Curriculum & Syllabus

of

B.Tech. Information Technology

(For the batch admitted in 2013-14 onwards)

R 2010

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

(An Autonomous Institution affiliated to Anna University Chennai and approved by AICTE New Delhi)

K.S.Rangasamy College of Technology - Autonomous Regulation	R 2010
Department	**Information Technology**
Programme Code & Name	**IT: B.Tech. Information Technology**

Vision

To look out the needs of national and global industrial sectors of IT and ITES

To inculcate the necessary social awareness and commitment to eliminate the digital divide in the various strata of our society

Mission

To transform the students into innovative, competent and high quality IT professionals to meet the growing global changes

To impart value - based education to the students and provide the necessary cutting edge skills

To provide equal opportunities for interaction with industry and society for mutual benefits

<u>PROGRAMME EDUCATIONAL OBJECTIVES:</u> (PEOs)

I. Our graduates will be professionally competent to work in industry that meet the needs of Indian and multinational software companies.

II. Our graduates will have necessary background in mathematics, science and engineering fundamentals required to solve and analyze engineering problems and to prepare them for graduate studies.

III. Our graduates will have the knowledge in various programming languages, software development process and computer networking.

IV. Our graduates will have the awareness of professional and ethical responsibilities, communication skills, and team work needed for a successful professional career.

V. Our graduates will have opportunity for motivation of excellence and life-long learning.

PROGRAMME OUTCOMES: (POs)

(a) Graduates are expected to demonstrate basic knowledge in mathematics, science and engineering.

(b) Graduates are expected to have ability to write programs, as well as to analyze and interpret the results.

(c) Graduates are expected to have ability to develop & test software and document it as per software development process.

(d) Graduates are expected to have knowledge on digital, hardware and communication technology.

(e) Graduates are expected to identify, formulate and solve computer networking problems.

(f) Graduates are expected to have understanding of ethical and professional responsibility.

(g) Graduates are expected to communicate effectively.

(h) Graduates are expected to engage themselves in life - long learning.

(i) Graduates are expected to function on multidisciplinary teams.

(j) Graduates are expected to participate and succeed in competitive examinations.

(k) Graduates are expected to show the understanding of impart of IT on the society and also will be aware of contemporary issues.

K.S.Rangasamy College of Technology, Tiruchengode - 637 215								
Curriculum for the Programmes under Autonomous Scheme									
Regulation	R 2010							
Department	Information Technology							
Programme Code & Name	IT: B.Tech. Information Technology							

Semester I								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 EN 101	Technical English	3	0	0	3	50	50	100
10 MA 101	Engineering Mathematics I	3	1	0	4	50	50	100
10 CH 102	Environmental Engineering	3	0	0	3	50	50	100
10 PH 101	Engineering Physics	3	0	0	3	50	50	100
10 GE 101	Fundamentals of Programming	3	1	0	3	50	50	100
10 GE 105	Basics of Engineering Mechanics (CS,EC,EE,EI, IT)	3	1	0	4	50	50	100
	PRACTICAL							
10 PH 100	Engineering Physics Laboratory	0	0	3	2	50	50	100
10 GE 1P2	Fundamentals of Programming Laboratory	0	0	3	2	50	50	100
	Total	18	03	06	24	800		

Semester II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 EN 102	Communication Skills	3	0	0	3	50	50	100
10 MA 102	Engineering Mathematics II	3	1	0	4	50	50	100
10 PH 102	Physics of Materials (CS,EC,EE,EI, IT)	3	0	0	3	50	50	100
10 CH 101	Engineering Chemistry	3	0	0	3	50	50	100
10 GE 102	Engineering Graphics (BT,CS,EC,EC,EI, IT)	2	0	3	4	50	50	100
10 GE 104	Basics of Civil and Mechanical Engineering (CS,EC,EE,EI, IT)	4	0	0	3	50	50	100
	PRACTICAL							
10 CH 100	Engineering Chemistry Laboratory	0	0	3	2	50	50	100
10 GE 1P1	Engineering Practices Laboratory	0	0	3	2	50	50	100
	Total	18	01	09	24	800		

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Curriculum for the Programmes under Autonomous Scheme							
Regulation	R 2010						
Department	Information Technology						
Programme Code & Name	IT : B.Tech. Information Technology						
Semester III							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 MA 003	Engineering Mathematics III	3	1	0	4	50	50	100
10 EE 001	Basics of Electrical Engineering (CS, IT)	3	0	0	3	50	50	100
10 EC 002	Electronic devices and Circuits (CS, IT)	3	0	0	3	50	50	100
10 EC 003	Digital Principles and System Design (CS, EC, IT)	3	0	0	3	50	50	100
10 IT 311	Advanced C and C++	3	0	0	3	50	50	100
10 CS 001	Data Structures Using C (CS, EE, EI, IT)	3	0	0	3	50	50	100
	PRACTICAL							
10 EC 0P1	Electronic Circuits and Digital Laboratory (CS, IT)	0	0	3	2	50	50	100
10 IT 3P1	Advanced C and C++ Laboratory	0	0	3	2	50	50	100
10 CS 0P1	Data Structures using C Laboratory (CS, EE, EI, IT)	0	0	3	2	50	50	100
10 TP 0P1	Career Competency Development I	0	0	2	0	100	00	100
Total		18	01	11	25	1000		
Semester IV							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 MA 004	Probability and Statistics (BT, IT, ME, TT)	3	1	0	4	50	50	100
10 CS 003	Design and Analysis of Algorithms (CS, IT)	3	0	0	3	50	50	100
10 EC 007	Microprocessors and Microcontrollers (CS, EC, IT)	3	0	0	3	50	50	100
10 IT 411	Computer Architecture	3	0	0	3	50	50	100
10 IT 412	Principles of Communication	3	0	0	3	50	50	100
10 IT 413	Java Programming	3	0	0	3	50	50	100
	PRACTICAL							
10 EC 0P3	Microprocessors and Microcontrollers Laboratory (CS,EC,IT)	0	0	3	2	50	50	100
10 IT 4P1	Hardware Laboratory	0	0	3	2	50	50	100
10 IT 4P2	Java Programming Laboratory	0	0	3	2	50	50	100
10 TP 0P2	Career Competency Development II	0	0	2	0	100	00	100
Total		18	01	11	25	1000		

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Department		Information Technology						
Programme Code & Name		IT : B.Tech. Information Technology						
Semester V								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 HS 001	Professional Ethics	3	0	0	3	50	50	100
10 CS 005	Database Management Systems (CS, IT)	3	1	0	4	50	50	100
10 IT 511	Telecommunication Systems	3	0	0	3	50	50	100
10 IT 512	Operating Systems	3	1	0	4	50	50	100
10 IT 513	Software Engineering	3	1	0	4	50	50	100
10 IT 514	Computer Networks	3	0	0	3	50	50	100
	PRACTICAL							
10 CS 0P4	Database Management Systems Laboratory	0	0	3	2	50	50	100
10 IT 5P1	Network Laboratory	0	0	3	2	50	50	100
10 IT 5P2	Operating System and Open Source Laboratory	0	0	3	2	50	50	100
10 TP 0P3	Career Competency Development III	0	0	2	0	100	00	100
	Total	18	03	11	27	1000		
Semester VI								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 IT 611	Object Oriented Analysis and Design	3	1	0	4	50	50	100
10 IT 612	Visual Programming	3	0	0	3	50	50	100
10 IT 613	Web Technology	3	1	0	4	50	50	100
10 IT 614	Cryptography and Network Security	3	1	0	4	50	50	100
10 IT 615	System Software	3	0	0	3	50	50	100
10 IT E1*	Elective I	3	0	0	3	50	50	100
	PRACTICAL							
10 IT 6P1	Visual Programming Laboratory	0	0	3	2	50	50	100
10 IT 6P2	CASE Tools Laboratory	0	0	3	2	50	50	100
10 IT 6P3	Web Technology Laboratory	0	0	3	2	50	50	100
10 TP 0P4	Career Competency Development IV	0	0	2	0	100	00	100
	Total	18	03	11	27	1000		

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Programme Code & Name	IT : B.Tech. Information Technology							
	Semester VII							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 HS 003	Principles of Management	3	0	0	3	50	50	100
10 IT 001	Mobile Computing (CS, IT)	3	0	0	3	50	50	100
10 IT 711	Component Based Technology	3	1	0	4	50	50	100
10 IT 712	Data Warehousing and Mining	3	1	0	4	50	50	100
10 IT 713	Computer Graphics and Multimedia	3	0	0	3	50	50	100
10 IT E2*	Elective II	3	0	0	3	50	50	100
	PRACTICAL							
10 IT 7P1	Software Components Laboratory	0	0	3	2	50	50	100
10 IT 7P2	Graphics and Multimedia Laboratory	0	0	3	2	50	50	100
10 IT 7P3	Project Work - Phase I	0	0	4	2	100	00	100
10 TP 0P5	Career Competency Development V	0	0	2	0	100	00	100
	Total	18	03	12	26	1000		
	Semester VIII							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 HS 002	Total Quality Management	3	0	0	3	50	50	100
10 IT 811	Software Quality Assurance and Testing	3	0	0	3	50	50	100
10 IT E3*	Elective III	3	0	0	3	50	50	100
10 IT E4*	Elective IV	3	0	0	3	50	50	100
	PRACTICAL							
10 IT 8P1	Project Work - Phase II	0	0	16	8	50	50	100
	Total	12	00	16	20	500		

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Regulation	R 2010
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Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
Elective I								
10 IT E11	Advanced Computer Networks	3	0	0	3	50	50	100
10 IT E12	Wireless Mobile Networking	3	0	0	3	50	50	100
10 IT E13	Software Quality Management	3	0	0	3	50	50	100
10 IT E14	Advanced Microprocessors	3	0	0	3	50	50	100
10 IT E15	Knowledge Based Decision Support Systems	3	0	0	3	50	50	100
10 IT E16	Advanced Computer Architecture	3	0	0	3	50	50	100
10 IT E17	Advanced Databases	3	0	0	3	50	50	100
10 IT E18	**Discrete and Numerical Methods**	3	0	0	3	50	50	100
Elective II								
10 IT E21	Cloud Computing (CS, IT)	3	0	0	3	50	50	100
10 IT E22	Grid Computing	3	0	0	3	50	50	100
10 IT E23	Software Project Management	3	0	0	3	50	50	100
10 IT E24	Design of Embedded Systems	3	0	0	3	50	50	100
10 IT E25	Pervasive Computing	3	0	0	3	50	50	100
10 IT E26	C# and .Net	3	0	0	3	50	50	100
10 IT E 27	**Mobile Application Development**	3	0	0	3	50	50	100
Elective III								
10 IT E31	Information Retrieval Techniques	3	0	0	3	50	50	100
10 IT E32	Software Testing	3	0	0	3	50	50	100
10 IT E33	E-Commerce	3	0	0	3	50	50	100
10 IT E34	Distributed Computing	3	0	0	3	50	50	100
10 IT E35	Client Server Computing	3	0	0	3	50	50	100
10 IT E36	XML and Web Services	3	0	0	3	50	50	100
10 IT E37	**Java Technologies**	3	0	0	3	50	50	100
Elective IV								
10 IT E41	Web Mining	3	0	0	3	50	50	100
10 IT E42	Multimedia Compression Technology	3	0	0	3	50	50	100
10 IT E43	Network Administration and Maintenance	3	0	0	3	50	50	100
10 IT E44	User Interface Design	3	0	0	3	50	50	100
10 IT E45	Semantic Web	3	0	0	3	50	50	100
10 IT E46	3G Wireless Networks	3	0	0	3	50	50	100
10 IT E47	**Cyber Security**	3	0	0	3	50	50	100

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Semester I							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 EN 101	TECHNICAL ENGLISH	3	0	0	3	50	50	100

Objective(s)	To improve learners vocabulary and to enable them to use words appropriately in different academic and professional contexts, familiarize learners 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 train learners in organized academic and professional writing.

1	GRAMMAR AND VOCABULARY	Total Hrs	9

Word formation with prefixes and suffixes – synonyms and antonyms – verb patterns- subject-verb agreement – tenses – voices – use of conditionals – comparative adjectives (affirmative and negative) – expanding nominal compounds – articles – use of prepositions - phrasal verbs – British and American vocabulary – error detection – abbreviations and acronyms.

2	LISTENING	Total Hrs	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

3	SPEAKING	Total Hrs	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 – expressing opinions (agreement / disagreement) – giving instructions

4	READING	Total Hrs	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 – cloze reading.

5	WRITING	Total Hrs	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)

Total hours to be taught	45

Text book (s) :	
1	Rizvi M Ashraf, 'Effective Technical Communication', 1st Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2005.

Reference(s) :	
1	Dr.M.Balasubraminian and Dr.G.Anbalagan, 'Performance in English' Anuradha Publications, Kumbakonan, 2007.
2	Sharon J. Gerson, Steven M. Gerson, 'Technical Writing – Process & Product'. 3rd Edition, Pearson Education (Singapore) (p) Ltd., New Delhi, 2004.
3	Mitra K. Barun, 'Effective Technical Communication – A Guide for Scientists and Engineers', Oxford University Press, New Delhi, 2006.

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Semester I						

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 MA 101	ENGINEERING MATHEMATICS I	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.		
1	MATRICES	Total Hrs	12

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.

2	GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS	Total Hrs	12

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.

3	FUNCTIONS OF SEVERAL VARIABLES	Total Hrs	12

Functions of two variables – Partial derivatives – Total differential – Maxima and minima – Constrained maxima and minima – Lagrange's multiplier method – Jacobians.

4	ORDINARY DIFFERENTIAL EQUATIONS	Total Hrs	12

Linear differential equations of Second and higher order with constant coefficient when the R.H.S is e^{ax}, x^n n>0,sin ax , cos ax, $e^{ax} x^n$, e^{x} Sin x, e^{x} cos x, x^n sin x and x^n cos x – Differential Equations with variable coefficients (Cauchy's Form and Legendre's Linear Equation).

5	DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS	Total Hrs	12

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)

Total hours to be taught	60

Text book :	
1	Veerarajan. T., "Engineering Mathematics (for first year), Fourth Edition Tata McGraw- Hill Publishing Company Limited, New Delhi, 2005.
2	Grewal. B.S., "Higher Engineering Mathematics", Thirty Eighth Edition, Khanna Publishers, Delhi, 2004.

References :	
1	Kandasamy. P, Thilagavathy. K and Gunavathy. K, "Engineering Mathematics" – S.Chand and Co. – New Delhi 2007.
2	Kreyszig. E., "Advanced Engineering Mathematics," Eighth Edition, John Wiley and Sons (Asia) Limited, Singapore 2001.
3	Venkataraman.M.K, "Engineering Mathematics, Volume I & II Revised Enlarged Fourth Edition".

