF PROGRAMMABLE DSPs</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">Multiplier and Multiplier accumulator – Modified Bus Structures and Memory access in P-DSPs – Multiple access memory – Multi-port memory – VLIW architecture- Pipelining – Special Addressing modes in P-DSPs – On chip Peripherals.</td></tr>
<tr><td>2</td><td colspan="4">TMS320C5X PROCESSOR</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">Architecture – Assembly language syntax - Addressing modes – Assembly language Instructions - Pipeline structure, Operation – Block Diagram of DSP starter kit – Application Programs for processing real time signals.</td></tr>
<tr><td>3</td><td colspan="4">TMS320C3X PROCESSOR</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">Architecture – Data formats - Addressing modes – Groups of addressing modes- Instruction sets - Operation – Block Diagram of DSP starter kit – Application Programs for processing real time signals – Generating and finding the sum of series, Convolution of two sequences, Filter design.</td></tr>
<tr><td>4</td><td colspan="4">ADSP PROCESSORS</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">Architecture of ADSP-21XX and ADSP-210XX series of DSP processors- Addressing modes and assembly language instructions – Application programs –Filter design, FFT calculation.</td></tr>
<tr><td>5</td><td colspan="4">ADVANCED PROCESSORS</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">Architecture of TMS320C54X: Pipe line operation, Code Composer studio - Architecture of TMS320C6X - Architecture of Motorola DSP563XX – Comparison of the features of DSP family processors.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="3">45</td></tr>
<tr><td colspan="10">Text Book(s) :</td></tr>
<tr><td>1</td><td colspan="9">B.Venkataramani and M.Bhaskar, “Digital Signal Processors – Architecture, Programming and Applications” – Tata McGraw – Hill Publishing Company Limited. New Delhi, 2003.</td></tr>
<tr><td colspan="10">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="9">User guides Texas Instrumentation, Analog Devices, Motorola.</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation										R 2008
Department	Electronics and Communication Engineering		Programme Code & Name				13 : B.E. Electronics and Communication Engineering			
ELECTIVE - I										
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130644E	MULTIMEDIA COMPRESSION TECHNIQUES		3	0	0	3	50	50	100	
Objective(s)	Introduction of Multimedia, To know the concept about Text, Audio, Image and Video compression techniques.									

1	INTRODUCTION	Total Hrs	9
Special features of Multimedia – Graphics and Image Data Representations – Fundamental Concepts in Video and Digital Audio – Storage requirements for multimedia applications -Need for Compression - Taxonomy of compression techniques – Overview of source coding, source models, scalar and vector quantization theory – Evaluation techniques – Error analysis and methodologies			
2	TEXT COMPRESSION	Total Hrs	9
Compaction techniques – Huffmann coding – Adaptive Huffmann Coding – Arithmetic coding – Dictionary techniques – LZW family algorithms			
3	AUDIO COMPRESSION	Total Hrs	9
Introduction Audio compression techniques - μ- Law and A- Law companding- ADCM- Audio compression – MPEG Audio coding - Frequency domain and filtering – sub-band coding – Application to speech coding – G.722 – Application to audio coding – MPEG audio, - CELP Vocoders			
4	IMAGE COMPRESSION	Total Hrs	9
Predictive techniques – DM, PCM, DPCM: Optimal Predictors and Optimal Quantization– Transform Coding – JPEG Standard – Sub-band coding algorithms: Design of Filter banks – Wavelet based Compression: Implementation using filters – JPEG 2000 standards.			
5	VIDEO COMPRESSION	Total Hrs	9
Video compression techniques and standards – MPEG Video Coding I: MPEG – 1 and 2 – MPEG Video Coding II: MPEG – Motion estimation and compensation techniques – H.261 Standard			
Total hours to be taught			45

Text Book(s) :	
1	Khalid Sayood, ”Introduction to Data Compression”, Morgan Kauffman Harcourt, India, 2nd edition.
2	David Salomon,” Data Compression – The complete reference”, Springer Verlag, New Yark, 2nd edition, 2001.
Reference(s) :	
1	Yun Q.Shi, Huifang Sun “Image and Video Compression for Multimedia Engineering” Fundamentals, Algorithms & Standards, CRC press, 2003.
2	Peter Symes “Digital Video Compression”, McGraw Hill Pub., 2004.
3	Mark Nelson “Data compression”, BPB Publishers, New Delhi, 1998.
4	Mark S.Drew, Ze-Nian Li “Fundamentals of Multimedia”, PHI, 1st Edition, 2003.
5	Watkinson,J “ Compression in Video and Audio”, Focal press,London.1995.

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Department	Electronics and Communication Engineering			Programme Code & Name		13 : Electronics and Communication Engineering			
ELECTIVE - I									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130645E	COMPUTER ARCHITECTURE	3	0	0	3	50	50	100	
Objective(s)	To have a through understanding of the basic structure and operation of a digital computer. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division. To study in detail the different types of control and the concept of pipelining, the hierarchical memory system including cache memories and virtual memory. And to study the different ways of communicating with I/O devices and standard I/O interfaces.								
1	BASIC STRUCTURE OF COMPUTERS				Total Hrs	9			
Functional units- Basic Operational Concepts, Bus Structures, Software Performance – Memory locations & addresses – Memory operations – Instruction and instruction sequencing – addressing modes – assembly language – Basic I/O operations – stacks and queues.									
2	ARITHMETIC				Total Hrs	9			
Addition and subtraction of signed numbers – Design of fast adders – multiplication of positive numbers- signed operand multiplication and fast multiplication – Integer division – floating point numbers and operations.									
3	BASIC PROCESSING UNIT				Total Hrs	9			
Fundamental concepts – Execution of a complete Instruction – Multiple bus organization – Hardwired control – microprogrammed control. Pipelining – Basic concepts – data hazards – instruction hazards – influence on Instruction sets – Data path and control consideration – Superscalar operation.									
4	MEMORY SYSTEM				Total Hrs	9			
Basic concepts – semiconductor RAMs, ROMs – Speed, size and cost – cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.									
5	I/O ORGANIZATION				Total Hrs	9			
Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface Circuits – Standard I/O Interfaces (PCI, SCSI, USB).									
Total hours to be taught						45			
Text Book(s) :									
1	Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization” 5th Ed, McGraw Hill, 2002.								
Reference(s) :									
1	M William Stallings, “Computer Organization & Architecture – Designing for Performance”, 6th Ed., Pearson Education, 2003 reprint.								
2	David A.Patterson and John L.Hennessy, “Computer Organization & Design, the hardware / software interface”, 2nd Ed, Morgan Kaufmann, 2002 reprint.								
3	John P.Hayes, “Computer Architecture & Organization”, 3rd Ed, McGraw-Hill, 1998.								

K.S.Rangasamy College of Technology - Autonomous Regulation										R 2008
Department	Electronics and Communication Engineering		Programme Code & Name			13 : Electronics and Communication Engineering				
ELECTIVE - I										
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130646E	TELEVISION AND VIDEO ENGINEERING		3	0	0	3	50	50	100	
Objective(s)	To study about the analysis and synthesis of TV Pictures and various TV camera tubes and concept about Composite Video Signal, Receiver Picture Tubes. To study the principles of Monochrome Television Transmitter and Receiver systems and various color Television systems and the advanced topics in Television systems									

1	FUNDAMENTALS OF TELEVISION	Total Hrs	9
Elements of a TV system - Analysis and synthesis of TV pictures - gross structure - image continuity - canning process - flicker - fine structure - tonal gradation, TV Camera tubes - Image Orthicon, vidicon, plumbicon, silicon diode array vidicon - solid state image scanners.			
2	COMPOSITE VIDEO SIGNAL & MONOCHROME TV TRANSMITTER	Total Hrs	9
Video Signal Components - details of horizontal & vertical sync pulses, functions of vertical pulse train, scanning sequence details. AM - channel bandwidth, VSB Transmission, complete channel bandwidth, FM - channel bandwidth – reception of VSB signals – monochrome TV transmitter.			
3	PICTURE TUBE & MONOCHROME TV RECEIVER	Total Hrs	9
Monochrome picture tube - picture tube characteristics & picture tube control circuits. Monochrome TV receiver – vertical and horizontal deflection circuits – EHT generation – video IF amplifier – Detailed study – video detector – sound channel separation – sync separator circuits.			
4	ESSENTIALS OF COLOR TELEVISION	Total Hrs	9
Color television – compatibility – color perception, Three color theory - luminance – Hue and saturation – color TV camera - values of luminance color difference signals – color TV display tubes – delta gun, precision in line and Trinitron picture tube, color signal transmission – Bandwidth for color signal transmission.			
5	COLOR TV SYSTEMS & ADVANCED TV SYSTEMS	Total Hrs	9
NTSC color TV system – NTSC color Receiver – limitations – PAL color TV system – cancellation of phase errors, PAL coder - PAL D color receiver – merits and demerits – SECAM System – merits and demerits Satellite TV - cable TV – Video disc recording and playback – Digital TV – stereo sound in TV – 3D TV – EDTV – digital equipments for TV studios.			
Total hours to be taught			45

Text book (s) :	
1	R.R.Gulati, “Monochrome and Colour Television”, New Age International Publishers, 2003
2	R.R.Gulati, “Modern Television Practice, Principles, Technology and Servicing”, Second edition, New Age International Publishers, 2004
Reference(s) :	
1.	A.M Dhake, “Television and Video Engineering”, Second edition, TMH, 2003.
2.	S.P.Bali, “Color Television, Theory and Practice”, TMH, 1994.

<table>
<tr><th colspan="7">K.S.Rangasamy College of Technology - Autonomous Regulation</th><th colspan="3">R 2008</th></tr>
<tr><td>Department</td><td colspan="2">Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="4">13:Electronics and Communication Engineering</td></tr>
<tr><td colspan="10">ELECTIVE - I</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2" colspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130647E</td><td colspan="2">ADVANCED MICROPROCESSORS</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="9">To explain the microprocessor architecture and addressing modes of MOTOROLA 68000 microprocessor and Advanced RISC architecture.</td></tr>
<tr><td>1</td><td colspan="5">MICROPROCESSOR ARCHITECTURE</td><td>Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">Instruction set – Data formats – Instruction formats – Addressing modes – Memory hierarchy – register file – Cache – Virtual memory and paging – Segmentation – Pipelining – The instruction pipeline – pipeline hazards – Instruction level parallelism – reduced instruction set – Computer principles – On-chip register files versus cache evaluation.</td></tr>
<tr><td>2</td><td colspan="5">THE MOTOROLA MC68000 FAMILY</td><td>Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">The MC 680X0 architecture-CPU register –Data formats-Addressing modes-Instruction set and assembly Directives-Memory management-Instruction and Data Caches-Exception Processing.</td></tr>
<tr><td>3</td><td colspan="5">ADVANCED RISC MICROPROCESSORS</td><td>Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">RSIC versus CISC-RISC properties-RISC evaluation—Advanced RISC microprocessor-DEC Alpha-The Power PC family-The sun SPARC family-The MIPS Rx000 family.</td></tr>
<tr><td>4</td><td colspan="5">HIGH PERFORMANCE RISC ARCHITECTURE :ARM</td><td>Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">The ARM architecture – Architectural inheritance-ARM Programmer’s model-ARM development tools-ARM assembly language program –Data processing instruction-Data transfer instruction-Control flow instruction.</td></tr>
<tr><td>5</td><td colspan="5">ARM PROCESSOR FAMILY</td><td>Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">ARM organization and implementation – The ARM instruction set - The thumb instruction set – ARM CPU cores.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="3">45</td></tr>
<tr><td colspan="10">Text Book(s):</td></tr>
<tr><td>1</td><td colspan="9">Daniel Tabak , ‘’ Advanced Microprocessors” McGraw Hill.Inc.,Second Edition.</td></tr>
<tr><td>2</td><td colspan="9">Steve Furber , ‘’ ARM System –On –Chip architecture “Addison Wesley , Second Edition.</td></tr>
<tr><td colspan="10">Reference(s):</td></tr>
<tr><td>1</td><td colspan="9">Jonathan.W.Valvano, "Embedded Microcomputer Systems, Real Time Interfacing”, Published by Thomson Brooks/Col, 2002.</td></tr>
<tr><td>2</td><td colspan="9">Raj Kamal, “Embedded Systems. Architecture, Programming and Design”. Tata McGraw Hill. 2003.</td></tr>
<tr><td>3</td><td colspan="9">Badri Ram ,’’Advanced microprocessors and interfacing”, Tata McGraw Hill,2007.</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering		Programme code & Name			13 : B.E. Electronics and Communication Engineering			
ELECTIVES- I									
Course Code	Course Name	Hours / Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130648E	NUMERICAL METHODS	3	0	0	3	50	50	100	
Objective(s)	With the present development of the computer technology, it is necessary to develop efficient algorithms for solving problems in science, engineering and technology. This course gives a complete procedure for solving different kinds of problems occur in engineering numerically. At the end of the course, the students would be acquainted with the basic concepts in numerical methods and their uses.								

1	SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS	Total Hrs	9
Linear interpolation methods (method of false position) - Newton's method - Statement of Fixed Point Theorem - Fixed pointer iteration x=g(x) method - Solution of linear system of Gaussian elimination and Gauss-Jordan methods - Iterative methods: Gauss Jacobi and Gauss – Seidel methods- Inverse of a matrix by Gauss-Jordan method. Eigen value of a matrix by power methods.			
2	INTERPOLATION AND APPROXIMATION	Total Hrs	9
Lagrangian Polynomials - Divided difference - Interpolation with a cubic spline - Newton forward and backward difference formulae.			
3	NUMERICAL DIFFERENTIATION AND INTEGRATION	Total Hrs	9
Derivatives from difference table - Divided difference and finite difference - Numerical integration by Trapezoidal and Simpson's 1/3 and 3/8 rules - Romberg's method - Two and three point Gaussian quadrature formulas - Double integrals using trapezoidal and Simpson's rules.			
4	INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS	Total Hrs	9
Single step Methods: Taylor Series and methods - Euler and Modified Euler methods - Fourth order Runge-Kutta method for solving first and second order equations - Multistep methods –Milne's and Adam's predictor and corrector methods.			
5	APPLICATION OF BOUNDARY VALUE PROBLEMS	Total Hrs	9
Finite difference solution for the second order ordinary differential equations. Finite difference solution for one dimensional heat equation by implict and explict methods - one dimensional wave equation and two dimensional Laplace and Poisson equations.			
Tutorial		Total Hrs	15
Total hours to be taught			60
Text book(s) :			
1.	Gerald, C.F, and Wheatley, P.O, "Applied Numerical Analysis", Sixth Edition, Pearson Education Asia, New Delhi.2002.		
2.	Kandasamy, P.Thilakavthy, K and Gunavathy, K. Numerical Methods. S.Chand and Co. New Delhi, 1999		
Reference(s):			
1.	Balagurusamy, E., "Numerical Methods", Tata McGraw-Hill Pub. Co. Ltd., New Delhi, 1999.		
2.	Venkatraman M.K, "Numerical Methods" National Pub. Company, Chennai, 1991.		
3.	Sankara Rao K., "Numerical Methods for Scientists and Engineers", 2^{nd} Ed. Prentice Hall India, 2004.		
4.	Subramaniam N., "Numerical Methods", SCM Publications, Erode -1.		

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering	Programme Code & Name				13 : B.E. Electronics and Communication Engineering			
Electives - II									
Course Code	Course Name	Hours / Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130751E	IT ESSENTIALS	3	0	0	3	50	50	100	
Objective(s)	To introduce the various essential concepts of IT								
1	ANALYSIS OF ALGORITHMS				Total Hrs	9			
Introduction to AOA – Code Tuning Techniques – Analysis of Algorithms – Analysis of Some Known Algorithms – Algorithmic Techniques – Linear search – Binary search – Bubble sort – Quick sort – Merge sort – Selection sort – Insertion sort – Intractable Problems									
2	OBJECT ORIENTED CONCEPTS				Total Hrs	9			
Introduction to Object oriented concepts – Advanced concepts in Object oriented technology – relationship – Inheritance – Abstract classes – polymorphism – Object oriented design methodology – Recent trends in OO Technology									
3	SYSTEM DEVELOPMENT METHODOLOGY				Total Hrs	9			
System Development Methodology – Evolution of Software – Software Development Models – Requirement Analysis and Design – Software Construction – Software Testing – Software Quality									
4	CLIENT SERVER CONCEPTS				Total Hrs	9			
Client server computing – Back Ground – Client Server Technologies – Middle ware technologies – Introduction to Web Technology									
5	WEB TECHNOLOGIES & USER INTERFACE DESIGN				Total Hrs	9			
The world wide web – Web Applications – Security in Applications – Issues in web based applications – Introduction to User Interface Design (UID) – The elements of UID – UID Tips and techniques – Good Vs Bad User Interface – Reports									
Total hours to be taught						45			
Text book (s) :									
1	Foundation Program Books Vol-2 and Vol-3, Infosys.								
Reference(s)									
1	Brad J Cox, Andrew J.Novobilski, Object – Oriented Programming – An evolutionary approach, Addison – Wesley, 1991.								
2	Alfred V Aho, John E Hopcroft, Jeffrey D Ullman, Design and Analysis of Computer Algorithms, Addison Wesley Publishing Co., 1998.								
3	Rojer Pressman, Software Engineering-A Practitioners approach, McGraw Hill, 5th ed., 2001.								
4	Wilbert O. Galitz, Essential Guide to User Interface Design, John Wiley, 1997.								
5	Alex Berson, Client server Architecture, Mc Grew Hill International, 1994.								
6	Dromey R.G., How to solve it by Computers, PHI, 1994.								

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Elective - II									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130752E	NETWORK SECURITY	3	0	0	3	50	50	100	
Objective(s)	To study the concepts of public-key encryption and hash functions, network security practice, system security, wireless security.								
1	SYMMETRIC CIPHERS				Total Hrs		9		
Overview – Classical encryption techniques – Block ciphers and data encryption standard –Finite fields – Advanced encryption standard – Contemporary symmetric ciphers – Confidentiality using symmetric encryption.									
2	PUBLIC-KEY ENCRYPTION AND HASH FUNCTIONS				Total Hrs		9		
Number theory – Public-key cryptography and RSA – Key management – Diffie-hellman key exchange – Elliptic curve cryptography – Message authentication and hash functions – Hash algorithms – Digital signatures and authentication protocols.									
3	NETWORK SECURITY PRACTICE				Total Hrs		9		
Authentication applications – Kerberos – X.509 authentication service – Electronic mail security – Pretty good privacy – S/MIME – IP security – IP security architecture – Authentication header – Encapsulating security payload – Key management.									
4	SYSTEM SECURITY				Total Hrs		9		
Intruders – Intrusion detection – Password management – Malicious software – Firewalls – Firewall design principles – Trusted systems.									
5	WIRELESS SECURITY				Total Hrs		9		
Wireless LAN security standards – Wireless LAN security factors and issues.									
Total hours to be taught							45		
Text Book(s):									
1	William Stallings, “Cryptography and Network Security – Principles and Practices”, 3rd Edition, Pearson Education, 2003.								
2	Atul Kahate, “Cryptography and Network Security”, 2nd Edition, TMH, 2007.								
Reference(s):									
1	Bruce Schneier, “Applied Cryptography”, 2nd Edition, John Wiley and Sons Inc, 2001.								
2	Stewart S. Miller, “Wi-Fi Security”, TMH, 2003.								
3	Charles B. Pfleeger and Shari Lawrence Pfleeger, “Security in Computing”, 3rd Edition, Pearson Education, 2003.								