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Course Code	Course Name		Hours / Week			Credit	Maximum marks		
			L	T	P	C	CA	ES	Total
10 CH 102	ENVIRONMENTAL ENGINEERING		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 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 – hydrological 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 - HIV-AIDS- Case Studies in current scenario.									
Total hours to be taught							45		
Text book :									
1.	R.Palanivelu and B.Srividhya, "Environmental Engineering: Sakura Publishers, Erode, 4th Edition, 2010.								
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.								

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Semester I

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 PH 101	ENGINEERING PHYSICS	3	0	0	3	50	50	100

Objective(s)	To enhance students' knowledge of theoretical and modern technological aspects in physics, enable the students to correlate the theoretical principles with application oriented studies.

1	ACOUSTICS OF BUILDING AND SOUND INSULATION	Total Hrs	9

Introduction-Classification of sound – Characteristics of musical sound – sound intensity level – Weber-Fechner law –Bel, Decibel, Phon, Sone – Acoustics of building - Reverberation – Reverberation time – Sabine's formula – Absorption co-efficient (derivation)– Factors affecting the acoustics of buildings and their remedies- Factors to be followed for good acoustics of building.

2	LASER AND APPLICATIONS	Total Hrs	9

Introduction – Principle of spontaneous emission, stimulated absorption and emission – Einstein's co-efficient (derivation)– Types of lasers: Nd:YAG, Semiconductor laser (homo junction and hetro junction), CO_2 laser – Applications: Lasers in welding, cutting, drilling and soldering- medical applications: laser endoscopy, bloodless surgery – Holography: Construction and reconstruction of hologram –applications.

3	FIBER OPTICS AND SENSORS	Total Hrs	9

Principles – cone of acceptance, numerical aperture (derivation)- Modes of propagation – Concept of bandwidth (Qualitative)- Crucible-crucible technique –zone refining (rod and tube method)- Classification based on materials, refractive index and modes– Splicing – Losses in optical fiber – Light sources for fiber optics – Detectors – Fiber optical communication links – Advantage of fiber optical cable over copper cables- Fiber optic sensors: Temperature, Displacement, Voltage and magnetic field measurement.

4	ULTRASONICS AND APPLICATIONS	Total Hrs	9

Introduction: Production of ultrasonic waves – Magnetostriction effect, magnetostriction generator-inverse piezoelectric effect, piezoelectric generator – Ultrasonic detection, properties, cavitation- acoustical grating- Industrial applications: Cleaning, SONAR, depth of sea – Non destructive testing – Pulse echo system, through transmission, resonance system- Medical applications:cardiology, neurology, ultrasonic imaging.

5	QUANTUM PHYSICS AND APPLICATIONS	Total Hrs	9

Development of Quantum theory – Dual nature of matter and radiation – de-Broglie wave length – Uncertainty principle, applications: single slit experiment, electron microscope - Schrodinger's equation time dependent and time independent – Particle in a box(one dimensional and three dimensional)- limitation of optical microscopy – electron microscope- Scanning electron microscope-transmission electron microscope-scanning transmission electron microscope-applications.

Total hours to be taught	45

Text Book:	
1.	Dr.Palanisamy P.K, "Engineering Physics", Scitech Publications, Chennai, 2010.

Reference (s) :	
1	Pillai S O, "Engineering Physics", New Age International Publishers, New Delhi, 2005.
2	Rajendran V, "Engineering Physics", Tata McGraw-Hill Publishers, New Delhi, 2008
3	www.howstuffworks.com

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Semester I							

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 GE 101	FUNDAMENTALS OF PROGRAMMING	3	1	0	3	50	50	100

Objective(s)	To enable students to learn the basic concepts of computer and developing skills in programming using C language.		

1	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+15(Tutorial) = 60

Text book :	
1	Dr.K.Duraisamy, R.Nallusamy, R.Kanagavalli, S.Ponmathangi, D.Muthusankar, P.Kaladevi, "Fundamentals of Programming", Techvision Publishers 2008.
2	E.Balagurusamy, "Programming in ANSI C", TMH, New Delhi, 2002.
References :	
1	Rajaraman V, "Fundamentals of Computers", Fourth Edition, PHI 2006.
2	Byron Gottfried, "Programming with C", II Edition, TMH, 2002.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Semester I							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 GE 105	BASICS OF ENGINEERING MECHANICS (CS,EC,EE,EI, IT)	3	1	0	4	50	50	100

Objective(s)	At the end of this course the student should be able to understand the scalar representation of forces and moments, static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. Further, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. He should be able to understand the laws of motion, the kinematics of motion and the interrelationship. He should also be able to write the dynamic equilibrium equation. All these should be achieved both conceptually and through solved examples.

1	FUNDAMENTALS		Total Hrs	12

Introduction - Units and Dimensions - Laws of Mechanics – Lame's theorem, Parallelogram and triangular Law of forces –Coplanar Forces – Resolution and Composition of forces – Equilibrium of a particle – Equivalent systems of forces – Principle of transmissibility – Single equivalent force.

2	EQUILIBRIUM OF RIGID BODIES		Total Hrs	12

Free body diagram – Types of supports and their reactions -Types of trusses-Analysis of trusses (Method of Joints only) – requirements of stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Scalar components of a moment – Varignon's theorem - Equilibrium of Rigid bodies in two dimensions.

3	PROPERTIES OF SURFACES AND SOLIDS		Total Hrs	12

Determination of Areas and Volumes – First moment of area and the Centroid of sections – Rectangle, circle, triangle from integration – T section, I section, Angle section, Hollow section by using standard formula – second moment of plane area – Rectangle, triangle, circle from integration - T section, I section, Angle section by using standard formula – Parallel axis theorem and perpendicular axis theorem – Polar moment of inertia.

4	DYNAMICS OF PARTICLES		Total Hrs	12

Displacement, Velocity, acceleration and their relationship – Relative motion – Curvilinear motion – Newton's law – Work Energy Equation of particles – Impulse and Momentum – Impact of elastic bodies.

5	FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS		Total Hrs	12

Frictional force – Laws of Coloumb friction – simple contact friction – Rolling resistance – Belt friction. Translation and Rotation of Rigid Bodies; Velocity and acceleration – General Plane motion.

Total hours to be taught	60

Text book (s) :	
1	Beer,F.P and Johnson Jr. E.R, "Vector Mechanics for Engineers", Vol. 1 Statics and Vol. 2 Dynamics, McGraw-Hill International Edition, 1997.
2	Rajasekaran, S, Sankarasubramanian, G., "Fundamentals of Engineering Mechanics", Vikas Publishing House Pvt. Ltd., 2000.

Reference(s) :	
1	Ashok Gupta, "Interactive Engineering Mechanics – Statics – A Virtual Tutor (CDROM)", Pearson Education Asia Pvt., Ltd., 2002.
2	Hibbeller, R.C.,"Engineering Mechanics", Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., 2000.
3	Palanichamy, M.S., Nagan, S., "Engineering Mechanics – Statics & Dynamics", Tata McGraw-Hill, 2001.
4	www.howstuffworks.com

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. InformationTechnology			
Semester I							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 PH 100	ENGINEERING PHYSICS LABORATORY	0	0	3	2	50	50	100

Objective(s)	To give exposure for understanding the various physical phenomena's in optics, acoustics material science and properties of matter in engineering applications, determine the fundamental constants like acceleration due to gravity, viscosity of liquid, wave length of laser, band gap of semiconductor etc.,

LIST OF EXPERIMENTS (Any Ten)	
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 acceptance angle numerical aperture using fibre optics.

Total hours to be taught	45

Lab Manual :	
1	"Physics Lab Manual", Department of Physics, KSRCT.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name			IT: B.Tech. Information Technology		
Semester I							
Course Code	Course Name	Hours/Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 GE 1P2	FUNDAMENTALS OF PROGRAMMING LABORATORY	0	0	3	2	50	50	100
Objective(s)	To enable the students to apply the concepts of C to solve real time problems						
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 to merge the given two files.
12. Write a C Program to perform Swap Using Pointers.

Total hours to be taught	45

I Semester - Course Outcomes

Modules	10 EN 101 – Technical English Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Comprehend the basic grammatical structures and generate new sentences in a given paradigm.
2	Explain and apply the enriched vocabulary in academic and professional contexts.
3	Identify the main idea and integrate it with supporting data to facilitate effective comprehension.
4	Infer, compare and summarize lexical & contextual meaning of various technical / general passages.
5	Recognize the basic phonetic units of language and execute it for better oral competency.
6	Recognize and interpret standard English Pronunciation & use it in diverse situations.
7	Find and classify different reading strategies and demonstrate better articulation / expression
8	Categorize words into different parts of speech and use them in different contexts.
9	Retrieve information from various sources and construct a well designed descriptive writing.
10	Identify the key words of concepts and learn to write definitions.

Modules	10 MA 101 - Engineering Mathematics – I Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Identify various operations on matrices.
2	Apply transformation techniques on matrices.
3	Analyze the properties of curvature using differential calculus.
4	Analyze the properties of envelope using differential calculus.
5	Examine the maxima and minima for functions of two variables.
6	Infer the constrained maxima and minima for functions of two variables.
7	Compute linear differential equations with constant coefficients.
8	Find the solutions of linear differential equations with variable coefficients
9	Solve pair of simultaneous linear differential equations.
10	Solve basic engineering problems represented by differential equations.

Modules	10 CH 102 - Environmental Engineering Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Recognize the environmental problems caused due to pollution.
2	Describe the structure of ecosystem and its impact on environment.
3	Identify the sources of water and its pollutants.
4	Analyse the methods for treatment of water and control its pollution.
5	Explain the various resources of land and its characteristics.
6	Demonstrate the awareness among public about the waste which degrades the land.
7	Discuss the details of policy adopted to use non renewable energy sources for energy conversion.
8	Discuss the details of policy adopted to use renewable energy sources for energy conversion.
9	Describe the importance and conservation of biodiversity in India.
10	Indicate the adverse effects of population explosion and conduct the awareness programme to safeguard human health.

Modules	10 PH 101 - Engineering Physics Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Categorize the sound and analyze its characteristics
2	Design buildings with good acoustics
3	Discuss the principle of laser emission and Classification
4	Identify the applications of lasers
5	Summarize the propagation of lights in fibre optic cables and characteristic parameters
6	Illustrate the fiber optic communication link and its applications
7	Express the production and detection methods of ultrasonic waves
8	Identify the applications of ultrasonic waves
9	Comprehend the development of quantum theory and its applications
10	Categorize the electron microscope and analyze its applications

Modules	10 GE 101 - Fundamentals of Programming Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Recognize the origin and evolution of computers, generations of computers and the applicability of computer system in various fields.
2	Describe about algorithms, Pseudo code, various flow chart symbols, different programming control structures and types of software
3	Capture the fundamentals of C - Constants, Variables and Data types, different operators and Expressions in C language
4	Describe different Input and Output operations with different formats and programs using different Branching and Looping statements
5	Narrate the basic concept of Array, types of array, character arrays and strings and able to write programs using array concepts.
6	Obtain knowledge about user defined functions and scope of variables in C
7	Comprehend basic concept of Structure, nested structures and Union
8	Identify the concept of File, File operations and Types of files
9	Grasp the basics of pointers and its operation and implement the concepts of Pointers and arrays, Pointers and Character Strings
10	Illustrate the concepts of Pointers and functions & Pointers and Structures

Modules	10 GE 105 – Basics of Engineering Mechanics Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Apply the laws of mechanics.
2	Identify the equilibrium conditions of particles;Calculate resultant force for the given system of forces.
3	Illustrate the free body diagram of a system; Determine the forces and reaction, moments and couples.
4	List the types of trusses, supports and calculate their reaction forces.
5	Compute the centroid and first moment of area of various sections.
6	Apply the parallel and perpendicular axis theorems to find out the moment of inertia and polar moment of inertia of various sections.
7	Calculate the displacement, velocity and acceleration of particles.
8	Analyse the relative motion, curvilinear motion and impact of elastic bodies.
9	Recognise the concept of friction and laws of friction.
10	Demonstrate the general plane motion of rigid body.

Modules	10 PH 100 – Engineering Physics Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Calculate the rigidity modulus of a wire by torsional pendulum.
2	Determination of Young's modulus of the material of a uniform bar by non-uniform and uniform bending method.
3	Evaluate the Viscosity of liquid by Poiseuille's method.
4	Calculate acceleration due to gravity by compound (bar) pendulum.
5	Illustrate the wavelength of mercury spectrum by Spectrometer grating.
6	Show the thickness of fiber by Air-wedge method.
7	Estimate wavelength of laser using grating and particle size determination.
8	Determination of velocity of ultrasonic waves and compressibility using ultrasonic interferometer.
9	Identify the band gap energy of a semiconductor.

Modules	10 GE 1P2 – Fundamentals of Programming Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Demonstrate the ability to use the editor, compiler, and linker to create source, object, and executable code and debugging of a simple 'C' program.
2	Familiarize with simple programs involving the fundamental programming constructs (variables, data types, expressions, assignment, simple I/O).
3	Gain the knowledge of the data types appropriate to specific programming problems.
4	Demonstrate the use of appropriate conditional and iteration constructs for a given programming task.
5	Use various string handling functions and arrays as part of the problem solution.
6	Implement the concept of structure data type as part of the solution.
7	Elucidate the concept of functions from the portable C library and Mastering the mechanics of parameter passing, Fibonacci series using recursive function
8	Utilize pointers to efficiently solve problems, swap two integers without using third variable
9	Design programs using file concepts
10	Demonstrate the ability to design, develop, and implement a fully functioning 'C' programming using structured techniques and reusable code.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Semester II							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 EN 102	COMMUNICATION SKILLS	3	0	0	3	50	50	100

Objective(s)	To equip students with effective speaking and listening skills in English, help them develop the soft skills and people skills which will make them to excel in their jobs and enhance to students' performs at placement interviews

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 - 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 Answer 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

Tenses - 'Do' forms – Impersonal Passive voice - Imperatives – using should form – Direct, Indirect speech – Discourse markers – SI Units – Numerical expressions - Use of negatives – Prepositions - Phrasal verbs - Correct use of words - Use of formal words in informal situations - Commonly confused words – Editing.

5	WRITTEN COMMUNICATION & CAREER SKILLS	Total Hrs	9

Writing e-mails - Writing Reports – Lab Reports - Preparing Curriculum Vitae and cover letters – Facing an Interview - Presentation skills - Persuasion skills – Flow Charts, Tree diagram – Recommendations – Check List – Slide Preparation – Verbal Reasoning (Analogy, Alphabet Test, Assertion & Reason, Situation Reaction Test) – Logical Deduction (Deriving Conclusions from passages, Theme Detection, Cause and Effect Reasoning).