K.S.Rangasamy College of Technology Autonomous Regulation								R 2008
Department	Electronics and Communication Engineering	Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Elective - II								

Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130753E	DATABASE MANAGEMENT SYSTEMS	3	0	0	3	50	50	100
Objective(s)	To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram. To make a study of SQL and relational database design. To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.							

1	INTRODUCTION AND CONCEPTUAL MODELING	Total Hrs	9
Introduction to File and Database systems- Database system structure – Data Models – ER model – Relatio Model – Relational Algebra and Calculus.			
2	RELATIONAL MODEL	Total Hrs	9
SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Functional dependencies - Normalization for Relational Databases (up to BCNF).			
3	DATA STORAGE AND INDEXING CONCEPTS	Total Hrs	9
Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File-Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree.			
4	TRANSACTION MANAGEMENT	Total Hrs	9
Transaction Processing – Introduction- Need for Concurrency control- Desirable properties of Transaction-Schedule and Recoverability- Serializability – Concurrency Control – Types of Locks- Two Phase locking-Time stamp based concurrency control – Recovery Techniques – Concepts- Immediate Update- Deferred Update - Shadow Paging.			
5	CURRENT TRENDS	Total Hrs	9
Object Oriented Databases – Need for Complex Data types - OO data Model- Nested relations - Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogenous- Distributed data Storage – XML – Structure of XML- Data- XML Document- Schema- Querying and Transformation. – Data Mining and Data Warehousing.			
Total hours to be taught			45

Text book (s) :	
1.	Abraham Silberschatz, Henry F. Korth and S. Sudarshan - "Database System Concepts", Fifth Edition, McGraw-Hill, 2002.
Reference(s) :	
1.	Ramez Elmasri and Shamkant B. Navathe, "Fundamental Database Systems", Third Edition, Pearson Education, 2003.
2.	Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 2003.
3.	Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- "Database System Implementation"- Pearson Education- 2000.
4.	Peter Rob and Corlos Coronel- "Database System, Design, Implementation and Management", Thompson Learning Course Technology- Fifth edition, 2003.

<table>
<tr><th colspan="9">K.S.Rangasamy College of Technology - Autonomous Regulation</th><th>R 2008</th></tr>
<tr><td colspan="2">Department</td><td colspan="2">Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="3">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="10">Electives - II</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td colspan="2">08130754E</td><td>DIGITAL IMAGE PROCESSING</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="8">To study the image fundamentals and mathematical transforms necessary for image processing. To study the image enhancement techniques and image restoration procedures.</td></tr>
<tr><td>1</td><td colspan="4">DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">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.</td></tr>
<tr><td>2</td><td colspan="4">IMAGE ENHANCEMENT TECHNIQUES</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">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.</td></tr>
<tr><td>3</td><td colspan="4">IMAGE RESTORATION</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">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.</td></tr>
<tr><td>4</td><td colspan="4">IMAGE COMPRESSION</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">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.</td></tr>
<tr><td>5</td><td colspan="4">IMAGE SEGMENTATION AND REPRESENTATION</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="10">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</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="3">45</td></tr>
<tr><td colspan="10">Text Book(s):</td></tr>
<tr><td>1</td><td colspan="9">Rafael C Gonzalez, Richard E Woods 2nd Edition,” Digital Image Processing”- Pearson Education 2003.</td></tr>
<tr><td colspan="10">Reference(s):</td></tr>
<tr><td>1</td><td colspan="9">Rafael C Gonzalez, Richard E Woods 3rd Edition,” Digital Image Processing”- Pearson Education 2006.</td></tr>
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K.S.Rangasamy College of Technology - Autonomous Regulation								**R 2008**		
Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
Electives - II										
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130755E	MEDICAL ELECTRONICS		3	0	0	3	50	50	100	
Objective(s)	To study the methods of recording various biopotentials. To study how to measure biochemical and various physiological information. To understand the working of units which will help to restore normal functioning. To understand the use of radiation for diagnostic and therapy. To understand the need and technique of electrical safety in Hospitals									
1	ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING					Total Hrs	9			
The origin of Bio-potentials; biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, EOG, lead systems and recording methods, typical waveforms and signal characteristics.										
2	BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT					Total Hrs	9			
PH, PO2, PCO2, PHCO3, Electrophoresis, colorimeter, photometer, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Blood cell counters.										
3	ASSIST DEVICES AND BIO-TELEMETRY					Total Hrs	9			
Cardiac pacemakers, DC Defibrillator, Telemetry principles, frequency selection, Bio-telemetry, radio-pill and tele-stimulation										
4	RADIOLOGICAL EQUIPMENTS					Total Hrs	9			
Ionising radiation, Diagnostic x-ray equipments, use of Radio Isotope in diagnosis, Radiation Therapy										
5	RECENT TRENDS IN MEDICAL INSTRUMENTATION					Total Hrs	9			
Thermograph, endoscopy unit, Laser in medicine, Diathermy units, Electrical safety in medical equipment.										
Total hours to be taught							45			
Text Book(s):										
1	Leislie Cromwell, "Biomedical instrumentation and measurements", Prentice Hall of India, New Delhi, 2007.									
Reference(s):										
1	Khandpur, R.S., "Handbook of Biomedical Instrumentation", 2nd edition TATA McGraw-Hill, New Delhi, 2003.									
2	Joseph J.Carr and John M.Brown, "Introduction to Biomedical equipment Technology", 4th edition, Pearson education, 2004.									

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering	Programme Code & Name			13 : Electronics and Communication Engineering				
Elective - II									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130756E	HIGH SPEED NETWORKS	3	0	0	3	50	50	100	
Objective(s)	To give an introduction about ATM and Frame relay. To learn the recent developments in High Speed Networks and to know the techniques involved to support real-time traffic and congestion control, and different levels of quality of service (Q.S) for various applications.								

1	HIGH SPEED NETWORKS	Total Hrs	9
Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL. High Speed LANs: Fast Ethernet, Gigabit Ethernet, Fiber Channel – Wireless LANs: applications, requirements Architecture of 802.11.			
2	CONGESTION AND TRAFFIC MANAGEMENT	Total Hrs	9
Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.			
3	TCP AND ATM CONGESTION CONTROL	Total Hrs	9
TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO back off – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.			
4	INTEGRATED AND DIFFERENTIATED SERVICES	Total Hrs	9
Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services.			
5	PROTOCOLS FOR QOS SUPPORT	Total Hrs	9
RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.			
Total hours to be taught			45
Text Books			
1	William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2002.		
Reference(s) :			
1	Warland & Pravin Varaiya, "HIGH PERFORMANCE COMMUNICATION NETWORKS", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.		
2	Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.		
3	W.Richard Stevens, Gary R.Wright " TCP/IP IIlustrated", Pearson Education, Volume 2, 2004		

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
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Electives- II									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130757E	ELECTROMAGNETIC INTERFERENCE AND ELECTROMAGNETIC COMPATIBILITY IN SYSTEM DESIGN	3	0	0	3	50	50	100	
Objective(s)	To learn about EMI Environment, EMI Coupling Principles and EMI Specification ,Standards and Limits								
1	EMI ENVIRONMENT				Total Hrs	9			
EMI/EMC concepts and definitions, Sources of EMI, conducted and radiated EMI, Transient EMI, Time domain vs vs Frequency domain EMI, Units of measurement parameters, Emission and immunity concepts, ESD.									
2	EMI COUPLING PRINCIPLES				Total Hrs	9			
Conducted, Radiated and Transient Coupling, Common Impedance Ground Coupling, Radiated Common Mode and Ground Loop Coupling, Radiated Differential Mode Coupling, Near Field Cable to Cable Coupling, Power Mains and Power Supply coupling.									
3	EMI/EMC STANDARDS AND MEASUREMENTS				Total Hrs	9			
Civilian standards - FCC,CISPR, IEC,EN, Military standards - MIL STD 461D/462, EMI Test Instruments /Systems, EMI Shielded Chamber, Open Area Test Site, TEM Cell, Sensors/Injectors/Couplers, Test beds for ESD and EFT, Military Test Method and Procedures (462).									
4	EMI CONTROL TECHNIQUES				Total Hrs	9			
Shielding, Filtering, Grounding, Bonding, Isolation Transformer, Transient Suppressors, Cable Routing, Signal Control, Component Selection and Mounting.									
5	EMC DESIGN OF PCBs				Total Hrs	9			
PCB Traces Cross Talk, Impedance Control, Power Distribution Decoupling, Zoning, Motherboard Designs and Propagation Delay Performance Models.									
Total hours to be taught						45			
Reference(s) :									
1	Henry W.Ott, "Noise Reduction Techniques in Electronic Systems", John Wiley and Sons, New York. 1988.								
2	C.R.Paul, “Introduction to Electromagnetic Compatibility” , John Wiley and Sons, Inc, 1992.								
3	V.P.Kodali, "Engineering EMC Principles, Measurements and Technologies", IEEE Press, 1996.								
4	Bernhard Keiser, "Principles of Electromagnetic Compatibility", Artech house, 3rd Ed, 1986.								