Total hours to be taught	45

Text book (s) :

1	Rizvi M Ashraf, 'Effective Technical Communication', 1st Edition, Tata McGraw-Hill 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.
4	Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name	IT: B.Tech. Information Technology				
Semester II							

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 MA 102	ENGINEERING MATHEMATICS II	3	1	0	4	50	50	100

Objective(s)	An aim of the course is to train the students in additional areas of engineering mathematics necessary for grooming them into successful engineers. The topics introduced will serve as basic tools for specialized studies in many engineering fields, significantly in fluid mechanics, field theory and communication engineering.

1	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 –Polar form– Cauchy– Riemann equations – Sufficient conditions (excluding proof) – Properties of analytic function – Harmonic conjugate – Construction of Analytic functions -Conformal mapping: w = az, 1/z and bilinear transformation.

4	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 :	
1	Veerarajan. T., "Engineering Mathematics (for first year), Fourth Edition Tata McGraw- Hill Publishing Company Limited, New Delhi, 2005.
2	Grewal. B.S., "Higher Engineering Mathematics", Thirty Eighth Edition, Khanna Publishers, Delhi, 2004.

References :	
1	Kandasamy. P, Thilagavathy. K and Gunavathy. K, "Engineering Mathematics" – S.Chand and Co. New Delhi 2007.
2	Venkataraman.M.K, "Engineering Mathematics, Volume I & II Revised Enlarged Fourth Edition", The National Pub. Co., Chennai, 2004.
3	Widder. D.V., "Advanced Calculus", Second Edition, Prentice Hall of India, New Delhi, 2000.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Semester II							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 PH 102	PHYSICS OF MATERIALS (CS,EC,EE,EI, IT)	3	0	0	3	50	50	100
Objective(s)	Impart fundamental knowledge in various engineering materials and applications, knowledge about conducting, superconducting, semiconducting, dielectric and Nanomaterials.							

1	CONDUCTING AND SUPERCONDUCTING MATERIALS	Total Hrs	9

Introduction-Classical Free electron theory-verification of Ohm's law -Electrical Conductivity- Expression for electrical Conductivity-Thermal Conductivity-Expression for thermal Conductivity-Widemann Franz Law(Derivation)- Lorentz number - Advantages and drawbacks of classical free Electron theory-Fermi distribution function- superconductivity-Properties of Superconductors-Factors affecting superconducting phenomena-penetration depth (Qualitative)- DC and AC Josephson effect (Qualitative)-BCS theory- Type-I and Type-II superconductors-High T_C Superconductors-Applications: SQUID, Cryotron, Magnetic Levitation.

2	MAGNETIC MATERIALS	Total Hrs	9

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 read out-Bubble memory-Magnetic Tape-Floppy Disc and Magnetic hard disc.

3	SEMICONDUCTING MATERIALS	Total Hrs	9

Introduction-properties-Elemental and Compound Semiconductors-Intrinsic and Extrinsic Semiconductors-Properties-Carrier Concentration in intrinsic and Extrinsic semiconductors (Derivation)- electrical conductivity of a semiconductor- determination of band gap-Relation between electrical conductivity and mobility-Fermilevel-Variation of Fermi level with Temperature and impurities-Hall effect-Hall Coefficient-Experimental Determination of Hall Coefficient, Applications.

4	DIELECTRIC MATERIALS	Total Hrs	9

Introduction-Polarization: Electronic, ionic, orientational and space charge-Frequency and Temperature dependence of polarization-Active and Passive Dielectric-internal field-Clasius –Mosotti relation(Derivation)-Dielectric Losses –types of dielectric materials (Liquid, Solid, gaseous)-Dielectric breakdown Mechanisms-Ferroelectric materials: properties and applications.

5	NANOMATERIALS	Total Hrs	9

Introduction-Properties-Fabrication methods-Top-Down Process – Ball milling-Nanolithography-Bottom-up Process-Vapour Phase Deposition(PVD & CVD)-Molecular Beam Epitaxy(MBE)-Metal Organic Vapour Phase Epitaxy(MOVPE)-Carbon Nano Tube(CNT):Properties,Preparation and applications.

Total hours to be taught	45

Text Book:

1	Dr.Arumugam M, "Engineering Physics II" Anuradha Publications, Kumbakonam, Reprint 2010.

Reference (s) :

1	Raghavan V, "Materials and Engineering", Prentice-Hall of India, New Delhi, 2007.
2	Gaur R K, Gupta S L, "Engineering Physics", Dhanpat Rai Publications, New Delhi, 2006.
3	www.howstuffworks.com

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			

Semester II							

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 CH 101	ENGINEERING CHEMISTRY	3	0	0	3	50	50	100
Objective(s)	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 and polymer and engineering materials.							

1	WATER TREATMENT		Total Hrs	9

Water - sources and sanitary significance – Hardness of water - Estimation of hardness by EDTA method – Alkalinity. Boiler feed water- scale formation, corrosion, caustic embrittlement, priming and foaming- softening of water - Internal and external treatment - zeolite process – demineralization – desalination – electro dialysis and reverse osmosis. Domestic water treatment.

2	ELECTRO CHEMISTRY		Total Hrs	9

Introduction – Kohlrausch's law- applications-conductometric titration-Electrode potential-Nernst equation-problems-Reference electrode-calomel electrode-SHE-weston cadmium cell-Types of electrodes-Measurement of pH using glass electrode-Galvanic series- emf series-applications. Electro chemical cells-concentration cells-reversible and irreversible cell – EMF - measurements – Potentiometric titrations

3	CORROSION & CORROSION CONTROL		Total Hrs	9

Corrosion – Electrochemical and chemical – Mechanism – factors influencing rate of corrosion - corrosion reaction – types of corrosion – differential aeration – pitting – corrosion control – Sacrificial anode and Impressed current method – Inhibitors – Protective coatings – Preliminary treatment – Electroplating (Cr & Ni) – Paints – Constituents and their functions – Special paints - Mechanism of drying.

4	FUELS & COMBUSTION		Total Hrs	9

Introduction-solid, liquid and gaseous fuels-Difference among solid,liquid and gaseous fuels-Explosive range(or) limits of inflammability-Calorific values –Spontaneous ignition temperature- flue gas analysis – Coal – analysis of coal– carbonization of coal-metallurgical coke -manufacture of metallurgical coke – hydrogenation of coal – petroleum – Cracking – Catalytic Cracking – Polymerisation - alkylation – Octane number – improving octane number by additives – Diesel – Cetane number –natural gas, water gas, producer gas, gobar gas & LPG.

5	POLYMERS		Total Hrs	9

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.

Total hours to be taught	45

Text book :	
1.	R.Palanivelu, B.Srividhya, K.Tamilarasu and P.Padmanaban, "Engineering Chemistry", Sakura Publishers, Erode, 4th Edition, 2010.

References :	
1.	Jain P.C. & Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Co. New Delhi, 14th Edition, 2002.
2.	Clair N Sawyer and Perry L Mc Carty, "Chemistry for Environmental Engineering", TMH Book Company, New Delhi, 14th Edition, 2002.
3.	Dara S.S. "A text book of Engineering Chemistry, S.Chand & Co. Ltd., 2003.
4.	Uppal M.M. revised by S.C.Bhatia, "Engineering Chemistry", Khanna Publishers, New Delhi, 6th Edition, 2001.
5	www.howstuffworks.com

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology				
Semester II								
Course Code	Course Name	Hours / Week			Credit		Maximum Marks	
		L	T	P	C	CA	ES	Total
10 GE 102	ENGINEERING GRAPHICS (BT,CS,EC,EE,EI, IT)	2	0	3	4	50	50	100
Objective(s)	Student's skill in the graphical communication of concepts and ideas in the design of engineering products are to be obtained by training them to understand objects by making free hand sketches of simple engineering objects and computer 2D and 3D modeling techniques.							

Instructions:
1. Unit – I Free Hand Sketching
2. Unit – II to V, examination will be conducted using drafting software

1	INTRODUCTION TO ENGINEERING DRAWING (Free Hand Sketching)	Total Hrs	12

Drawing Sheet Layouts - Title Block - Instruments used - Lines - Lettering – Dimensioning
Construction of Pentagon, Hexagon, Conic Sections. Construction of Ellipse, Parabola and Hyperbola (Eccentricity method only) with tangent and normal Introduction to cycloid only and Involutes of square and circle. Introduction to Drafting Software

2	ORTHOGRAPHIC PROJECTION(Using Drafting Software)	Total Hrs	12

Theory of projection - Terminology, Method of projection, introduction of First angle and Third angle projection. Conversion of pictorial views into orthographic view. Projection of points in first quadrant.

3	PROJECTION OF LINES AND PLANES(Using Drafting Software)	Total Hrs	12

Projection of lines in first quadrant - parallel to one plane and inclined to other, true length, true inclinations. Projection of planes in first quadrant inclined to one plane – Triangular, Rectangular, Pentagonal, Hexagonal, Circular planes.

4	PROJECTION OF SOLIDS AND SECTION OF SOLIDS(Using Drafting Software)	Total Hrs	12

Projection of simple solids (axis is parallel to one plane) - Prisms, Pyramids, Cylinder and Cone using change of position method. Sectioning of above solids in simple position (base is on HP and axis perpendicular to HP) by cutting plane inclined to one reference plane, true shape of section.

5	DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTION(Using Drafting Software)	Total Hrs	12

Development of lateral surfaces of simple and truncated solids - Prisms, Pyramids, Cylinders and Cones with square hole perpendicular to the axis. Principles of isometric projection. Isometric scale - isometric projections of simple solids, Prisms, Pyramids, Cylinders and Cones. Introduction to Perspective Projection (Not for examination)

Total hours to be taught	60

Text book (s) :		
1	Kulkani D.M, Rastogi A.P, Sarkar A.K, "Engineering Graphics with AutoCAD", PHI Learning Private Limited, New Delhi, 2009.
2	Venugopal K., "Engineering Graphics", New Age International (P) Limited, 2002.

Reference(s) :	
1	Bhatt N.D., "Engineering Drawing", Charotar Publishing House Pvt. Ltd., 49th Edition, Anand, Gujarat, 2006.
2	Natarajan K.V., "A textbook of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2006
3	Shah M.B. and Rana B.C., "Engineering Drawing", Pearson Education, 2005.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name	IT: B.Tech. Information Technology				

Semester II								

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 GE 104	BASICS OF CIVIL AND MECHANICAL ENGINEERING (CS,.EC,EE,EI, IT)	4	0	0	3	50	50	100

BASICS OF CIVIL ENGINEERING				

Objective(s)	At the end of the course the students must know the various aspect of Civil Engineering activity for society needs and developments.		
1	INTRODUCTION	Total Hrs	8

Introduction – Scope of Civil Engineering – Function of Civil Engineers – Construction Materials – Classification – Uses –Requirements:- – Bricks-stone – Cement – Sand – Concrete – Steel Sections.

2	SUBSTRUCTURE & SUPERSTRUCTURE	Total Hrs	8

Substructure – Selection of site for building– Bearing capacity of soil – Requirement of good foundation – Types of foundation – Residential foundation - Superstructure – Technical terms: - Types – Brick masonry – Stone masonry – Components:- – Beams – Columns – Lintels – Types of roofing – Types of Flooring.

3	SURVEYING	Total Hrs	8

Surveying – Objectives – Types of Survey – Instruments used for Measurement of distances – Calculation of areas (Problems).e-waste management.

Total hours to be taught	24

Text book (s) :	
1	Palanisamy, M.S., "Basics of Civil Engineering. , TMH Publishing Co., New Delhi, 2008.

Reference(s) :	
1	Ramamrutham.S, Basic Civil Engineering Dhanpat Rai Publishing Co. (P) Ltd. 1999

BASICS OF MECHANICAL ENGINEERING			

Objective(s)	At the end of this semester, the student should be conversant in power plant, IC Engines, R & A/C and Belt drives.		
1	SOURCES OF ENERGY AND POWER PLANTS	Total Hrs	8

Introduction - classification of energy sources - conventional energy sources: working principle of steam, Gas, Diesel, Hydro-electric and Nuclear power plant - Non - conventional energy sources: working principle of Solar, Wind, Tidal and Geothermal power plant.

2	INTERNAL COMBUSTION ENGINES	Total Hrs	8

Introduction - working principle of diesel and petrol engines - Four stroke and two stroke cycles -Comparison of two stroke and four stroke engine – fuel supply system-Ignition system - calculation of Mechanical efficiency and Brake thermal efficiency.

3	REFRIGERATION AND AIR-CONDITIONING AND BELT DRIVES	Total Hrs	8

Introduction - Terminology of Refrigeration and Air conditions – working principle of vapour compression and absorption system-Layout of typical domestic refrigerator, window and split type room air conditioners - calculation of Cop -Types of Belt, selection of belt drives - material used for belt -calculation of power transmitted by belt.

Total hours to be taught	24

Text book (s):	
1	Shanmugam.G, "Basic Mechanical Engineering", Tata McGraw- Hill publishing Company Limited, New Delhi, Second Reprint, 2007.

Reference(s):	
1	Khurmi.R.S, J.K. Gupta, "Theory of Machines", Eurasia Publisher House (p) Ltd., New Delhi, 2003.
2	www.howstuffworks.com

K.S.Rangasamy College of Technology - Autonomous Regulation					R 2010		
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Semester II							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 CH 100	ENGINEERING CHEMISTRY LABORATORY	0	0	3	2	50	50	100
Objective(s)	Educate the theoretical concepts Experimentally						
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).						
Total hours to be taught						45	
Lab Manual :							
1	R.Palanivelu and B.Srividhya, "Engineering Chemistry Lab Manual".						
Reference(s) :							
1	J. Mendham, R.C. Denney, J.D. Barnes and N.J.K. Thomas, Vogel's Text book of Quantitative Chemical Analysis, 6th Edition, Pearson Education, 2004.						

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Semester II							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 GE 1P1	ENGINEERING PRACTICES LABORATORY	0	0	3	2	50	50	100

Objective(s)	To provide exposure to the students with hands on experience on various basic engineering practices in Mechanical Engineering

1	FITTING	Total Hrs	9

Safety aspects in Fitting, Study of tools and equipments, Preparation of models- Filing, Square, Vee.

2	CARPENTRY	Total Hrs	9

Safety aspects in Carpentry, Study of tools and equipments, Preparation of models- Planning, Tee Halving, Cross Lap, Wood turning.

3	SHEET METAL	Total Hrs	9

Safety aspects in Sheet metal, Study of tools and equipments, Preparation of models- Cylinder, Cone, Tray.

4	WELDING	Total Hrs	9

Safety aspects of welding, Study of arc welding equipments, Preparation of models -Lap, butt, T-joints. Study of Gas Welding and Equipments.

5	ELECTRICAL WIRING AND PLUMBING	Total Hrs	9

Safety aspects of Electrical wiring, Study of Electrical Materials and wiring components, Wiring circuit for a lamp using single and stair case switches. Wiring circuit for fluorescent lamps
Study of plumbing tools, Study of pipe connection with coupling and reducer.

Total hours to be taught	45

II Semester - Course Outcomes

Modules	10 EN 102 – Communication Skills Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Look for specific details and overcome speech barriers.
2	Pick key points by listening and improve casual conversational skills.
3	Understand different forms of communication with differences among them.
4	Know about formal speech and descriptive techniques, and use specific words in specific contexts.
5	Fine tune language for different conversational contexts and purposes.
6	Learn telephone etiquette by using language for assent and dissent.
7	Understand grammatical structures, its technical aspects and usage
8	Use discourse markers, enhance punctuation and learn discourse coherence
9	Comprehend content, generate different forms of template and enhance reference skills
10	Construct well-knit documents for job readiness and career competence

Modules	10 MA 102 - Engineering Mathematics II Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Perform double integration in Cartesian and polar coordinates.
2	Evaluate the area by using double integration and volume by using triple integration.
3	Compute the line, surface & volume integrals of a vector function
4	Define and verify the theorems of vector calculus.
5	Verify and construct analytic function.
6	Construct conformal mapping in analytic functions.
7	Classify the singularities of complex function
8	Evaluate real definite integrals by choosing integer and the contour
9	State the Laplace transform and inverse Laplace transform of different functions
10	Solve the second order linear ODE with suitable initial conditions

Modules	10 PH 102 - Physics of Materials Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Outline the conducting materials with their merits and demerits
2	Describe the theory of superconducting materials and its applications
3	Classify and analysis the properties of magnetic materials
4	Identify the applications of magnetic materials in storing the data
5	Compare the properties of semiconductors
6	Analyze the electrical conductivity, fermi level semiconductors and applications
7	Discuss the concept of polarization in dielectric materials
8	Classify the breakdown mechanism, and identify the applications of dielectric materials
9	Identify the importance and explain the fabrication methods of nano materials
10	Describe the properties, preparation and applications of Carbon nano tubes

Modules	10 CH 101 - Engineering Chemistry Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Identify the hardness of water and its testing methods
2	Assess the softening and desalination techniques
3	Recognize the principles involved in electrochemistry
4	Describe the measurement of pH and potentiometric titrations
5	Identify the different types of corrosion
6	Interpret the knowledge about corrosion control and mechanism of drying of oil in paints
7	Predict the analysis and combustion of fuels
8	Describe the manufacturing methods of solid, liquid and gaseous fuels
9	Write the preparation, properties and uses of polymeric materials
10	Illustrate the various moulding techniques.

Modules	10 GE 102 – Engineering Graphics Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Use drawing instruments for lettering, lines and dimensioning.
2	Construct different shapes by eccentricity method; Use drafting software.
3	Draw the orthographic projection.
4	Convert pictorial view into orthographic view.
5	Draw the projection of lines.
6	Draw the projection of planes.
7	Draw the projection of simple solids.
8	Draw the sectional view of solids.
9	Develop the lateral surfaces of simple and truncated solids.
10	Draw the isometric projection of surfaces.

Modules	10 GE 104 - Basics of Civil and Mechanical Engineering Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Describe the scope and functions of civil engineering.
2	Identify the construction materials required.
3	Identify and explain the sub structure of a building.
4	Identify and explain the super structure of a building.
5	Classify surveying and carryout surveying.
6	Describe the working principle of power generation using conventional energy sources.
7	Describe the working principle of power generation using non-conventional energy sources.
8	Explain the working principle of Internal Combustion engine; Calculate efficiency.
9	Draw and illustrate the Layout of typical domestic refrigerator.
10	Describe the scope and functions of civil engineering.

Modules	10 CH 100 - Engineering Chemistry Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Estimate the hardness, alkalinity and chloride content of water.
2	Calculate the dissolved oxygen in boiler feed water.
3	Examine the water of crystalline in a crystalline salt.
4	Interpret the conductometric titration with different combinations of acid and base.
5	Test the precipitation titration by conductometric method.
6	Estimate the strength of HCl by pH meter.
7	Calculate the ferrous ion by potentiometric titration.
8	Estimate the sodium and potassium in a water sample.
9	Estimate the ferric ion by spectrophotometry.

Modules	10 GE 1P1 – Engineering Practices Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Recognize tools for fitting, carpentry, sheet metal, welding, electrical wiring and plumbing.
2	Demonstrate the safety rules in basic engineering practices laboratory.
3	Prepare models of fitting.
4	Prepare models of carpentry.
5	Make models of sheet metal.
6	Prepare joints by arc welding.
7	Construct electrical wiring circuit and demonstrate.
8	Demonstrate plumbing work.

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010	
Department	Information Technology	Programme code & Name		IT : B.Tech. Information Technology				
Semester III								

Course Code	Course Name	Hours / Week			Credi t	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 MA 003	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	Veerarajan.T, "Engineering mathematics-III", Tata McGraw Hill Publishing Company Limited, New Delhi.
2	Grewal, B.S., "Higher Engineering Mathematics", Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.

References :	
1	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.
2	Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics Volume III", S. Chand & Company ltd., New Delhi, 1996.

K. S. Rangasamy College of Technology – Autonomous Regulation			R2010
Department	Information Technology	Programme code & Name	IT: B.Tech. Information Technology

Semester III							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 EE 001	BASICS OF ELECTRICAL ENGINEERING (CS, IT)	3	0	0	3	50	50	100

Objective(s)	Exposing the students to Electrical Engineering topics like electrical circuits, magnetic circuits, various sources of electrical power & system, electrical machines and measuring instruments for electrical quantities.

1	ELECTRICAL CIRCUITS	Total Hrs	10

Electrical Circuits elements – resistance, inductance and capacitance; Basic definitions – current, voltage, Energy, Power – Ohm's law - Kirchoff's Law - Series and parallel resistances (simple problems using Kirchoff's Laws);Introduction to AC circuits – Instantaneous, RMS and average value of sine wave –form factor and peak factor- single phase and three phase balanced circuits – Phasor diagram (simple problems)

2	MAGNETIC CIRCUITS	Total Hrs	9

Ohm's law of magnetic circuit – Simple and composite magnetic circuits – effect of air gap – leakage factor – Fringing effect (simple problems).
Faraday's law of electro magnetic induction – self and mutual induced EMF – self and mutual inductances – statically and dynamically induced EMF (simple problems).

3	DC MACHINES & TRANSFORMERS	Total Hrs	9

DC machines - Construction – Principle of operation – EMF equation of DC generator – Torque equation of DC motor –Torque equation of DC motor – Back EMF - Types of DC motors – characteristics – applications; Single phase transformers - construction – Types – Principle of operation – EMF equation – Regulation – Efficiency; Three phase transformers – connections – Line and phase voltages / currents (simple problems)

4	AC MACHINES & MEASURING INSTRUMENTS	Total Hrs	9

Induction motor – 3 phase induction motor - Construction – Types - Principles of operation – Power flow diagram – applications; Single phase induction motor - Principle of operation – Types – applications; Synchronous machines – Principles – Construction – types – EMF equation. Stepper motor – Principle – Application.
Construction and working principle of moving coil and moving iron instruments – Dynamo meter type watt meter – 1 phase and 3 phase induction type energy meter.

5	POWER SYSTEM	Total Hrs	8

Structure of electric power system – Sources of Electrical Energy – Schematic diagram of Power plants; Steam, Hydroelectric, Nuclear, Gas, Wind and Solar (Qualitative Treatment only). House and industrial wiring materials – Earthing – Lighting arrester.

Total hours to be taught	45

Text book (s) :	
1	R. Muthusubramaniam, S. Salivahanan and KA Muraleedharan, "Basic Electrical, Electronics and Computer Engineering", TMH 2007.(Unit I : Chapter 1,4,5) (Unit II : Chapter 2,3) (Unit III :Chapter 6) (Unit IV : Chapter 6,7)
2	V.K.Mehta and Rohit Mehta 'Principle of Power System', S. Chand & Company, 2008. (Unit – V : Chapter – 1,2)

Reference(s) :	
1	B.L. Theraja and A.K. Theraja, 'Electrical Technology', S. Chand & Company LTD, New Delhi, 2009.
2	Del Tora 'Electrical Engineering Fundamentals' Pearson Education, New Delhi, 2007.
3	Edward Hughes, "Electrical Technology", ELBS.

K.S.Rangasamy College of Technology - Autonomous Regulation					R 2010	
Department	Information Technology	Programme code & Name		IT : B.Tech. Information Technology		
Semester III						

Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 EC 002	ELECTRONIC DEVICES AND CIRCUITS (CS, IT)	3	0	0	3	50	50	100

Objective(s)	To teach the fundamentals of semiconductor diode, BJT and biasing of transistors. To teach the working principles of feedback amplifiers, oscillators and power amplifiers.

1	SEMICONDUCTOR DIODES AND APPLICATIONS	Total Hrs	9

Conductors, semiconductors and insulators. N type and P type semiconductors. Semiconductor conductivity. PN junction. Biased junctions - PN junction diode – characteristics and parameters. Diode approximations- Zener diodes- Rectifier - Half wave rectification, Full wave rectification. Half wave and full wave rectifier power supplies.

2	BIPOLAR JUNCTION TRANSISTORS AND FIELD EFFECT TRANSISTORS	Total Hrs	9

Bipolar junction transistor operation, BJT voltage and currents- BJT amplification- BJT switching- CB, CE and CC characteristics FIELD EFECT Transistors, junction field effect transistors, JFET characteristics – MOSFETs – Enhancement and depletion types – comparison of BJT with MOSFET

3	TRANSISTOR BIASING	Total Hrs	9

BJT biasing – dc load line and bias point. Base bias, collector to base bias, voltage divide bias, comparison of basic bias circuits. Bias circuit design. Thermal stability of bias circuits. FET biasing- Dc load line and bias point. Gate bias, self bias, voltage divider bias. Frequency response of CE amplifier.

4	FEEDBACK AMPLIFIERS AND OSCILLATORS.	Total Hrs	9

Classification of amplifier- the feedback concept- general characteristics of negative feedback amplifiers- Effect of negative feedback upon output and input resistances - voltage series, current series, current shunt and voltage shunt feedback amplifier
Sinusoidal oscillators- Barkhausen Criterion. Mechanism for start of oscillation and stabilization of amplitude. RC phase shift oscillator - Analysis of LC Oscillators, Colpitts, Hartley oscillators.

5	LARGE SIGNAL AMPLIFIERS	Total Hrs	9

Classification of amplifiers, Class A large signal amplifier, second harmonic distortion,higher order harmonic generation, the transformer coupled audio power amplifier, efficiency, push pull amplifiers. Class B amplifiers, class AB operation Crossover distortion and methods of eliminating it.

Total hours to be taught	45

Text Book(s):	
1	David A. Bell, " Electronic devices and circuits ", Oxford University Press, 2008 5th edition (I, II, III Units)
2	Millman J. and Halkias .C., " Electronic devices and circuits ", Tata McGraw-Hill, 2007. (IV, V Units)

Reference(s) :	
1	Floyd, Electronic Devices, Sixth edition, Pearson Education, 2003.
2	Robert L. Boylestad and Louis Nashelsky, Electronic Devices & Circuit Theory, 8th edn., PHI, 2002.
3	Schilling and Belove, "Electronic Circuits", TMH, Third Edition, 2002
4	Sedra Smith, "Micro Electronic Circuits" Oxford university Press, 2004.

K.S.Rangasamy College of Technology - Autonomous Regulation					R 2010		
Department	Information Technology	Programme code & Name			IT: B.Tech. Information Technology		
Semester III							
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 EC 003	DIGITAL PRINCIPLES AND SYSTEM DESIGN (CS, EC, IT)	3	0	0	3	50	50	100
Objective(s)	To Introducing number systems and codes, basic postulates of Boolean algebra and show the correlation between Boolean expressions. To Outline the formal procedures for the analysis and designing of combinational circuits and sequential circuits and introducing 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 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 - BCD adder - Magnitude Comparator – Multiplexer / Demultiplexer - encoder / decoder – parity checker – code converters: binary to gray, gray to binary, BCD to excess 3 code. Implementation of combinational logic using MUX.							
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 machines – Analysis of clocked sequential circuits: state equation - State table – State diagram – State reduction & assignment - Design procedure. Register – shift registers - Universal shift register – Shift counters – Ring counters.							
4	ASYNCHRONOUS SEQUENTIAL CIRCUITS			Total Hrs		9	
Analysis procedure – Transition table - Flow table – Race conditions -Design of fundamental mode circuits – Primitive flow table – Reduction of state and flow table – Race free state assignment - 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 – ROM organization - PROM – EPROM – EEPROM – EAPROM – Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) - Field Programmable Gate Arrays (FPGA). Implementation of combinational logic using ROM, PAL and PLA.							
Total hours to be taught						45	
Text Book(s) :							
1	M. Morris Mano, 'Digital Design', 4th edition, Prentice Hall of India Pvt. Ltd./Pearson edu., New Delhi, 2007.						
Reference(s) :							
1	Donald P.Leach and Albert Paul Malvino, Goutam Saha 'Digital Principles and Applications', 7th edition., Tata McGraw Hill Publishing Company Limited, New Delhi, 2010.						
2	S. Salivahanan and S. Arivazhagan, 'Digital Circuits and Design', 3rd edition, Vikas Publishing House Pvt. Ltd, New Delhi.						
3	Charles H.Roth, 'Fundamentals of Logic Design', 5th edition Brooks/cole, 2004.						
4	John .M Yarbrough, 'Digital Logic Applications and Design', 1rst edition , Nelson engineering, 2006.						
5	John F.Wakerly, 'Digital Design: Principles and Practices', 4th edition, Pearson Education, 2008.						