K.S.Rangasamy College of Technology - Autonomous Regulation										R 2008
Department	Electronics and Communication Engineering			Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Electives - III										
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks				
		L	T	P	C	CA	ES	Total		
08130761E	MICROCONTROLLER SYSTEM DESIGN AND APPLICATIONS	3	0	0	3	50	50	100		
Objective(s)	To introduce the design architecture, interfacing and application of 8096 microcontroller.									

1	PROGRAMMING FRAME WORK	Total Hrs	9
Assembly language – Instruction set - 8051 CPU structure – Register File - Interfacing application using PWM mode – Simple program and applications.			
2	REAL TIME CONTROL	Total Hrs	9
8096 CPU structure-8096 interrupts structure – Interrupt control-priorities - critical register - Programmable timers - Interrupt Density and Interval Considerations – Real Time Clock.			
3	INPUT/OUTPUT PORTS	Total Hrs	9
High Speed Inputs – Modes - interrupt and status – High speed Outputs - HSO CAM – software Timers – Input ports – Output Ports – I/O control and status registers.			
4	8096 EXPANSION MODES	Total Hrs	9
Bus control – Memory timing - External RAM and ROM expansion – PWM control- A/D interface - Serial Port.			
5	SOFTWARE BLOCKS AND APPLICATIONS	Total Hrs	9
Queues - Tables and Strings – Stack memoirs – Key switch – parsing – Application of 8096 controllers to generate gating signal for converter and inverters.			
Total hours to be taught			45

Text Book(s) :	
1	John B. Peatman, “Design with Micro controllers”, McGraw-Hill international Limited Singapore.
2	Michael Slater, “Microprocessor based design .A comprehensive guide to effective hardware design”, Prentice Hall, New Jersey.

Reference(s) :	
1	Ayala, Kenneth, “The 8051 Microcontroller Upper Saddle River”, New Jersey, Prentice Hall, 2000.
2	James W. Stewart, Kai X. Miao, “8051 Microcontroller, The: Hardware, Software, and Interfacing”, Prentice-Hall Career & Technology.
3	Intel manual on 16 bit embedded controllers, Santa Clara.
4	Muhammad Ali Mazidi, Janice Gillispie mazidi. “The 8051 Microcontroller and Embedded systems”, Person Education, 2004.

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<tr><td colspan="11">Electives - III</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2" colspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="4">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td colspan="2">Total</td></tr>
<tr><td>08130762E</td><td colspan="2">TCP / IP DESIGN AND IMPLEMENTATION</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td colspan="2">100</td></tr>
<tr><td>Objective(s)</td><td colspan="10">To understand the internals of the TCP/IP protocols. To understand how TCP/IP is actually implemented. To understand the interaction among the protocols in a protocol stack.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="11">Internetworking concepts and architectural model- classful Internet address – CIDR-Sub netting and Super netting –ARP- RARP- IP – IP Routing –ICMP – Ipv6</td></tr>
<tr><td>2</td><td colspan="5">TCP</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="11">Services – header – connection establishment and termination- interactive data flow- bulk data flow- timeout and retransmission – persist timer - keepalive timer- futures and performance</td></tr>
<tr><td>3</td><td colspan="5">IP IMPLEMENTATION</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="11">IP global software organization – routing table- routing algorithms-fragmentation and reassembly- error processing (ICMP) –Multicast Processing (IGMP)</td></tr>
<tr><td>4</td><td colspan="5">TCP IMPLEMENTATION</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="11">Data structure and input processing – transmission control blocks- segment format- comparison-finite state machine implementation-Output processing- mutual exclusion-computing the TCP data length</td></tr>
<tr><td>5</td><td colspan="5">TCP IMPLEMENTATION II</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="11">Timers-events and messages- timer process- deleting and inserting timer event- flow control and adaptive retransmission-congestion avoidance and control – urgent data processing and push function.</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td colspan="3">45</td></tr>
<tr><td colspan="11">Text Book(s):</td></tr>
<tr><td>1</td><td colspan="10">Douglas E.Comer – “Internetworking with TCP/IP Principles, Protocols and Architecture”, Vol. 1 & 2 fourth edition, Pearson Education Asia, 2003
(Unit I in Comer Vol. I, Units II, IV & V – Comer Vol. II)</td></tr>
<tr><td>2</td><td colspan="10">W.Richard Stevens “TCP/IP illustrated” Volume 1 Pearson Education, 2003 (Unit II)</td></tr>
<tr><td colspan="11">Reference(s):</td></tr>
<tr><td>1</td><td colspan="10">TCP/IP protocol suite, Forouzan, 2nd edition, TMH, 2003</td></tr>
<tr><td>2</td><td colspan="10">W.Richard Stevens “TCP/IP illustrated” Volume 2 Pearson Education 2003.</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation			R 2008
Department	Electronics and Communication Engineering	Programme Code & Name	13 : B.E. Electronics and Communication Engineering

Electives-III

Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
08130763E	SATELLITE COMMUNICATION	3	0	0	3	50	50	100

Objective(s)	Overview of satellite systems in relation to other terrestrial systems. Study of satellite orbits and launching. Study of earth segment and space segment components. Study of satellite access by various users. Study of DTH and compression standards.

1	OVERVIEW OF SATELLITE SYSTEMS, ORBITS AND LAUNCHING METHODS	Total Hrs	9

Introduction – Frequency Allocations for Satellite Services – Intelsat – U.S.Domsats – Polar Orbiting Satellites – Problems – Kepler's Law –Definitions of Terms for Earth-orbiting Satellites – Orbital Elements – Apogee and Perigee Heights – Orbital Perturbations –Inclined Orbits – Calendars – Universal Time – Julian Dates – Sidereal Time – The Orbital Plane – The Geocentric-Equatorial Coordinate System – Earth Station Referred to the IJK Frame – The Top centric-Horizon Co-ordinate System – The Sub-satellite Point – Predicting Satellite Position.

2	GEOSTATIONARY ORBIT & SPACE SEGMENT	Total Hrs	9

Introduction – Antenna Look Angels – The Polar Mount Antenna – Limits of Visibility – Near Geostationary Orbits – Earth Eclipse of Satellite – Sun Transit Outage – Launching Orbits – Problems – Power Supply – Attitude Control – Spinning Satellite Stabilization – Momentum Wheel Stabilization – Station Keeping – Thermal Control – TT&C Subsystem – Transponders – Wideband Receiver – Input Demultiplexer – Power Amplifier – Antenna Subsystem – Morelos – Anik-E – Advanced Tiros-N Spacecraft

3	EARTH SEGMENT & SPACE LINK	Total Hrs	9

Introduction – Receive-Only Home TV Systems – Master Antenna TV System – Community Antenna TV System – Transmit-Receive Earth Stations – Problems – Equivalent Isotropic Radiated Power – Transmission Losses – Free-Space Transmission – Feeder Losses – Antenna Misalignment Losses – Fixed Atmospheric and Ionospheric Losses – Link Power Budget Equation – System Noise – Carrier-to-Noise Ratio – Uplink – Saturation Flux Density – Input Back Off – The Earth Station HPA – Downlink – Output Back off – Satellite TWTA Output – Effects of Rain –Combined Uplink and Downlink C/N Ratio.

4	SATELLITE ACCESS	Total Hrs	9

Single Access – Preassigned FDMA, Demand-Assigned FDMA, SPADE System. Bandwidth-limited a Power-limited TWT amplifier operation, FDMA downlink analysis. TDMA : Reference Burst; Preamble and Postamble, Carrier recovery, Network synchronization, unique word detection, Traffic Date, Frame Efficiency and Channel capacity, preassigned TDMA, Demand assigned TDMA, Speech Interpolation and Prediction, Downlink analysis for Digital transmission. Companion of uplink Power requirements for FDMA & TDMA. On-board signal Processing for TDMA / FDMA operation, Satellite switched TDMA. Code-Division Multiple Access. Network Layers – TCP Link – Satellite Links and TCP – Enhancing TCP Over Satellite Channels Using Standard Mechanisms – Requests for comments – Split TCP connections – Asymmetric Channels – Proposed Systems.

5	DIRECT BROADCAST SATELLITE SERVICES	Total Hrs	9

Introduction – Orbital Spacings – Power Rating and Number of Transponders – Frequencies and Polarization – Transponder Capacity – Bit Rates for Digital Television – MPEG Compression Standards – Forward Error Correction – Home Receiver Outdoor Unit (ODU) – Home Receiver Indoor Unit (IDU) – Downlink Analysis – Uplink -Problems - Satellite Mobile Services – VSATs – Radarsat – Global Positioning Satellite System – Orbcomm.

Total hours to be taught	45

Text Book(s) :

1	Dennis Roddy, Satellite Communications, McGraw-Hill Publication Third edition 2001

Reference(s) :

1	Timothy Pratt – Charles Bostian & Jeremy Allmuti, Satellite Communications, John Willy & Sons (Asia) Pvt. Ltd. 2004
2	Wilbur L. Pritchars Henri G.Suyder Hond Robert A.Nelson, Satellite Communication Systems Engineering, Pearson Education Ltd., Second edition 2003.
3	M.Richharia : Satellite Communication Systems (Design Principles Macmillan Press Ltd. 2nd Edition 2003.

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<tr><td colspan="10">Electives- III</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td colspan="2" rowspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="2">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES / Total</td></tr>
<tr><td colspan="2">08130764E</td><td colspan="2">ADVANCED DIGITAL SYSTEM DESIGN</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50 / 100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="8">To learn how to design programmable logic circuits, logic synthesis compiler based on VHDL. To determine the types of fault that occur in digital circuits</td></tr>
<tr><td>1</td><td colspan="5">SEQUENTIAL CIRCUIT DESIGN</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="10">Analysis of Clocked Synchronous Sequential Networks (CSSN) - Modeling of CSSN –State Stable Assignment and Reduction – Design of CSSN –ASM Chart – ASM Realization.</td></tr>
<tr><td>2</td><td colspan="5">ASYNCHRONOUS SEQUENTIAL CIRCUIT DESIGN</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="10">Analysis of Asynchronous Sequential Circuit (ASC) – Flow Table Reduction – Races in ASC – State Assignment – Problem and the Transition Table – Design of ASC – Static and Dynamic Hazards – Essential Hazards .</td></tr>
<tr><td>3</td><td colspan="5">FAULT DIAGNOSIS AND TESTABILITY ALGORITHMS</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="10">Fault Table Method – Path Sensitization Method – Boolean Difference Method – Kohavi Algorithm – Tolerance Techniques –Fault in PLA –Built-in Self Test.</td></tr>
<tr><td>4</td><td colspan="5">SYNCHRONOUS DESIGN USING PROGRAMMABLE DEVICES</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="10">Programmable Logic Devices –A Simple GAL & EPROM Architecture - Realization State machine using PLD – FPGA – Xilinx FPGA – Xilinx 2000 - Xilinx 3000.</td></tr>
<tr><td>5</td><td colspan="5">SYSTEM DESIGN USING VHDL</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="10">VHDL Description of Combinational Circuits – Arrays – VHDL Operators –Compilation and Simulation of VHDL Code – Modeling using VHDL – Flip Flops – Registers – Counters – Sequential Machine – Combinational Logic Circuits .</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td colspan="2">45</td></tr>
<tr><td colspan="10">Text book(s)</td></tr>
<tr><td>1</td><td colspan="9">John M Yarbrough “Digital Logic appns. and Design” Thomson Learning, 2001.</td></tr>
<tr><td>2</td><td colspan="9">Nripendra N Biswas “Logic Design Theory” Prentice Hall of India, 2001.</td></tr>
<tr><td>3</td><td colspan="9">Charles H. Roth Jr. “Fundamentals of logic design, 5th edition 2004</td></tr>
<tr><td colspan="10">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="9">Donald G. Givone “Digital principles and Design” Tata McGraw Hill 2002.</td></tr>
<tr><td>2</td><td colspan="9">Charles H. Roth Jr. “”Digital system design Using VHDL” Thomson learning 1998.</td></tr>
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Department	Electronics and Communication Engineering			Programme Code & Name			13 : B.E. Electronics and Communication Engineering		
Electives – III									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130765E	DIGITAL COMMUNICATION RECEIVERS	3	0	0	3	50	50	100	
Objective(s)	Overview of digital communication techniques. To study the receiver performance in AWGN channel. To study the receiver performance in fading channel. To study the different techniques for synchronization. To study the various equalization techniques.								
1	REVIEW OF DIGITAL COMMUNICATION TECHNIQUES			Total Hrs		9			
Base band and band pass communication, signal space representation, linear and nonlinear modulation techniques, and Spectral characteristics of digital modulation									
2	OPTIMUM RECIEVERS FOR AWGM CHANNEL			Total Hrs		9			
Correlation demodulator, matched filter , maximum likelihood sequence detector, optimum receiver for CPM signals,M-ary orthogonal signals, envelope detectors for M-ary and correlated binary signals									
3	RECIEVERS FOR FADING CHANNELS			Total Hrs		9			
Characterization of fading multiple channels, statistical models, slow fading,frquency selective fading,, diversity technique, RAKE demodulator, coded waveform for fading channel									
4	SYNCHRONIZATION TECHNIQUES			Total Hrs		9			
Carrier and signal synchronization, carrier phase estimation-PLL,Decision directed loops, symbol timing estimation, maximum likelihood and non-decision directed timing estimation, joint estimation									
5	ADAPTIVE EQUALIZATION			Total Hrs		9			
Zero forcing algorithm,LMS algortihm,adaptive decision-feedback equalizer and Equalization of Trellis-coded signals.Kalman algorithm, blind equalizers and stochastic gradient algorithm. Echo cancellation									
Total hours to be taught						45			
Text Book(s):									
1	John.G.Proakis, “Digital communication “5th Edition, McGraw-Hill, New York, 2007.								
Reference(s):									
1	Heinrich Meyer, Mare Moeneclacy, Stefan.A.Fechtel, " Digital communication receivers ", Vol I & Vol II, John Wiley, New York, 1997.								
2	E.A.Lee and D.G.Messerschmitt, " Digital communication ", 2nd Edition, Allied Publishers, New Delhi, 1994.								
3	Simon Marvin, " Digital communication over fading channel; An unified approach to performance Analysis ", John Wiley, New York, 2000.								

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering	Programme Code & Name				13 : B.E. Electronics and Communication Engineering			
Electives- III									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130766E	SPEECH AND AUDIO SIGNAL PROCESSING	3	0	0	3	50	50	100	
Objective(s)	Introduction to Analog VLSI and Basic CMOS and BiCMOS Circuit Techniques, Mode Signal Processing and Neural Information Processing and Analog VLSI Interconnects.								

1	MECHANICS OF SPEECH	Total Hrs	9
Speech production mechanism – Nature of Speech signal – Discrete time modeling of Speech production – Representation of Speech signals – Classification of Speech sounds – Phones – Phonemes – Phonetic and Phonemic alphabets – Articulatory features. Music production – Auditory perception – Anatomical pathways from the ear to the perception of sound – Peripheral auditory system – Psycho acoustics.			
2	TIME DOMAIN METHODS FOR SPEECH PROCESSING	Total Hrs	9
Time domain parameters of Speech signal – Methods for extracting the parameters Energy, Average Magnitude – Zero crossing Rate – Silence Discrimination using ZCR and energy – Short Time Auto Correlation Function – Pitch period estimation using Auto Correlation Function.			
3	FREQUENCY DOMAIN METHOD FOR SPEECH PROCESSING	Total Hrs	9
Short Time Fourier analysis – Filter bank analysis – Formant extraction – Pitch Extraction – Analysis by Synthesis- Analysis synthesis systems- Phase vocoder—Channel Vocoder. HOMOMORPHIC SPEECH ANALYSIS: Cepstral analysis of Speech – Formant and Pitch Estimation – Homomorphic Vocoders.			
4	LINEAR PREDICTIVE ANALYSIS OF SPEECH	Total Hrs	9
Formulation of Linear Prediction problem in Time Domain – Basic Principle – Auto correlation method – Covariance method – Solution of LPC equations – Cholesky method – Durbin's Recursive algorithm – lattice formation and solutions – Comparison of different methods – Application of LPC parameters – Pitch detection using LPC parameters – Formant analysis – VELP – CELP.			
5	APPLICATION OF SPEECH & AUDIO SIGNAL PROCESSING	Total Hrs	9
Algorithms: Spectral Estimation, dynamic time warping, hidden Markov model – Music analysis – Pitch Detection – Feature analysis for recognition – Music synthesis – Automatic Speech Recognition – Feature Extraction for ASR – Deterministic sequence recognition – Statistical Sequence recognition – ASR systems – Speaker identification and verification – Voice response system – Speech Synthesis: Text to speech, voice over IP.			
Total hours to be taught			45
Reference(s) :			
1	Ben Gold and Nelson Morgan, Speech and Audio Signal Processing, John Wiley and Sons Inc., Singapore, 2004.		
2	L.R.Rabiner and R.W.Schaffer – Digital Processing of Speech signals – Prentice Hall -1978.		
3	Quatieri – Discrete-time Speech Signal Processing – Prentice Hall – 2001.		
4	J.L.Flanagan – Speech analysis: Synthesis and Perception – 2nd edition – Berlin – 1972.		

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering		Programme code & Name			13 : B.E. Electronics and Communication Engineering			
Electives- III									
Course Code	Course Name	Hours / Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130767E	OPERATIONS RESEARCH	3	0	0	3	50	50	100	
Objective(s)	To study the principles and techniques of operation research and apply these techniques in decision making for work accomplishment								
1	LINEAR PROGRAMMING				Total Hrs		9		
Formulation of LP problem – solution of LP problem by graphical method- simplex method- Duel simplex method-Big-M-method.									
2	TRANSPORTATION PROBLEM				Total Hrs		9		
Northwest corner rule - Vogle's approximation method – least cost method - MODI method - assignment problem - balanced and unbalanced assignment problems – traveling salesman problems.									
3	CPM/ PERT				Total Hrs		9		
Drawing of CPM and PERT networks – finding critical path- project cost control – determining the value of Z – variate in the case of PERT networks – S.D, variances etc.									
4	SEQUENCING AND REPLACEMENT MODELS				Total Hrs		9		
Processing n jobs on 2 machines-processing n jobs on 3 machines – processing n jobs on m machines. Replacement models- individual replacement-group replacement- problems.									
5	GAME THEORY				Total Hrs		9		
Rule of saddle Point determination – rule of dominance – mixed strategy – graphical approach- problems related to the above theoretical aspects. Monte-Carlo technique.									
Total hours to be taught							45		
Text book(s):									
1	V. Sundaresan , K.S. Ganapathy Subramanian , K.Ganesan., "Operations Research" A.R Publications, Chennai. Third Edition (2005).								
2	Kanti Swarup, P.K. Gupta, Man Mohan, "Operations Research" Sultan Chand & Sons, New Delhi. Twelfth Edition (2004) ISBN: 81-8054-226-2.								
Reference(s) :									
1	J.Heizer, B.Render, "Production and Operations Management", Prentice Hall (1993), ISBN: 0-205-14048-3.								
2	Hamdy A. Taha, "An Introduction to Operations Research" Maxmillan Publishing Company, New York. Fifth Edition, 1996.								
3	Fredrick S. Hiller and Gerald J Liberman "Introduction to Operations Research" McGraw- Hill, Industrial Engineering Series, International Edition , 1995.								