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			
Semester III							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 IT 311	ADVANCED C AND C++	3	0	0	3	50	50	100
Objective(s)	Since C and C++ play a predominant role in software development, it is felt that the following objectives can be achieved after studying this subject, review of advanced features of C, understand the concepts of Object Oriented Programming, write simple applications using C++.						
1	ADVANCED C				Total Hrs	9	
Review of Pointers, Structures, Unions and File Operations – Simple Applications.							
2	OVERVIEW OF C++				Total Hrs	9	
Principles of Object-Oriented Programming – Beginning with C++ - Tokens, Expressions and Control Structures - Functions in C++.							
3	CONCEPTS OF OBJECT-ORIENTED PROGRAMMING				Total Hrs	9	
Classes and Objects – Function Overloading, Copy Constructors and Default arguments. - Operator Overloading –Inheritance.							
4	POINTERS AND FILE OPERATIONS				Total Hrs	9	
Pointers, References and Dynamic Memory Allocation operators - Virtual Functions and Polymorphism – C++ I/O System Basics: C++ Streams , Formatted I/O. – C++ File I/O.							
5	ADDITIONAL FEATURES				Total Hrs	9	
Templates – Exception handling – Standard Template Library: Overview, Container Class, Vectors, Lists, Strings.							
Total hours to be taught						45	
Text book (s) :							
1	Yashavant Kanetkar, "Let us C", BPB Publications, 2006.						
2	Herbert Schildt, "The Complete Reference C++", Tata McGraw Hill, Fourth Edition 2008.						
Reference :							
1	E. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw Hill, Fourth Edition 2008.						

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010
Department	Information Technology	Programme code & Name		IT: B.Tech. Information Technology			
Semester III							

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 001	DATA STRUCTURES USING C (CS, EE, EI, IT)	3	0	0	3	50	50	100
Objective(s)	Learning the systematic way of solving problems, different methods of organizing large amounts of data, Programming in C, efficient implementation of different data structures, and to implement solutions for specific problems.							

1	LISTS, STACKS AND QUEUES	Total Hrs	9

Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT

2	TREES	Total Hrs	10

Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – Splay Trees – B – Trees

3	HASHING AND PRIORITY QUEUES (HEAPS)	Total Hrs	8

Hashing – General idea – Hash Function – Separate chaining – Open addressing – Rehashing – Extendible hashing – Priority Queues (Heaps) – Model – Simple Implementations – Binary Heap – Applications of Priority Queues – d – Heaps.

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	M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd edition, Pearson Education Asia, 2002. (chapters 3, 4.1-4.4 (except 4.3.6), 4.5, 4.6, 4.7, 5.1-5.2, 5.3, 5.4, 5.5, 5.6, 6.1-6.3.3, 6.4, 6.5, 7.1-7.7 (except 7.2.2, 7.3, 7.4.1, 7.5.1, 7.6.1, 7.7.5, 7.7.6), 7.11, 9.1-9.3.2, 9.5-9.5.2, 9.6-9.6.2).

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 Pseudocode Approach with C", Thomson Brooks / COLE, 1998.

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010
Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			
Semester III							
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 EC 0P1	ELECTRONIC CIRCUITS AND DIGITAL 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. Characteristics of JFET

4 Half Wave and full wave Rectifier

5. Frequency response CE amplifier using voltage divider bias

6. RC phase shift oscillator

7. Study of logic gates

8. Study of JK, D and T flip flops

9. Study of Mod-n counter

10 Study of encoder and decoder

11 Study of multiplexer and demultiplexer

12 Study of shift register

Total hours to be taught		45

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			
Semester III							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 IT 3P1	ADVANCED C AND C++ LABORATORY	0	0	3	2	50	50	100

I. Programs using C

1. Program using Structures with pointers

2. Program using File handling functions

II. Programs using C++

3. Programs Using Functions with default and const arguments

4. Implementation of Call by Value, Call by Address and Call by Reference

5. Simple Classes for understanding objects, member functions, Constructors and Destructors

6. Classes with primitive data members

7. Classes with arrays as data members

8. Program using Operator Overloading including Unary and Binary Operators

9. Program using Function Overloading

10. Program using Inheritance

11. Multilevel Inheritance

12. Multiple Inheritance

13. Hierarchical Inheritance

14. Hybrid Inheritance

15. Program using Virtual functions and Virtual Base Classes

16. Program using File Handling

17. Sequential access

18. Random access

19. Program using Templates

20. Program using exception Handling Mechanism

21. Program using Manipulating String Objects using pointers.

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010
Department	Information Technology	Programme Code &Name	IT : B.Tech. Information Technology			
Semester III						

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 0P1	DATA STRUCTURES USING C LABORATORY (CS, EE, EI, IT)	0	0	3	2	50	50	100
Objective(s)	Teaching the students to write programs in C , various data structures as Abstract Data Types and solving problems using the ADTs							

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. Linked list implementations of Stack ADT
5. Implementation of stack applications:

    (a) Program for 'Balanced Paranthesis'

    (b) Program for 'Evaluating Postfix Expressions'
6. Queue ADT
7. Search Tree ADT - Binary Search Tree
8. Heap Sort
9. Quick Sort
10. Write a C Program to Implement Insertion sort.

Content beyond the syllabus:

1. Implement Doubly Linked List using C with the following operations:

    i) Find   ii) Insert   iii) Delete   iv) Display.
2. Write a C Program to Implement Shell sort.
3. Write a C program to implement the linear search technique.

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			

Semester III								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 TP 0P1	CAREER COMPETENCY DEVELOPMENT I	0	0	2	0	100	00	100
Objective(s)	To enhance employability skills and to develop career competency							

Unit – 1	Written Communication – Part 1	Hrs
Usage of noun, pronoun, adjective (Comparative Forms), Verb, Adjectives, Adverb, Tenses, Articles and Preposition - Change of Voice - Change of Speech - Synonyms & Antonyms - One Word Substitution - Using the Same Word as Different Parts of Speech - Odd Man Out - Spelling & Punctuation (Editing) Materials: Instructor Manual, Word Power Made Easy Book		8
Unit – 2	Written Communication – Part 2	
Analogies - Sentence Formation - Sentence Completion - Sentence Correction - idioms & Phrases - Jumbled Sentences, Letter Drafting (Formal Letters) - Reading Comprehension(Level 1) - Contextual Usage - Foreign Language Words used in English Materials: Instructor Manual, Word Power Made Easy Book		8
Unit – 3	Oral Communication – Part 1	
Self Introduction - Situational Dialogues / Role Play (Telephonic Skills) - Oral Presentations- Prepared -'Just A Minute' Sessions (JAM) Materials: Instructor Manual, News Papers		4
Unit – 4	Oral Communication – Part 2	
Describing Objects / Situations / People, Information Transfer - Picture Talk - News Paper and Book Review Materials: Instructor Manual, News Papers		4
Unit – 5	Speed Maths, Quantitative Aptitude	
Think Without Ink(TWI) Approach - Speed Maths: Squaring of Numbers - Multiplication of Numbers - Finding Square Roots - Finding Cube Roots - Solving Simultaneous Equations Faster - Number System: HCF, LCM - Decimals - Percentages - Averages - Powers and Roots - Sudoku (level 1) - Series Completion (Numbers, Alphabets, Pictures) - Odd Man Out - Puzzles Materials: Instructor Manual, Aptitude Book		6
	Total	30

Evaluation Criteria			
S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	50 Questions – 30Questions from Unit 1 & 2, 20 Questions from Unit 5, (External Evaluation)	50
2	Evaluation 2 Oral Communication 1	Self Introduction, Role Play & Picture Talk from Unit-3 (External Evaluation by English and MBA Dept)	30
3	Evaluation 3 Oral Communication 2	Book Review & Prepared Speech from Unit-4 (External Evaluation by English and MBA Dept)	20
		Total	100

Reference Books
1. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, "Quantitative Aptitude", TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications
Note :
• Instructor can cover the syllabus by Class room activities and Assignments(5 Assignments/week)
• Instructor Manual has Class work questions, Assignment questions and Rough work pages
• Each Assignment has 20 questions from Unit 1, 2 and Unit 5 and 5 questions from Unit 3 and 4
• Evaluation has to be conducted as like Lab Examination.

III Semester - Course Outcomes

Module	**10 MA 003- Engineering Mathematics III** **Course Outcomes**
	At the end of the course, the student will be able to
1.	Ability to form partial differential equations by eliminating arbitrary constants and functions
2.	Understand the solutions of some standard types of first order partial differential equations
3.	Effectively apply the methods to solve Lagranges Linear Equations
4.	Enhance the ability of solving homogeneous linear partial differential equations with constant coefficients
5.	Augment the knowledge of basic concepts of Fourier series
6.	Construe and express odd and even functions as a Fourier series
7.	Ability to expand the given functions into half range sine and cosine series and the concept of Parsevals identity
8.	Gain the knowledge about the concept of Hamonic analysis to express the given numerical value as Harmonics
9.	Knack of classifying of second order partial differential equations
10.	Understand the procedure to find the solutions of one dimensional wave equations
11.	Effective application of the procedure to find the solutions of one dimensional heat equations in steady state conditions
12.	Understand the procedure to find the solutions of one dimensional equations in unsteady state condition
13.	Understand the concepts of Fourier transform pair, sine transform and cosine transform
14.	Gaining the knowledge about the properties of Fourier transform
15.	Ability to apply convolution theorem for finding transform function
16.	Understand the usage of Parsevals identity for finding transform function
17.	Excercise to know the basic z- transforms and its properties
18.	Understand the concept of inverse Z transforms
19.	Firsthand knowledge about the different methods to find inverse Z transform for the given functions
20.	Ability to know the procedure to solve difference equations by using Z-transform

Module	**10 EE 001- Basics of Electrical Engineering** **Course Outcomes**
	At the end of the course, the student will be able to
1.	Demonstrate a basic understanding of physics in basic circuit elements.
2.	Recall basic circuital laws in the field of electrical and electronics engineering and apply it to debug complex electrical circuits
3.	Analyze and design simple circuits using a clearly defined system based approach to solve a specific problem.
4.	Recognize the basic laws of magnetism and distinguish magnetic circuit from an electrical circuit.
5.	Demonstrate an understanding of the differences in construction, performance and operation between the main topologies of electrical machines.
6.	Select and employ techniques for analyzing electrical machines
7.	Analyze various measuring techniques for electrical quantities.
8.	Illustrate the concepts of indicating instruments for voltage, current and magnetic measurements.
9.	Demonstrate an awareness of the sources of electrical energy and their sustainability
10.	Describe the roles played by generation, transmission, distribution and utilisation of modern electricity energy systems.

Modules	10 EC 002- Electronic devices and Circuits Course Outcomes
	At the end of the course, the student will be able to
1	Describe the basic theory of semiconductors and the construction and working of doides
2	Discuss the principles of rectification and regulation and analyse various rectifier circuits
3	Explain the construction and working of bipolar junction transistor in various configuration
4	Discucc the construction and working operation of FET in various configuration
5	Describe the concepts of biasing, stablization and analyse them in bipolar junction transistors
6	Describe the types of FET biasing
7	Understand the concepts and characteristics of negative feedback amplifiers
8	Design and analyse various oscillator circuits
9	Classify, design and analyse Large signal amplifiers
10	Understand the concepts of different distortion and elimination methods

Modules	10 EC 003- Digital Principles and System Design Course Outcomes
	At the end of the course, the student will be able to
1	Describe the fundamentals of numbering systems & code conversion.
2	Explain the concepts of Boolean functions and solve them using Karnaugh map.
3	Implementation of Boolean functions using logic gates.
4	Design of combinational logic circuits.
5	Describe the concept of flip flop as a basic element of a sequential circuit and analyze the characteristics of various flip flops.
6	Design various sequential circuits using flip flops.
7	Design asynchronous sequential circuits.
8	Describe various hazards and their elimination.

Modules	10 IT 311 - Advanced C and C++ Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the principles and practice of structure and union oriented program in C
2.	Be able to create a file and able to handle major operations in file handling in C
3.	Have knowledge about Pointers
4.	Study the major issues in C Program
5.	Have knowledge on object oriented concept
6.	Obtain knowledge on Tokens and expression in C++
7.	Understand the concept of control structure and function in C++
8.	Study about the classes and objects
9.	Ability to use the constant and default arguments in C++
10.	Acquire knowledge about function overloading concept.
11.	Understand the principles of call by value, call by reference and address concept in C ++ program
12.	Able to create bank account using constructor and destructor
13.	Ability to implement array as data member concept in C ++
14.	Understand how to implement the compile time polymorphism program in c++
15.	Gain knowledge on operator overloading in C ++
16.	Understand how to implement the compile time polymorphism program using function overloading in C ++
17.	Demonstrate the ability to derive classes using inheritance concept in C++ program
18.	Express the ability to implement polymorphism by using virtual base class in C++program.
19.	Understand the file handling concept in C++
20.	Understand the principles of template function ,class templete concept in C ++ program Implement the exception handling mechanisms in C++

Modules	10 CS 001 - Data Structures Using C Course Outcomes
	At the end of the course, the student will be able to
1.	Recognize the concept of List ADT and its implementations.
2.	Implement Stack ADT and its applications.
3.	Understand the Circular Queue ADT and its applications.
4.	Familiar with Circular linked list and its real time applications.
5.	Identify the concept of Binary and Binary Search tree with its operations.
6.	Knowledge about how to implement AVL tree with application.
7.	Gain the knowledge of Splay.
8.	Aware about the variations of B-Trees.
9.	Specify the Purpose of various Hashing techniques.
10.	Review various implementations and operations of priority Queues.
11.	Understand how D-Heap works.
12.	Distinguish separate chaining and Open addressing.
13.	Observe the concept of Insertion and Merge sorting.
14.	Aware about Quick sort, Shell sort and Heap sort.
15.	Demonstrate various External sorting techniques.
16.	Understand the difference between Internal and External sorting.
17.	Implement theshortest path algorithms and minimum spanning tree algorithms.
18.	Observe the concept of Depth First Search and Biconnectivity.
19.	Implement Topological sorting techniques and is application.
20.	Analyse the difference between DFS and BFS.