<table>
<tr><td colspan="5">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="4">R 2008</td></tr>
<tr><td>Department</td><td>Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="4">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="9">Electives - IV</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130871E</td><td>NEURAL NETWORKS AND APPLICATIONS</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">Students will get an introduction about artificial neural networks and its types, students will be provided with an up to date developments in artificial neural networks. Enable the students to know techniques involved to support pattern recognitions & feature extraction.</td></tr>
<tr><td>1</td><td colspan="3">INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Neuro-physiology- General Processing Element – ADALINE – LMS learning rule – MADALINE – MR2 training algorithm.</td></tr>
<tr><td>2</td><td colspan="3">BPN AND BAM</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Back Propagation Network – update of output and hidden layer weights – application of BPN – associative memory – Bi-Associative Memory – Hopfield memory – traveling sales man problem.</td></tr>
<tr><td>3</td><td colspan="3">SIMULATED ANNEALING AND CPN</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Annealing, Boltzmann machine – learning – application – Counter Propagation Network – architecture – training – Applications.</td></tr>
<tr><td>4</td><td colspan="3">SOM AND ART</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Self organizing map- learning algorithm – feature map classifier – applications – architecture of Adaptive Resonance Theory – pattern matching in ART network.</td></tr>
<tr><td>5</td><td colspan="3">NEOCOGNITRON</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Architecture of Neocognitron – Data processing and performance of Neocognitron - architecture of spatio – temporal networks for speech recognition.</td></tr>
<tr><td colspan="6">Total hours to be taught</td><td colspan="3">45</td></tr>
<tr><td colspan="9">Text Book(s):</td></tr>
<tr><td>1</td><td colspan="8">J.A. Freeman and B.M.Skapura, “Neural Networks, Algorithms Applications and Programming Techniques”, Person Education, 2006.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Laurene Fausett, “Fundamentals of Neural Networks: Architecture, Algorithms and Application”, Person Education, 2009.</td></tr>
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<tr><td colspan="9">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="2">R 2008</td></tr>
<tr><td>Department</td><td colspan="2">Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="5">13 : B.E. Electronics and Communication Engineering</td></tr>
<tr><td colspan="11">Electives -IV</td></tr>
<tr><td rowspan="2" colspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="4">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td colspan="2">Total</td></tr>
<tr><td colspan="2">08130872E</td><td>TELECOMMUNICATION SWITCHING AND NETWORKS</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td colspan="2">100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="9">To introduce the concepts of Frequency and Time division multiplexing. To introduce digital multiplexing and digital hierarchy namely SONET / SDH. To introduce the concepts of space switching, time switching and combination switching, example of a switch namely No.4 ESS Toll switch. To introduce the need for network synchronization and study synchronization issues. To outline network control and management issues. To study the enhanced local loop systems in digital environment. To introduce ISDN, DSL / ADSL, and fiber optic systems in subscriber loop. To introduce statistical modeling of telephone traffic.</td></tr>
<tr><td>1</td><td colspan="4">MULTIPLEXING</td><td colspan="3">Total Hrs</td><td colspan="3">09</td></tr>
<tr><td colspan="11">Transmission Systems, FDM Multiplexing and modulation, Time Division Multiplexing, Digital Transmission and Multiplexing: Pulse Transmission, Line Coding, Binary N-Zero Substitution, Digital Biphase, Differential Encoding, Time Division Multiplexing, Time Division Multiplex Loops and Rings.
SONET/SDH: SONET Multiplexing Overview, SONET Frame Formats SONET Operations, Administration and Maintenance, Payload Framing and Frequency Justification, Virtual Tributaries, DS3 Payload Mapping, E4 Payload Mapping, SONET Optical Standards, SONET Networks. SONET Rings: Unidirectional Path-Switched Ring, Bidirectional Line-Switched Ring.</td></tr>
<tr><td>2</td><td colspan="4">DIGITAL SWITCHING</td><td colspan="3">Total Hrs</td><td colspan="3">09</td></tr>
<tr><td colspan="11">Switching Functions, Space Division Switching, Time Division Switching, two-dimensional Switching: STS Switching, TST Switching, No.4 ESS Toll Switch, Digital Cross-Connect Systems, Digital Switching in an Analog Environment. Elements of SSN07 signaling.</td></tr>
<tr><td>3</td><td colspan="4">NETWORK SYNCHRONIZATION CONTROL AND MANAGEMENT</td><td colspan="3">Total Hrs</td><td colspan="3">09</td></tr>
<tr><td colspan="11">Timing: Timing Recovery: Phase-Locked Loop, Clock Instability, Jitter Measurements, Systematic Jitter. Timing Inaccuracies: Slips, Asynchronous Multiplexing, Network Synchronization, U.S. Network Synchronization, Network Control, Network Management.</td></tr>
<tr><td>4</td><td colspan="4">DIGITAL SUBSCRIBER ACCESS</td><td colspan="3">Total Hrs</td><td colspan="3">09</td></tr>
<tr><td colspan="11">ISDN: ISDN Basic Rate Access Architecture, ISDN U Interface, ISDN D Channel Protocol. High-Data-Rate Digital Subscriber Loops: Asymmetric Digital Subscriber Line, VDSL. Digital Loop Carrier Systems: Universal Digital Loop Carrier Systems, Integrated Digital Loop Carrier Systems, Next-Generation Digital Loop Carrier, Fiber in the Loop, Hybrid Fiber Coax Systems, Voice band Modems: PCM Modems, Local Microwave Distribution Service, Digital Satellite Services.</td></tr>
<tr><td>5</td><td colspan="4">TRAFFIC ANALYSIS</td><td colspan="3">Total Hrs</td><td colspan="3">09</td></tr>
<tr><td colspan="11">Traffic Characterization: Arrival Distributions, Holding Time Distributions, Loss Systems, Network Blocking Probabilities: End-to-End Blocking Probabilities, Overflow Traffic, Delay Systems: Exponential service Times, Constant Service Times, Finite Queues.</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td colspan="3">45</td></tr>
<tr><td colspan="11">Text Book(s):</td></tr>
<tr><td>1</td><td colspan="10">Bellamy John, “Digital Telephony”, John Wily & Sons, Inc. 3rd edn. 2000.</td></tr>
<tr><td colspan="11">Reference(s):</td></tr>
<tr><td>1</td><td colspan="10">Viswanathan. T., “Telecommunication Switching System and Networks”, Prentice Hall of India Ltd., 1994.</td></tr>
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<tr><td colspan="5">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="4">R 2008</td></tr>
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<tr><td colspan="9">Electives -IV</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130873E</td><td>REAL TIME OPERATING SYSTEM</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">To introduce the basic of OS Structure consists of Kernal and other service function.</td></tr>
<tr><td>1</td><td colspan="3">REVIEW OF OPERATING SYSTEMS</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Basic Principles – System Calls – Files – Processes – Design and Implementation of processes – Communication between processes – Operating System structures.</td></tr>
<tr><td>2</td><td colspan="3">DISTRIBUTED OPERATING SYSTEMS</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Topology – Network types – Communication – RPC – Client server model – Distributed file system – Design strategies.</td></tr>
<tr><td>3</td><td colspan="3">REAL TIME MODELS AND LANGUAGES</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Event Based – Process Based and Graph based Models – Petrinet Models – Real Time Languages – RTOS Tasks – RT scheduling - Interrupt processing – Synchronization – Control Blocks – Memory Requirements.</td></tr>
<tr><td>4</td><td colspan="3">REAL TIME KERNEL</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Principles – Design issues – Polled Loop Systems – RTOS Porting to a Target – Comparison and study of various RTOS like QNX, VX works, PSOS, C Executive – Case studies.</td></tr>
<tr><td>5</td><td colspan="3">RTOS APPLICATION DOMAINS</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">RTOS for Image Processing – Embedded RTOS for voice over IP – RTOS for fault Tolerant Applications – RTOS for Control Systems.</td></tr>
<tr><td colspan="6">Total hours to be taught</td><td colspan="3">45</td></tr>
<tr><td colspan="9">Text Book(s) :</td></tr>
<tr><td>1</td><td colspan="8">Herma K., “Real Time Systems – Design for distributed Embedded Applications”, Kluwer Academic, 2003.</td></tr>
<tr><td>2</td><td colspan="8">Charles Crowley, “Operating Systems-A Design Oriented approach” McGraw Hill 2003.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">Krishna C.M., Kang, Shin G., “Real Time Systems”, McGraw Hill, 2004.</td></tr>
<tr><td>2</td><td colspan="8">Raymond J.A.Bhur, Donald L.Bailey, “An Introduction to Real Time Systems”, PHI 2001.</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation										R 2008
Department	Electronics & Communication Engineering			Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Electives - IV										
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks				
		L	T	P	C	CA	ES	Total		
08130874E	BROAD BAND NETWORKS	3	0	0	3	50	50	100		
Objective(s)	To study about ATM networks, switching and routing.									

1	INTRODUCTION TO B-ISDN	Total Hrs	9
B-ISDN, B-ISDN services. Protocol reference model. Reference configurations, Issues in B-ISDN. Network evolution through ISDN to B-ISDN, asynchronous TDM, congestion control issues.			
2	ASYNCHRONOUS TRANSFER MODE	Total Hrs	9
Transfer modes; Circuit switched networks, message switching, and packet switching. ATM cell header fields. ATM protocol reference model. The human noise and ATM. Source Characterization in networks: CBR services. VBR services. Quality of service metrics in ATM networks. Traffic Management in ATM networks. Characteristics of ATM networks. Resource provisioning. Call admission control. Traffic shaping. Traffic policing. Selective discarding. Reactive congestion control mechanisms.			
3	ROUTING	Total Hrs	9
Routing in current networks. Routing in ATM networks. Routing methodologies. Routing modes, Transport layer.			
4	ATM SWITCHING	Total Hrs	9
Shared medium architectures. Shared memory architectures, Space division architecture Performance analysis of ATM architectures.			
5	NETWORK ARCHITECTURES FOR HIGH SPEED LANS AND MANS	Total Hrs	9
FDDI, FDDI-II IEEE 802.6; topology, protocol, architecture, DQDB layer, distributed queue access protocol. SMDS and frame relay services.			
Total hours to be taught			45
Text Book(s):			
1	W.Stallings, “Local and Metropolitan Area Networks”, 5th Edition, Prentice hall ,		
2	W. Stallings, “ISDN and Broadband ISDN With Frame Relay and ATM”, 4th Edition, Prentice hall, 1998		
Reference(s):			
3	R.O. Onvural, “Asynchronous Transfer Mode Networks: Performance Issues”, 2nd Edition , Artech House, 1995		
4	M.Schwartz, “Broadband Integrated Networks”, Prentice hall , 1996		

K.S.Rangasamy College of Technology - Autonomous Regulation										**R 2008**
Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering				
Electives- V										
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks			
			L	T	P	C	CA	ES	Total	
08130881E	ASIC DESIGN		3	0	0	3	50	50	100	
Objective(s)	To Know about the hardware and software which are involved in an application specific integrated circuits.And to know how to design an application specific integrated circuits for a specific application.									
1	INTRODUCTION TO ASICS, CMOS LOGIC AND ASIC LIBRARY DESIGN					Total Hrs		9		
Types of ASICS - CMOS Design rules - Combinational Logic Cell – Sequential logic cell - Data path logic cell - Transistors as Resistors - Logical effort –Library cell design - Library architecture.										
2	PROGRAMMABLE ASICS, PROGRAMMABLE ASIC LOGIC CELLS AND PROGRAMMABLE ASIC I/O CELLS					Total Hrs		9		
Anti fuse - static RAM - EPROM and EEPROM technology - PREP benchmarks - Actel ACT - Xilinx LCA –Altera FLEX - Altera MAX DC & AC inputs and outputs - Clock & Power inputs - Xilinx I/O blocks.										
3	PROGRAMMABLE ASIC INTERCONNECT, PROGRAMMABLE ASIC DESIGN SOFTWARE AND LOW LEVEL DESIGN ENTRY					Total Hrs		9		
Actel ACT -Xilinx LCA - Xilinx EPLD - Altera MAX 5000 and 7000 - Altera MAX 9000 - Altera FLEX – Design systems - Logic Synthesis - Half gate ASIC -Schematic entry - Low level design language - PLA tools -EDIF- CFI design representation.										
4	LOGIC SYNTHESIS, SIMULATION AND TESTING					Total Hrs		9		
VHDL and logic synthesis - types of simulation -boundary scan test - fault simulation - automatic test pattern generation.										
5	ASIC CONSTRUCTION,FLOOR PLANNING, PLACEMENT AND ROUTING					Total Hrs		9		
System partition - FPGA partitioning - partitioning methods - floor planning - placement - physical design flow global routing - detailed routing - special routing - circuit extraction - DRC.										
Total hours to be taught								45		
Text Book										
1	M.J.S .Smith, "Application Specific Integrated Circuits, Addison -Wesley Longman Inc., 1997.									
Reference(s) :										
1	Farzad Nekoogar and Faranak Nekoogar, From ASICs to SOCs: A Practical Approach, Prentice Hall PTR, 2003.									
2	Wayne Wolf, FPGA-Based System Design, Prentice Hall PTR, 2004.									
3	R. Rajsuman, System-on-a-Chip Design and Test. Santa Clara, CA: Artech House Publishers, 2000.									

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Electives - V										
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks				
		L	T	P	C	CA	ES	Total		
08130882E	INTERNET PROGRAMMING	3	0	0	3	50	50	100		
Objective(s)	To study the concept of dynamic HTML, JavaScript, XML, PERL, CGI AND PHP.									
1	INTRODUCTION				Total Hrs	9				
Introduction to the Internet and World Wide Web - World Wide Web Consortium (W3C) - History of the Internet History of the World Wide Web - History of SGML -*XML* Introduction to HyperText Markup Language - Editing HTML - Common Elements – Headers - Linking - Images - Unordered Lists – Nested and Ordered Lists - HTML Tables-Basic HTML Forms										
2	DYNAMIC HTML				Total Hrs	9				
Dynamic HTML Object Model and Collections, Event Model, Filters and Transitions, Data Binding with Tabular Data Control, Dynamic HTML-Structured Graphics ActiveX Controls, Dynamic HTML-Path, Sequencer and Sprite ActiveX Controls.										
3	JAVASCRIPT				Total Hrs	9				
JavaScript, Introduction to Scripting, Control Statements, Functions, Arrays, Objects.										
4	XML				Total Hrs	9				
Creating Markup with XML -Parsers and Well-formed XML Documents -Parsing an XML Document with msxml - Document Type Definition (DTD) - Document Type Declaration - Element Type Declarations - Attribute Declarations - Document Object Model - DOM Implementations - – DOM Components - path - XSL: Extensible Stylesheet Language Transformations (XSLT)										
5	PERL, CGI AND PHP				Total Hrs	9				
Perl - String Processing and Regular Expressions - Form Processing and Business Logic - Server-Side Includes - Verifying a Username and Password - Using DBI to Connect to a Database -PHP – form Processing and Business Logic --Connecting to a Database - Dynamic Content in PHP										
Total hours to be taught						45				
Text Book(s):										
1	Deitel H M , Deitel P J and Goldberg A B, Internet & World Wide Web How to Program, Prentice Hall of India -3rd Edition -2007									
Reference(s):										
1	Deitel & Deitel XML How to Program, Pearson Education,2001									
2	Negrino and Smith Javascript for the World Wide Web, 5th Edition, Peachpit Press 2003.									

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering		Programme Code & Name			13 : B.E. Electronics and Communication Engineering			
Electives – V									
Course Code	Course Name		Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
08130883E	WIRELESS NETWORK TECHNOLOGIES		3	0	0	3	50	50	100
Objective(s)	To study physical and MAC layer alternatives, to study wireless network planning and operation and to study wireless WAN, LAN & WPAN ANDGEOLOCATION systems.								
1	PHYSICAL AND WIRELESS MAC LAYER ALTERNATIVES					Total Hrs	9		
Wired transmission techniques: Design of wireless modems – Power efficiency – Out of band radiation – Applied wireless transmission techniques – Short distance base band transmission – UWB pulse transmission – Broad modems for higher speeds – diversity and smart receiving techniques – Random access for data oriented networks – Integration of voice and data traffic.									
2	WIRELESS NETWORK PLANNING AND OPERATION					Total Hrs	9		
Wireless networks topologies – Cellular topology – Cell fundamentals signal to interference ratio calculation – Capacity expansion techniques –Cell splitting – Use of directional antennas for cell sectoring – Micro cell method – Overload cells – Channels allocation techniques and capacity expansion FCA – Channel borrowing techniques – DCA – Mobility management – Radio resources and power management securities in wireless networks.									
3	WIRELESS WAN					Total Hrs	9		
Mechanism to support a mobile environment – Communication in the infrastructure – IS-95 CDMA forward channel – IS-95 CDMA reverse channel – Packet and frame formats in IS-95, IMT-2000 – Forward channel in W-CDMA and CDMA 2000 – Reverse channels in W-CDMA and CDMA-2000 – GPRS and higher data rates – Short Messaging Service in GPRS mobile application protocols.									
4	WIRELESS LAN					Total Hrs	9		
Historical overviews of the LAN industry – Evolution of the WLAN industry – Wireless home networking – IEEE 802.11 – The PHY layer – MAC layer – Wireless ATM – HYPER LAN – HYPER LAN-2.									
5	WPAN ANDGEOLOCATION SYSTEMS					Total Hrs	9		
IEEE 802.15 WPAN – Home RF – Bluetooth – Interface between bluetooth and 802.11 – Wireless geolocation technologies for wireless geolocation – Geolocation standards for E.911 service.									
Total hours to be taught							45		
Text Book(s):									
1	Kaveh Pahlavan and Prashant Krishnamoorthy., “Principles of Wireless Networks, – A United Approach”, Pearson Education, 2002.								
2	Jochen Schiller., “Mobile Communications”, Person Education, 2nd Edition, 2003.								
Reference(s):									
1	Wang, X. and Poor, H.V., “Wireless Communication Systems”, Pearson Education, 2004.								
2	Mallick, M., “Mobile and Wireless Design Essentials”, Wiley Publishing Inc, 2003.								
3	Nicopolitidis, P., Obaidat, M.S., Papadimitria, G.I. and Pomportsis, A.S., “Wireless Networks”, John Wiley and Sons, 2003.								