Modules	10 EC 0P1 - Electronic Circuits and Digital Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Characteristics of PN Junction Diode and Zener Diode
2.	Characteristics of BJT (common emitter configuration)
3.	Characteristics of JFET
4.	Half Wave and full wave Rectifier
5.	Frequency response CE amplifier using voltage divider bias
6.	RC phase shift oscillator
7.	Study of logic gates
8.	Study of JK, D and T flip flops
9.	Study of Mod-n counter
10.	Study of encoder and decoder
11.	Study of multiplexer and demultiplexer
12.	Study of shift register

Modules	10 IT 3P1 - Advanced C and C++ Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the principles and practice of structure and union oriented program in C
2.	Be able to create a file and able to handle major operations in file handling in C
3.	Have knowledge about Pointers
4.	Study the major issues in C Program
5.	Have knowledge on object oriented concept
6.	Obtain knowledge on Tokens and expression in C++
7.	Understand the concept of control structure and function in C++
8.	Study about the classes and objects
9.	Ability to use the constant and default arguments in C++
10.	Acquire knowledge about function overloading concept.
11.	Understand the principles of call by value, call by reference and address concept in C ++ program
12.	Able to create bank account using constructor and destructor
13.	Ability to implement array as data member concept in C ++
14.	Understand how to implement the compile time polymorphism program in c++
15.	Gain knowledge on operator overloading in C ++
16.	Understand how to implement the compile time polymorphism program using function overloading in C ++
17.	Demonstrate the ability to derive classes using inheritance concept in C++ program
18.	Express the ability to implement polymorphism by using virtual base class in C++program.
19.	Understand the file handling concept in C++
20.	Understand the principles of template function ,class templete concept in C ++ program. Implement the exception handling mechanisms in C++

Modules	10 CS 0P1 - Data Structures using C Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Demonstrate the array implementation of List ADT.
2.	Illustrate linked list implementation of List ADT.
3.	Demonstrate Cursor implementation of List ADT.
4.	Implement circular linked list.
5.	Enumerate Linked list implementation of Stack ADT.
6.	Illustrate linked list implementation of Queue ADT.
7.	Implement the evaluation of post fix expression.
8.	Evaluate Balanced Parenthesis with the help of Stack ADT.
9.	Demonstrate the conversion of Infix to postfix expression.
10.	Implement Queue ADT.
11.	Demonstrate the Circular queue implementation using singly linked list.
12.	Implement Binary Search Tree ADT.
13.	Enumerate the implementation of AVL tree
14.	Demonstrate the implementation of splay tree.
15.	Implement the concept of B-Tree
16.	Demonstrate the heap tree and its application.
17.	Illustrate Heap Sort.
18.	Implement Quick Sort.
19.	Demonstrate Insertion sort.
20.	Illustrate the difference between BFS and DFS

K.S.Rangasamy College of Technology – Autonomous Regulation						R2010	
Department	Information Technology	Programme Code and Name		IT: B.Tech. Information Technology			
Semester IV							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 MA 004	PROBABILITY AND STATISTICS (BT, IT, ME, TT)	3	1	0	4	50	50	100

Objective(s)	At the end of the course, the students would Acquire skills in handling situations involving more than one random variable and functions of random variables. Be introduced to the notion of sampling distributions and have acquired knowledge of statistical techniques useful in making rational decision in management problems. Be exposed to statistical methods designed to contribute to the process of making scientific judgments in the face of uncertainty and variation.

1	PROBABILITY AND RANDOM VARIABLE	Total Hrs	12

Axioms of probability - Conditional probability - Total probability - Bayes 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.

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	TESTING OF HYPOTHESIS	Total Hrs	12

Sampling distributions – Testing of hypothesis for mean, variance, proportions and differences using Normal, t, Chi-square and F distributions - Tests for independence of attributes and Goodness of fit.

5	DESIGN OF EXPERIMENTS	Total Hrs	12

Analysis of variance – One way classification – Completely Randomized block Design - Two – way classification – Randomized Block Design - Latin square.

Total hours to be taught	60

Text book (s) :

1	Gupta, S.C, and Kapur, J.N., "Fundamentals of Mathematical Statistics", Sultan Chand, Ninth edition, New Delhi, 1996.

Reference(s) :

1	Ross. S., "A first Course in Probability", Fifth Edition, Pearson Education, Delhi 2002.
2	Johnson. R. A., "Miller & Freund's Probability and Statistics for Engineers", Sixth Edition, Pearson Education, Delhi, 2000.
3	Lipschutz. S and Schiller. J, "Schaum's outlines - Introduction to Probability and Statistics", McGraw-Hill, New Delhi, 1998.
4	Walpole, R. E., Myers, R. H. Myers R. S. L. and Ye. K, "Probability and Statistics for Engineers and Scientists", Seventh Edition, Pearsons Education, Delhi, 2002.
5	Johnson. R. A., "Miller & Freund's Probability and Statistics for Engineers", Sixth Edition, Pearson Education, Delhi, 2000. (Chapters 7, 8, 9, 12).

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010
Department	Information Technology	Programme Code & Name	IT : B.Tech. Information Technology				
Semester IV							

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 003	DESIGN AND ANALYSIS OF ALGORITHMS (CS, IT)	3	0	0	3	50	50	100

Objective(s)	Introducing basic concepts of algorithms, mathematical aspects and analysis of algorithms, sorting and searching algorithms, various algorithmic techniques and algorithm design methods.

1	BASIC CONCEPTS OF ALGORITHMS	Total Hrs	8

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

2	MATHEMATICAL ASPECTS AND ANALYSIS OF ALGORITHMS	Total Hrs	8

Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

3	ANALYSIS OF SORTING AND SEARCHING ALGORITHMS	Total Hrs	10

Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute-force string matching – Divide and conquer – Merge sort – Quick Sort – Binary Search – Binary tree- Traversal and Related Properties – Decrease and Conquer – Insertion Sort – Depth first Search and Breadth First Search.

4	ALGORITHMIC TECHNIQUES	Total Hrs	10

Transform and conquer – Presorting – Balanced Search trees – AVL Trees – Heaps and Heap sort – Dynamic Programming – Warshall's and Floyd's Algorithm – Optimal Binary Search trees – Greedy Techniques – Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman trees.

5	ALGORITHM DESIGN METHODS	Total Hrs	9

Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset-Sum Problem — Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

Total hours to be taught	45

Text book (s) :	
1	Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.

Reference(s):	
1	T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt. Ltd., 2001
2	Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 2003.
3	A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis Of Computer Algorithms", Pearson Education Asia, 2003.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT : B.Tech. Information Technology			
Semester IV							

Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	C A	ES	Total
10 EC 007	MICROPROCESSORS AND MICROCONTROLLERS (CS, EC, IT)	3	0	0	3	50	50	100

Objective(s)	To introduce the architecture and programming of 8085 and 8086 microprocessor, interfacing of peripheral devices with 8085 microprocessor and architecture and programming of 8086 microprocessor. To introduce the architecture, programming and interfacing of 8051 micro controller.

1	8085 MICROPROCESSOR	Total Hrs	9

8085 Architecture – Instruction set – Addressing modes – Timing diagrams – Assembly language programming – Memory interfacing – Interfacing I/O devices.

2	PERIPHERALS INTERFACING	Total Hrs	9

Programmable Peripheral Interface(PPI 8255) –Programmable Interval Timer(PIT 8253) – 8259 Programmable Interrupt Controller – keyboard & display controller (8279)- Interfacing serial I/O (8251)- ADC/DAC interfacing - stepper motor interfacing – Traffic light controller.

3	8086 MICROPROCESSOR	Total Hrs	9

8086 Internal Architecture – Addressing modes – Instruction set - Assembly language programming- signals and timing – MIN/MAX mode of operation – Interrupts - Interfacing memory and I/O devices – System design using 8086.

4	8051 MICROCONTROLLER	Total Hrs	9

8051 Architecture – Instruction set – Addressing modes - Assembly language programming – I/O port programming- 8051 Micro controller hardware - I/O pins, ports and circuits - External memory - Interfacing to external memory and 8255.

5	8051 PROGRAMMING AND APPLICATION	Total Hrs	9

Interrupts – counters and Timers - Timer and counter programming - Serial Communication - Interrupt programming - 8051 Interfacing: LCD, ADC, Sensors, Stepper Motors, Keyboard and DAC.

Total hours to be taught	45

Text book (s) :	
1	Ramesh S Goankar, "Microprocessors Architecture, Programming and application with 8085". 5th edition, Prentice Hall, New Delhi, 2002
2	Krishna Kant, "Microprocessors and Microcontrollers Architecture, Programming and System design 8085, 8086, 8051, 8096", PHI, Third printing- 2010.

Reference(s) :	
1	Mohammed Ali Mazidi and Janice Gilli Spil Mazidi, The 8051 microcontroller, Prentice Hall of India, 2006
2	Douglas V.Hall,"Microprocessors and Interfacing Programming and Hardware", Tata McGraw-Hill publishing company Limited, New Delhi. Fifteenth reprint 2002
3	A.K. Ray and K.M.Burchandi, Intel Microprocessors Architecture Programming and Interfacing, McGraw Hill International Edition. Twelfth reprint 2009
4	M.Rafiquizzaman " Microprocessor - Theory and applications" Prentice Hall of India Pvt Ltd., 2005

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Semester IV							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 411	COMPUTER ARCHITECTURE	3	0	0	3	50	50	100

Objective(s)	To have a thorough understanding of the basic structure and operation of a digital computer, discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division, study in detail the different types of control and the concept of pipelining, study the hierarchical memory system including cache memories, study the different ways of communicating with I/O devices and standard I/O interfaces.

1	BASIC STRUCTURE OF DIGITAL COMPUTERS	Total Hrs	10

Functional units- Basic Operational Concepts - Bus Structures – Design of digital circuits – simplification of Boolean circuits using K – map and tabulation methods – Design of simple combinational circuits for arithmetic operations, code conversion – Design of Synchronous sequential circuits, synchronous MOD counter, shift register.

2	ARITHMETIC	Total Hrs	8

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 – decoders and encoders – multiplexers and demultiplexers - semiconductor RAMs, ROMs – Speed, size and cost – cache memories - Performance consideration.

5	I/O ORGANIZATION	Total Hrs	9

Accessing I/O devices – Enabling and disabling 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.
2	M.Morris Mano," Digital Design," third edition, Pearson Education, 2002.

Reference (s) :	
1	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.
4	Charles H.Roth, Jr. "fundamentals of Lock Design," Fourth edition, Jaico Publishing House, 2000.
5	Donald D.Givone, "Digital Principles and Design," Tat McGraw-Hill, 2003.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			
Semester IV							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 412	PRINCIPLES OF COMMUNICATION	3	0	0	3	50	50	100

Objective(s)	To have an idea about the different modulation schemes, study in detail about the AM and FM Transmitters & Receivers, gain knowledge about different digital modulation techniques for digital transmission, understand the method of spread spectrum modulation and different multiple access methods.

1	AMPLITUDE MODULATION: TRANSMISSION AND RECEPTION	Total Hrs	9

Introduction to communication-Modulation and Demodulation-The electro magnetic frequency spectrum-Bandwidth and Information capacity-Principles of amplitude modulation - AM modulating circuits - AM transmitters – Receiver parameters- AM receivers- Tuned Radio frequency receiver, Super heterodyne receiver.

2	ANGLE MODULATION: TRANSMISSION AND RECEPTION	Total Hrs	9

Angle Modulation – Mathematical analysis- Deviation sensitivity- FM and PM waveforms – Phase deviation and modulation index – Frequency deviation and percent modulation- Frequency analysis and Bandwidth requirements of angle modulated waves- Frequency and Phase Modulators- Direct FM Transmitters- FM Receivers – FM demodulators.

3	DIGITAL MODULATION	Total Hrs	9

Introduction- Information capacity, bits, bit rate, baud and Mary encoding- Amplitude shift keying-Frequency shift keying-Phase shift keying- Bandwidth efficiency- Differential phase shift keying.

4	DIGITAL TRANSMISSION	Total Hrs	9

Introduction-Pulse Modulation-Pulse code modulation- PCM sampling- Delta modulation PCM- Adaptive delta modulation PCM- Differential PCM- Pulse transmission.

5	SPREAD SPECTRUM MODULATION	Total Hrs	9

Pseudo-noise sequence- A notion of spread spectrum- Direct sequence spread spectrum with coherent binary PSK – Probability of error- Frequency hop spread spectrum- Applications-Multiplexing -TDMA, FDMA and CDMA-Comparison of various multiple access techniques.

Total hours to be taught	45

Text book (s) :

1	Wayne Tomasi, "Electronic Communication Systems: Fundamentals Through Advanced", Pearson Education, fifth edition, 2007. (UNIT I Chapters – 1, 4, 5; UNIT II: Chapters-7, 8; UNIT III Chapter-9; UNIT IV Chapter-10; UNIT V Chapter-11).
2	Simon Haykin, "Digital Communications", John Wiley & Sons, 2009. (UNIT V Chapter – 9)

Reference (s) :

1	Dennis Reddy, John Coolen,"Electronic Communications", Pearson education, fourth edition, 2004.
2	Kennedy, Davis," Electronic Communication Systems", Tata Mc Graw hill, fourth edition, 2009.
3	Roy Blake," Electronic Communication Systems", Thomsan Delmar, second edition 2005.

K.S.Rangasamy College of Technology - Autonomous Regulation		R 2010
Department	Information Technology	Programme Code &Name	IT: B.Tech. Information Technology

Semester IV							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 413	JAVA PROGRAMMING	3	0	0	3	50	50	100

Objective(s)	Understand the concepts of Object Oriented Programming, design and develop Java Applications and applets, introduce the concepts of packages and class libraries, develop network programs in Java.

1	JAVA INTRODUCTION		Total Hrs	9

An overview of Java, Data types, Variables and arrays, Operators, Control statements, Classes Objects, Methods, Inheritance.

2	JAVA CONCEPTS		Total Hrs	9

Packages and Interfaces, Exception handling, Multithreaded programming, Strings.

3	PACKAGES		Total Hrs	9

Lang packages, Util packages – The Collections Framework, I/O packages, Net work package.

4	INTRODUCTION TO AWT		Total Hrs	9

Applets Package, Event handling, Introducing the AWT: working with windows, Graphics and Text.

5	AWT PACKAGE AND DATABASE CONNECTIVITY		Total Hrs	9

Using AWT controls, Layout Managers and Menus, Java Data Base Connectivity (JDBC).

Total hours to be taught	45

Text book (s) :

1	Herbert Schildt, "The complete Reference – Java 2", fifth edition, Tata McGraw Hill Publishing Company, 2006.
2	H.M. Deitel, P.J. Deitel "JAVA^{TM} How to program", sixth edition, Pearson Education – 2007. [JDBC only]

Reference (s) :

1	Advanced programming in JAVA prentice – Hall of India Private Limited NIIT – 2003.
2	Pratik patel and Karlmoss "Java Data base programming with JDBC", Second Edition, Dream tech press – 2000.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Semester IV							
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 EC 0P3	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY(CS,EC,IT)	0	0	3	2	50	50	100
LIST OF EXPERIMENTS							

1. Programs for sorting and searching (Using 8086 & 8051).

2. Interfacing and programming of keyboard & display controller

3. Interfacing and programming of interrupt controller

4. Interfacing and programming of Timer

5. Interfacing ADC and DAC with 8085.

6. Parallel Communication and Serial Communication

7. Interfacing and Programming of Traffic light controller.

8. Interfacing and Programming of digital clock using timer.

9. Interfacing, Programming of Stepper Motor & DC Motor Speed control.

10. Microcontroller 8051- Sample programs through IDE using KEIL.

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010	
Department	Information Technology	Programme Code &Name			IT: B.Tech. Information Technology			
Semester IV								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 4P1	HARDWARE LABORATORY	0	0	3	2	50	50	100

LIST OF EXPERIMENTS

1.   Study of Motherboard.
2.   Study of SMPS.
3. (i) Configuring BIOS setup program and practicing trouble shooting of typical
       problems using BIOS utility.

  (ii)   a. Install Hard Disk
          b. Configure CMOS-Setup
          c. Master / Slave / IDE Devices

4. (i) Printer installation
                a. Install and Configure Dot-matrix and Laser printer
                b. Trouble shoot the above printers

   (ii) Install Audio / Video devices
                a. Microphone Speaker Headset and Web camera

5. (i) Install and configure Scanner
     (ii) Modem and TV tunes card Installations
                a. Install and configure Internal and External Modem
                b. Install and configure TV tuner card.

6.   a. Partition Hard Disk using FDISK and
          b. Format Hard Disk
          c. Windows XP-Operating System Installation.
          d. Identify problems with Software installation using drivers available in the
             motherboard CD

7.   a. Identify the connectors using wireless devices
          b. Bluetooth setup.

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Semester IV							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 IT 4P2	JAVA PROGRAMMING LABORATORY	0	0	3	2	50	50	100

LIST OF EXPERIMENTS

1. Program using control statements.

2. Program to implement the concept of class and objects.

3. Program to illustrate the use of overloading and overriding.

4. Program to implement the concept of interfaces and packages.

5. Program using exception handling mechanism.

6. Program to achieve inter thread communication and deadlock avoidance.

7. Program to implement the file operations.

8. Program using Applets.

9. Program using AWT.

10. Program using collections.

11. Program using Net package.

12. Program using JDBC.

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Semester IV							

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 TP 0P2	CAREER COMPETENCY DEVELOPMENT II	0	0	2	0	100	00	100

Objective(s)	To enhance employability skills and to develop career competency

Unit – 1	Written Communication – Part 3	Hrs
Reading Comprehension Level 2 (Paraphrasing Poems) - Letter Drafting - Email Writing - Paragraph Writing - News paper and Book Review Writing - Skimming and Scanning - Interpretation of Pictorial Representations. Practices: Sentence Completion - Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Editing Materials: Instructor Manual, Word power Made Easy Book, News Papers		6
Unit – 2	Oral Communication – Part 3	
Self Introduction - Miming (Body Language) - Introduction to the Sounds of English - Vowels, Diphthongs & Consonants, Introduction to Stress and Intonation - Extempore - News Paper and Book Review - Technical Paper Presentation. Material: Instructor Manual, News Papers		4
Unit – 3	Verbal Reasoning – Part 1	
Analogies - Alphabet Test - Theme Detection - Family Tree - Blood Relations (Identifying relationships among group of people) - Coding & Decoding - Situation Reaction Test - Statement & Conclusions Material: Instructor Manual, Verbal Reasoning by R.S.Aggarwal		8
Unit – 4	Quantitative Aptitude – Part 1	
Problem on Ages - Percentages - Profit and Loss - Simple & Compound Interest - Averages - Ratio, Proportion Material: Instructor Manual, Aptitude Book		6
Unit – 5	Quantitative Aptitude – Part 2	
Speed, Time & Work and Distance - Pipes and Cisterns - Mixtures and Allegations - Races - Problem on Trains - Boats and Streams Practices : Puzzles, Sudoku, Series Completion, Problem on Numbers Material: Instructor Manual, Aptitude Book		6
	Total	30

Evaluation Criteria			
S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	15 Questions Each from Unit 1, 3, 4 & 5 (External Evaluation)	60
2	Evaluation 2 Oral Communication	Extempore & Miming – Unit 2 (External Evaluation by English, MBA Dept.)	20
3	Evaluation 3 Technical Paper Presentation	Internal Evaluation by the Dept.	20
		Total	100

Reference Books
1. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, "Quantitative Aptitude", TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications

Note :
• Instructor can cover the syllabus by Class room activities and Assignments (5 Assignments/week)
• Instructor Manual has Class work questions, Assignment questions and Rough work pages
• Each Assignment has 20 questions from Unit 1, 3, 4 and Unit 5 and 5 questions from Unit 2.
• Evaluation has to be conducted as like Lab Examination.

IV Semester - Course Outcomes

Modules	10 MA 004 - Probability and Statistics Course Outcomes
	At the end of the course, the student will be able to
1.	Ability of probability and Conditional probability
2.	Understand the Bayes theorem and solutions of problems.
3.	Knowledge of Probability mass function and Probability density functions
4.	Enhance the ability of Moment generating functions and their properties.
5.	Augment the knowledge of Binomial and Poisson distributions.
6.	Construe and express Geometric and Negative Binomial distributions.
7.	Ability of Uniform distribution and Exponential distributions.
8.	Gain the knowledge about the Gamma, Weibull and Normal distributions and their properties.
9.	Knack of joint distributions
10.	Understand the procedure to Marginal and conditional distributions
11.	Effective application of Covariance, Correlation and Regression, Transformation of random variables
12.	Understand the procedure Central limit theorem.
13.	Understand the concepts of Sampling distributions
14.	Gaining the knowledge Testing of hypothesis for mean and variance
15.	Ability to student t, Chi-square and F distributions
16.	Understand the usage tests for independence of attributes and Goodness of fit.
17.	Gain the knowledge one way classifications method.
18.	Understand the concept two way classifications.
19.	Firsthand knowledge about Randomized Block Design.
20.	Ability to know the procedure to latin square.

Modules	10 CS 003 - Design and Analysis of Algorithms Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the concept of algorithm solving techniques
2.	Know about the various types of problems in algorithm solving
3.	Analyze the various steps involved in problem solving
4.	Find the worst case, best case and average case efficiency
5.	Analyze the mathematical steps involved in non recursive algorithms
6.	Analyze the mathematical steps involved in recursive algorithms
7.	Know about the mathematical analysis of algorithm
8.	Study about static and dynamic algorithm vizualization
9.	Analyze the various sorting by divide and conquer algorithm
10.	Solve and obtain the solution for decrease and conquer
11.	Understand the techniques of design strategies
12.	Construct the binary tree with related properties
13.	Study about the design methods and transformation approaches
14.	Learn about the optimal algorithm techniques and its method
15.	Provide feasible and optimal solution for given problem
16.	Construct the AVL tree with balance factor
17.	Analyze about the search technique involved in backtracking
18.	Find the optimal solution for improvement of backtracking
19.	Obtain the shortest path with minimum cost
20.	Gain the knowledge about 4queen or 8queen problem

Modules	10 EC 007 - Microprocessors and Microcontrollers Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the concept of 8085 architecture
2.	Know about the addressing modes and instruction set
3.	Analyse peripheral interfacing
4.	Find working of traffic control lighter
5.	Know about 8086 architecture and addressing mode
6.	Obtain knowledge of 8086 system design
7.	Understand the concept of 8051 architecture
8.	Find interfacing of 8051 to external memory
9.	Understand working of interupts , counters, timers
10.	Obtain knowledge of LCD sensors and ADC

Modules	10 IT 411 - Computer Architecture Course Outcomes
	At the end of the course, the student will be able to
1.	Know about the basic functional units of a computer, their operation and bus structures
2.	Simplify the boolean functions using K-map and tabulation method
3.	Learn the design of Combinational circuits
4.	Learn the design of Sequential circuits
5.	Study the basics of Addition and subtraction of signed numbers, multiplication, and Integer division
6.	Study the basics design of fast adders
7.	Analyze the differences between Hardwired control and Micro programmed control
8.	Understand basic concept of instruction execution
9.	Gain knowledge about pipelining and hazards
10.	Observe the basic concepts and types of RAM and ROM memories
11.	Understand the concept of Decoders, Encoders
12.	Understand the concept of Multiplexers and Demultiplexers
13.	Observe the basic concepts of RAM and ROM memories
14.	Learn about Cache memory and Performance issues
15.	Acquire knowledge about Accessing I/O devices and Interrupts
16.	Find concepts of interrupts usage
17.	Gain knowledge about Direct Memory Access
18.	Understand how buses are used in device communication
19.	Analyse the interface circuits among different devices in system
20.	Learn about Standard I/O Interfaces with examples

Modules	10 IT 412 - Principles of Communication Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the need for modulation and demodulation.
2.	Realize the fundamental process of amplitude modulation and its time domain analysis.
3.	Understand the signal transmission through Amplitude modulation.
4.	Differentiate the radio receivers and analyze its characteristics.
5.	Understand the concepts of frequency and phase modulation
6.	Comprehend some of the common circuits used to produce angle modulated waves.
7.	Understand the transmitter involved for direct FM transmission.
8.	Identify the basic receiver circuits used for the reception of FM and PM signals.
9.	Learn the concepts of digital modulation.
10.	Gain knowledge about the digital transmission using ASK and FSK.
11.	Understand the role of bit rate, baud rate and frequency parameter in digital transmission.
12.	Identify different phase shifts involved for digital transmission and reception.
13.	Understand the details of sampling and a PCM transmission system.
14.	Select suitable method to perform digital transmission of analog signals.
15.	Understand the operation of DPCM transmitter and receiver.
16.	Analyze the performance of different digital transmission systems.
17.	Understand the need, advantages and applications of spread spectrum communication.
18.	Understand operation of spread spectrum using coherent binary phase shift keying.
19.	Comprehend the spread spectrum communication using slow and fast frequency hopping.
20.	Differentiate the concept of different multiple access techniques.

Modules	10 IT 413 - Java Programming Course Outcomes
	At the end of the course, the student will be able to
1.	Demonstrates the ability to use object-oriented features and data types of java.
2.	Understand the ability to employ different control statements.
3.	Implement classes and control access to members of a class.
4.	Understand the reusability through inheritance concepts.
5.	Extrapolate code reduction and access different operations through single packages and interfaces.
6.	Implement error-handling techniques using exception handling.
7.	Apply the concept of multithreading applications that can take advantage of multiple processors and perform background tasks.
8.	Understand String concepts and perform String operations.
9.	Understand the importance of lang package.
10.	Implement input/output (I/O) functionality to read from and write to data and text files and understand I/O streams
11.	Understand the concept of collections framework, legacy collection classes, event model, date and time facilities, internationalization, and miscellaneous utility classes
12.	Understand the UDP and socket for designing server side communication.
13.	Implement client side programming and also enriching the web browser
14.	Create an event-driven graphical user interface (GUI).
15.	Understand and design a window for the application.
16.	Understand the library of classes and create a Graphical User Interface (GUI) to interact with users
17.	Develop an event-driven graphical user interface using AWT controls.
18.	Effectively use layout managers with AWT and build complex screens with the help of one or multiple layout managers.
19.	Understand menus and apply them in the frames.
20.	Understand JDBC technology and enables to manipulate data from databases.

Modules	10 EC 0P3 - Microprocessors and Microcontrollers Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Programs for sorting and searching (Using 8086 & 8051).
2.	Interfacing and programming of keyboard & display controller
3.	Interfacing and programming of interrupt controller
4.	Interfacing and programming of Timer
5.	Interfacing ADC and DAC with 8085.
6.	Parallel Communication and Serial Communication
7.	Interfacing and Programming of Traffic light controller.
8.	Interfacing and Programming of digital clock using timer.
9.	Interfacing, Programming of Stepper Motor & DC Motor Speed control.
10.	Microcontroller 8051- Sample programs through IDE using KEIL.

Modules	10 IT 4P1 - Hardware Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Study about the various components of motherboard
2.	Study about SMPS
3.	Develop ability to trouble shoot typical system problems using BIOS utility
4.	Knowledge about the installation of Install Hard Disk
5.	Knowledge about the installation of Install CMOS-Setup
6.	Knowledge about the installation of Dot-matrix and Laser printer
7.	Knowledge about the installation of Microphone Speaker Headset
8.	Knowledge about the installation of web camera
9.	Ability to install various operating systems
10.	Know about Hard Disk Partition using FDISK and Format Hard Disk
11.	Knowledge about Hard Disk Formatting
12.	Identify problems with Software installation using drivers available in the motherboard CD
13.	Understand various wireless devices
14.	Understand various network devices
15.	Understand various network protocols
16.	Configure Local Area Network.
17.	Analyze system configuration and upgrade
18.	Identify the connectors using wireless devices
19.	Knowledge on how to transfer files using Bluetooth setup
20.	Assemble the parts of a computer

Modules	10 IT 4P2 - Java Programming Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Implement classes and control access to members of a class
2.	Use members of classes found in the java API
3.	Implement various concepts of class and objects.
4.	Understand the methodology to deploy different control statements
5.	Implementation of function overloading
6.	Implementation of function overriding techniques for avoiding redundancy
7.	Use of interfaces to encode similarities which the classes of various types share
8.	Use exception handling mechanisms signifying the unavailability of certain resource
9.	Developing multi threaded environment in web based applications
10.	Implement various file operations
11.	Implement various file handling techniques like copy, edit, update ,read, write using various i/o streams
12.	Demonstrate the ability to employ various types of selection constructs
13.	Use AWT package to develop user interface objects like buttons, checkboxes and menus etc
14.	Develop web applications using AWT package
15.	Demonstrate the application of collections to use various data structures
16.	Demonstrate the utility methods to perform functions such as sorting a list of data
17.	Apply net packages for implementing networking applications
18.	Use JDBC connection as a bridge between application and the actual database
19.	Implement, compile, test and run java programmes, comprising more than one class, to address a particular software problem
20.	Design and construct an event driven graphic user interfaces(GUI) for application software

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT : B.Tech. Information Technology			
Semester V							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 HS 001	PROFESSIONAL ETHICS	3	0	0	3	50	50	100

Objective(s)	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(s) :		
1	Govindarajan M, Natarajan S, Senthil Kumar V.S, "Engineering Ethics", Prentice Hall of India (P) Ltd, New Delhi, 10th Reprint 2009.	
Reference(s):		
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.	

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010
Department	Information Technology	Programme Code & Name		IT : B.Tech. Information Technology			
Semester V							

Course Code	Course Name	Hours / Week			Cre dit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 005	DATABASE MANAGEMENT SYSTEMS (CS, IT)	3	1	0	4	50	50	100

Objective(s)	To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram, make a study of SQL and relational database design, understand the internal storage structures using different file and indexing techniques which will help in physical DB design, know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure, have an introductory knowledge about the emerging trends in the area of distributed DB- OO DB- Data mining and Data Warehousing and XML.

1	INTRODUCTION AND CONCEPTUAL MODELING		Total Hrs	12

Introduction to File and Database systems- Database system structure – Data Models – ER model – Relational Model – Relational Algebra and Calculus.

2	RELATIONAL MODEL		Total Hrs	12

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	12

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	12

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	12

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- DTD- XML Document Schema- Querying and Transformation – Data Mining and Data Warehousing.

Total hours to be taught	60

Text book :	
1	Abraham Silberschatz, Henry F. Korth and S. Sudarshan - "Database System Concepts", Sixth Edition, McGraw-Hill, 2011.