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<tr><td colspan="9">Electives-V</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130884E</td><td>RADAR AND NAVIGATIONAL AIDS</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">To derive and discuss the range equation and the nature of detection. To apply Doppler principle to radars and hence detect moving targets, cluster, also to understand tracking radars. To refresh principles of antennas and propagation as related to radars, also study of transmitters and receivers. To understand principles of navigation, in addition to approach and landing aids as related to navigation. To under stand navigation of ships from share to share.</td></tr>
<tr><td>1</td><td colspan="3">INTRODUCTION TO RADAR</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Basic radar – The simple form of the radar equation – Radar block diagram – Radar frequencies – Applications of radar – The origins of radar. The Radar Equation: Introduction – Detection of signals in noise – Receiver noise and the signalto- noise ratio – Probability density functions – Probabilities of detection and false alarm – Integration of radar pulses – Radar cross section of targets – Radar cross section fluctuations – Transmitter power – Pulse repetition frequency – Antenna parameters – System losses – Other radar equation considerations.</td></tr>
<tr><td>2</td><td colspan="3">MTI AND PULSE DOPPLER RADAR</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Introduction to doppler and MTI radar – Delay-line cancellers – Staggered pulse repetition frequencies – Doppler filter banks – Digital MTI processing – Moving target detector – Limitations to MTI performance – MTI from a moving platform (AMIT) – Pulse doppler radar – Other Doppler radar topics – Tracking with radar – Monopulse tracking – Conical scan and sequential lobing – Limitations to tracking accuracy – Low-angle tracking – Tracking in range – Other tracking radar topics – Comparison of trackers – Automatic tracking with surveillance radars (ADT).</td></tr>
<tr><td>3</td><td colspan="3">DETECTION OF SIGNALS IN NOISE</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Introduction – Matched – Filter receiver – Detection criteria – Detectors – Automatic detector – Integrators – Constant – False – Alarm rate receivers – The radar operator – Signal management – Propagation radar waves – Atmospheric refraction – Standard propagation – Nonstandard propagation – The radar antenna – Reflector antennas – Electronically steered phased array antennas – Phase shifters – Frequency – Scan arrays. Radar Transmitters – Radar Receivers.</td></tr>
<tr><td>4</td><td colspan="3">RADIO DIRECTION FINDING</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Introduction -The loop antenna – Loop input circuits – An aural null direction finder – The goniometer – Errors in direction finding –Automatic direction finders. Radio Ranges – The LF/MF four course radio range – VHF omni directional range (VOR) – VOR receiving equipment – Range and accuracy of VOR – Recent developments. Hyperbolic Systems of Navigation (Loran and Decca) – Loran-A equipment – Range and precision of standard loran – Loran-C – The decca navigation system – Decca receivers – Range and accuracy of decca – The omega system</td></tr>
<tr><td>5</td><td colspan="3">DME AND TACAN</td><td colspan="2">Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Introduction – Distance measuring equipment – Operation of DME – TACAN –Instrument landing Aids – Ground controlled approach system– Microwave Landing System (MLS)- Doppler Navigation – Inertial Navigation – Satellite Navigation System – The transit system – Navstar Global Positioning System (GPS).</td></tr>
<tr><td colspan="6">Total hours to be taught</td><td colspan="3">45</td></tr>
<tr><td colspan="9">Text Book(s) :</td></tr>
<tr><td>1</td><td colspan="8">Merrill I. Skolnik, “Introduction to Radar Systems”, 3rd Edition, TMH, 2003.</td></tr>
<tr><td>2</td><td colspan="8">Dr.A.K.Sen and Dr.A.B.Bhattacharya “Rader systems and Radio Aids to Navigation” 5 edition, 2002, Khanna Publisher.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">Peyton Z. Peebles, “Radar Principles”, John Wiley, 2004.</td></tr>
<tr><td>2</td><td colspan="8">Toomay, J.C., “Principles of Radar”, 2nd Edition, PHI, 2004.</td></tr>
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<tr><td colspan="5">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="3">R 2008</td></tr>
<tr><td>Department</td><td>Electronics and Communication Engineering</td><td colspan="3">Programme Code & Name</td><td colspan="3">13:Electronics and Communication Engineering</td></tr>
<tr><td colspan="8">Electives - V</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/ Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>08130885E</td><td>COMPUTER HARDWARE AND INTERFACING</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">To study the details about CPU and MEMORY, to discuss motherboards, storage devices and bus architecture.</td></tr>
<tr><td>1</td><td colspan="4">CPU AND MEMORY</td><td>Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">CPU essentials – processor modes – modern CPU concepts – Architectural performance features – the Intel's CPU – CPU over clocking – over clocking requirements – over clocking the system – over clocking the Intel processors – Essential memory concepts – memory organizations – memory packages – modules – logical memory organizations – memory considerations – memory types – memory techniques – selecting and installing memory.</td></tr>
<tr><td>2</td><td colspan="4">MOTHERBOARDS</td><td>Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Active motherboards – sockets and slots – Intel D850GB – Pentium4 mother board – expansion slots – form factor – upgrading a mother board – chipsets – north bridge – south bridge – CMOS – CMOS optimization tactics – configuring the standard CMOS setup – motherboard BIOS – POST – BIOS features – BIOS and Boot sequences – BIOS shortcomings and compatibility issues – power supplies and power management – concepts of switching regulation–potential power problems–power management.</td></tr>
<tr><td>3</td><td colspan="4">STORAGE DEVICES</td><td>Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">The floppy drive – magnetic storage – magnetic recording principles – data and disk organization – floppy drive – hard drive – data organization and hard drive – sector layout – IDE drive standard and features – Hard drive electronics – CD-ROM drive – construction – CDROM electronics – DVD-ROM – DVD media – DVD drive and decoder</td></tr>
<tr><td>4</td><td colspan="4">I/O PERIPHERALS</td><td>Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Parallel port – signals and timing diagram – IEEE1284 modes – asynchronous communication - serial port signals – video adapters – graphic accelerators – 3D graphics accelerator issues – DirectX – mice – modems – keyboards – sound boards – audio bench marks</td></tr>
<tr><td>5</td><td colspan="4">BUS ARCHITECTURE</td><td>Total Hrs</td><td colspan="3">9</td></tr>
<tr><td colspan="9">Buses – Industry standard architecture (ISA), peripheral component Interconnect (PCI) – Accelerated Graphics port (AGP) – plug-and-play devices – SCSI concepts – USB architecture</td></tr>
<tr><td colspan="5">Total hours to be taught</td><td colspan="4">45</td></tr>
<tr><td colspan="9">Text Book(s):</td></tr>
<tr><td>1</td><td colspan="8">Stephen J.Bigelow, “Trouble Shooting, maintaining and Repairing PCs”, Tata McGraw-Hill, New Delhi, 2001.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Craig Zacker & John Rourke, “The complete reference:PC hardware”, Tata McGraw-Hill, New Delhi, 2001</td></tr>
<tr><td>2</td><td colspan="8">Mike Meyers, “Introduction to PC Hardware and Trouble shooting”, Tata McGraw-Hill, New Delhi, 2003</td></tr>
<tr><td>3</td><td colspan="8">B.Govindarajulu, “IBM PC and Clones hardware trouble shooting and maintenance”, Tata McGraw-Hill, New Delhi, 2002</td></tr>
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K.S.Rangasamy College of Technology - Autonomous Regulation									R 2008
Department	Electronics and Communication Engineering			Programme Code & Name		13 : B.E. Electronics and Communication Engineering			
Electives- V									
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
08130886E	MEDICAL IMAGING	3	0	0	3	50	50	100	
Objective(s)	Students will get an introduction about Bio-Medical Imaging Techniques and its types. It will be provided with an image visualization concepts.It also enable the students to know the segmentation Technique in image processing								

1	INTRODUCTION	Total Hrs	9
Introduction to imaging modalities-Image quality - X-rays in Diagnostic imaging-X-ray production-X-ray interactions-X-ray spectra-X-ray dosimetry-X-ray detection-radiography-mammography-fluoroscopy. Computed tomography systems- Scanner design-reconstruction techniques-image quality artifacts-multislice imaging-scanner performance.			
2	MAGNETIC RESONANCE IMAGING	Total Hrs	9
Basic principles of nuclear magnetic resonance-Image creation- Slice selection, Frequency encoding, Phase Encoding, pulse sequence, Image characteristics and artifacts, Hardware and software components.			
3	ULTRASOUND IMAGING	Total Hrs	9
The wave equation-Impedance, Power and reflection-Acoustic properties of Biological tissues-Transducers, beam patterns and resolution-Diagnostic imaging modes –Doppler principles.			
4	SEGMENTATION	Total Hrs	9
Image preprocessing-Thersholding-Edge based techniques-Region based segmentation-Classification deformable models-Image Registration-Geometrical Transformations-Point based methods-Surface based methods-Intensity based methods			
5	3D VISUALIZATION	Total Hrs	9
Pre processing-Scene-based visualization-object based visualization-Manipulation. Medical Applications and Systems– Diagnostics-Therapeutics- Interventions.			
Total hours to be taught			45

Reference(s) :

1	Isaac Bankman, I. N. Bankman , Handbook of Medical Imaging: Processing and Analysis (Biomedical Engineering),Academic Press,2000.
2	K.Krish Shung,Micheal B. Smith, Benjamin Tsui, Principles of Medical Imaging, Academic Press Inc; London 1992.
3	Jacob Beutel (Editor), M. Sonka (Editor), Handbook of Medical Imaging, Volume 2. Medical Image Processing and Analysis, SPIE Press 2000.
4	Albert Macowski, Medical Imaging Systems, Prentice hall New Jersy-1983.
5	Avinash C.Kak, Malcolm Shaney, Principles of Computerized Tomographic Imaging