Reference (s) :	
1	Ramez Elmasri and Shamkant B. Navathe, "Fundamental Database Systems", Fifth Edition, Pearson Education, 2009.
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- 2003.
4	Peter Rob and Corlos Coronel- "Database System, Design, Implementation and Management", Thompson Learning Course Technology- Fifth edition, 2003.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010
Department	Information Technology	Programme Code & Name		IT : B.Tech. Information Technology		
Semester V						

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 511	TELECOMMUNICATION SYSTEMS	3	0	0	3	50	50	100

Objective(s)	To gain knowledge about characteristics of transmission lines and microwave devices, study about the fundamentals of satellite communication & optical communication, gain knowledge about advances in Telephone systems and TV systems, understand the essentials of cellular communication systems and wireless technologies.		
1	INTRODUCTION TO ANTENNAS, MICROWAVE DEVICES AND RADAR	Total Hrs	9
Transmission lines – Types and Characteristics, Antenna Fundamentals – Different types of antennas & their Characteristics, Radio Frequency wave propagation- Microwave Principles - Microwave Tubes - Radar - Pulsed Radar - CW Radar			
2	OVERVIEW OF SATELLITE SYSTEMS, ORBITS AND LAUNCHING	Total Hrs	9
Introduction – Kepler's laws - Satellite orbits- Frequency Allocations for Satellite Services- Satellite communication systems –Satellite Sub Systems –Earth stations- Satellite Applications			
3	OPTICAL COMMUNICATION AND TELEPHONE SYSTEM	Total Hrs	9
Light wave communication systems – Optical Fiber Modes and Configurations - Optical Transmitters & Receivers –Fiber optic Data communication systems -Telephones –Telephone system- Facsimile- Integrated services Digital Network			
4	TELEVISION	Total Hrs	9
Elements of a TV system - gross structure - image continuity -scanning process - TV Signal - Color Signal Generation - Colour Picture Tube - TV transmitter - TV receiver – Modern Cable TV System – Satellite TV – Digital Television.			
5	CELLPHONE & WIRELESS TECHNOLOGIES	Total Hrs	9
Cellular Telephone Systems – The advanced Mobile Phone System (AMPS) – Digital Cell Phone System – Wireless LAN – PAN's & blue tooth – Zigbee & Mesh Wireless Networks – WiMax & Wireless Metropolitan Area Networks – Infrared Wireless – Radio Frequency Identification & Near Field Communication.			
Total hours to be taught			45

Text book (s) :	
1	Louis.E.Frenzel, "Communication Electronics – Principles and Application", 3rd Edition, Tata McGraw-Hill, 2004.
2	Louis E-Frenzel, "Principles of Electronics Communication System", 3rd Edition, Tata McGraw-Hill, 2008.
Reference (s) :	
1	Wayne Tomasi, "Electronic Communication systems", 4th Edition, Pearson Education, 2002.
2	Marin Cole, "Introduction to Telecommunications -Voice, Data and Internet", Pearson Education, 2001.
3	Dennis Roddy, "Satellite Communications", McGraw-Hill Publication Third edition 2001
4	R.R.Gulati, "Monochrome and Colour Television", New Age International Publishers, 2003

K.S.Rangasamy College of Technology - Autonomous Regulation		R 2010
Department	Information Technology	Programme Code & Name	IT : B.Tech. Information Technology

Semester V

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 512	OPERATING SYSTEMS	3	1	0	4	50	50	100

Objective(s)	To have an overview of different types of operating systems, know the components of an operating system have a thorough knowledge of process management, have a thorough knowledge of storage management, know the concepts of I/O and file systems.

1	BASIC CONCEPTS	Total Hrs	12

Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems– Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication.

2	PROCESS MANAGEMENT	Total Hrs	12

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 .

3	MEMORY MANAGEMENT - I	Total Hrs	12

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	MEMORY MANAGEMENT - II	Total Hrs	12

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	I/O SYSTEMS	Total Hrs	12

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. Kernel I/O Subsystems - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management.

Total hours to be taught	60

Text book(s) :	
1	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", Eighth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2009.

Reference (s) :	
1	Harvey M. Deitel, "Operating Systems", Third Edition, Pearson Education Pvt. Ltd, 2003.
2	Andrew S. Tanenbaum, "Modern Operating Systems", Third Edition, Prentice Hall of India Pvt. Ltd, 2007.
3	William Stallings, "Operating System", Prentice Hall of India, 4th Edition, 2003.
4	Pramod Chandra P. Bhatt, "An Introduction to Operating Systems, Concepts and Practice", PHI, 2007.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			
Semester V							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 513	SOFTWARE ENGINEERING	3	1	0	4	50	50	100

Objective(s)	To be aware of Different life cycle models, requirement dictation process, analysis modeling and specification, architectural and detailed design methods, implementation and testing strategies, project planning and management, use of CASE tools.

1	SOFTWARE PROCESS	Total Hrs	12

A Generic View Of Processes – Process Models: Waterfall – Incremental – Evolutionary Process Model – Component Based Development. Agile Process – Agile Models: Adaptive Software Development – System Engineering Hierarchy – Risk Management: Risk Identification – Risk Projection – Risk Refinement.

2	REQUIREMENT ANALYSIS	Total Hrs	12

Requirement Engineering: Tasks, Initiating The Requirements Engineering Process, Eliciting Requirements, Developing Use Cases – Negotiating Requirements – Validating Requirements – Building The Analysis Models: Scenario Based Modeling – Data Modeling Concepts – Flow Oriented Model – Class Based Modeling – Behavioral Model.

3	SOFTWARE DESIGN	Total Hrs	12

Design Concepts – Design Models – Pattern Based Software Design – Architectural Design – Data Design – Architectural Design and Patterns – Mapping Data Flow into a Software Architecture –User Interface Analysis and Design. Change Management.

4	SOFTWARE TESTING	Total Hrs	12

Software Testing – Strategies – Issues – Test Strategies For Conventional And Object Oriented Software – Validation Testing – System Testing – Testing Tactics: White Box Testing, Basis Path Testing – Control Structure Testing – Black Box Testing – Testing GUI – Testing Client/Server – Test Documentation.

5	SOFTWARE PROJECT MANAGEMENT	Total Hrs	12

Quality Concepts – Software Quality Assurance – Estimation – Software Project Estimation – Decomposition Techniques: Software Sizing – Problem Based Estimation – An Example of LOC Based Estimation – An Example of FP Based Estimation – Empirical Estimation Models – Project Scheduling – Reengineering: Reverse Engineering.

Total hours to be taught	60

Text book (s) :

1	Roger S. Pressman., "Software Engineering: A Practitioner's Approach", (Sixth Edition), McGraw Hill, 2005.

Reference(s) :

1	I.Sommerville, "Software Engineering", V Edition: Addison Wesley, 1996.
2	Pankaj Jalote, "An Integrated Approach to Software Engineering", Springer Verlag, 1997.
3	James F Peters and Witold Pedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
4	Fairely, "Software Engineering Concepts", McGraw Hill, 1995.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			
Semester V							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 514	COMPUTER NETWORKS	3	0	0	3	50	50	100

Objective(s)	To understand the concepts of Data Communications study the functions of different layers, introduce IEEE standards employed in Computer Networking, make the students to get familiarized with different Protocols and Network Components.		
1	DATA COMMUNICATIONS	Total Hrs	9

Networks – Components and Categories –Line Configuration – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Coaxial Cable – Fiber Optics – Line Coding – Modems .

2	DATA LINK LAYER	Total Hrs	9

Error – Detection and Correction – Parity – LRC – CRC – Hamming code – Flow Control and Error Control - Stop and Wait – go back-N ARQ – Selective Repeat ARQ- Sliding Window – HDLC. LAN - Ethernet IEEE 802.3 – IEEE 802.4 - IEEE 802.5 - FDDI - Bridges.

3	NETWORK LAYER	Total Hrs	9

Internetworks – Circuit Switching – Packet Switching– IP addressing methods – Subnetting – Routers- Routing Algorithms – Distance Vector Routing – Link State Routing.

4	TRANSPORT LAYER	Total Hrs	9

Duties of Transport Layer – Multiplexing – Demultiplexing – Sockets – 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) – SMTP – FTP – HTTP - WWW – Security – Cryptography –Privacy–Digital Signature–PGP-Access Authorization.

Total hours to be taught	45

Text book (s) :	
1	Behrouz A. Forouzan, "Data communication and Networking", McGraw-Hill, Fourth Edition, 2006.

Reference (s) :	
1	Behrouz A. Forouzan, "Data communication and Networking", McGraw-Hill, Second Edition, 2003.
2	James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach", Pearson Education, Fifth Edition 2009.
3	Larry L.Peterson and Bruce S. Davie, "Computer Networks, A Systems Approach", The Morgan Kaufman Series in Networking, Fourth Edition, 2007.
4	Andrew S. Tanenbaum, "Computer Networks", PHI, Fourth Edition, 2003.
5	William Stallings, "Data and Computer Communication", Eighth Edition, Pearson Education, 2007.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT : B.Tech. Information Technology			
Semester V							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 0P4	DATABASE MANAGEMENT SYSTEMS LABORATORY	0	0	3	2	50	50	100
Objective(s)	To teach the concepts of DDL, DML, DCL commands, Cursors, Triggers, integrity and ODBC connectivity.							

LIST OF EXPERIMENTS

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) commands in RDBMS.
3. Data Control Language (DCL) commands in RDBMS.
4. High-level language extension with Cursors.
5. High level language extension with Triggers
6. Procedures and Functions.
7. Embedded SQL.
8. Integrity in SQL.
9. Design and implementation of Payroll Processing System using ODBC.
10. Design and implementation of Banking System using ODBC.
11. Design and implementation of Library Information System using ODBC.

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Semester V							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 5P1	NETWORK LABORATORY	0	0	3	2	50	50	100
Objective(s)	To teach the concepts of ARP routing algorithms, encryption and decryption algorithms and introduction about simulators.							

LIST OF EXPERIMENTS

1. Simulation of ARP and RARP.
2. Simulation of stop and wait protocol.
3. Simulation of sliding window protocol.
4. Simulation of distance vector routing algorithm.
5. Simulation of link state vector routing algorithm.
6. Develop a client-server application for chatting.
7. Message encryption and decryption using RSA algorithm.
8. Message encryption and decryption using DES algorithm.
9. Study of NS2.
10. Study of Glomosim.

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			
Semester V							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 5P2	OPERATING SYSTEM AND OPEN SOURCE LABORATORY	0	0	3	2	50	50	100

Objective(s)	To teach the concepts of Linux, Internet applications, Security with Open Source and give practical training in installing & configuring various applications.

(Implement the following on LINUX platform. Use C for high level language implementation)

1. Shell programming
   ❖ command syntax
   ❖ write simple functions
   ❖ basic tests
2. Shell programming
   ❖ loops
   ❖ patterns
   ❖ expansions
   ❖ substitutions
3. Write programs using the following system calls of UNIX operating system:
   fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
6. Implementation of FIFO page replacement algorithms.
7. Implementation of Best-fit, First-fit algorithms for memory management.
8. Installation of Open Office, Mail client & Web/internet browser and configuration.
9. User Creation, Group Creation.
10. Configuration of DNS, DHCP.
11. Configuration of device like Printer, Ethernet and TCP /IP.
12. Perl programming
    ❖ Arithmetic operation
    ❖ Loop
    ❖ String
    ❖ functions

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010

Department	Information Technology	Programme Code & Name	IT : B.Tech. Information Technology

Semester V							

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 TP 0P3	CAREER COMPETENCY DEVELOPMENT III	0	0	2	0	100	00	100

Objective(s)	To enhance employability skills and to develop career competency

Unit – 1	Written and Oral Communication – Part 1	Hrs
	Reading Comprehension Level 3 - Self Introduction - News Paper Review - Self Marketing - Debate-Structured and Unstructured GDs Psychometric Assessment – Types & Strategies to answer the questions Practices: Sentence Completion - Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Interpretation of Pictorial Representations - Editing - GD - Debate. Materials: Instructor Manual, Word power Made Easy Book, News Papers	6
Unit – 2	Verbal & Logical Reasoning – Part 1	
	Syllogism - Assertion and Reasons - Statements and Assumptions - Identifying Valid Inferences - identifying Strong Arguments and Weak Arguments - Statements and Conclusions - Cause and Effect - Deriving Conclusions from Passages - Seating Arrangements Practices: Analogies - Blood Relations - Statement & Conclusions Materials: Instructor Manual, Verbal Reasoning by R.S.Aggarwal	8
Unit – 3	Quantitative Aptitude – Part 3	
	Probability - Calendar- Clocks - Logarithms - Permutations and Combinations Materials: Instructor Manual, Aptitude Book	6
Unit – 4	Quantitative Aptitude – Part 4	
	Algebra - Linear Equations - Quadratic Equations - Polynomials Practices: Problem on Numbers - Ages - Train - Time and Work - Sudoku - Puzzles Materials: Instructor Manual, Aptitude Book	6
Unit – 5	Technical & Programming Skills	
	C Language - Control Structures – Data Types – Arrays – Operators -Functions- Structures – Pointers-Files Practices : Programs and Find Output and Errors Materials: Instructor Manual , Exploring C by Yashwant Kanetkar	4
		Total	30

Evaluation Criteria			
S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	15 Questions each from Unit 1, 2, 3, 4 & 5 (External Evaluation)	60
2	Evaluation 2 - Oral Communication	GD and Debate (External Evaluation by English, MBA Dept & External Trainers)	20
3	Evaluation 3 – Technical Paper Presentation	Internal Evaluation by the Dept.	20
		Total	100

Reference Books
1. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, "Quantitative Aptitude", TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications

Note :
- Instructor can cover the syllabus by Class room activities and Assignments (5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough work pages
- Each Assignment has 20 Questions from Unit 1,2,3,4 and 5 and 5 Questions from Unit 1
- Evaluation has to be conducted as like Lab Examination.

V Semester - Course Outcomes

Modules	10 HS 001 - Professional Ethics Course Outcomes
	At the end of the course, the student will be able to
1	Understand the basic concepts of professional ethics, core qualities of professional practitioners and theory of right action.
2	Understand the major ethical issues and type of inquiries.
3	Understand the Kohlberg's stages of moral development and Carol Gilligan theory.
4	Understand the moral dilemma, moral autonomy and value based ethics.
5	Understand the role of Engineers as managers, consultants and leaders.
6	Understand the role of code and accountability.
7	Understand the rules of practice and professional obligations
8	Understand the ethical concepts in space shuttle challenger case study
9	Understand the safety, risk and types of risk
10	Understand the design of safety and the role of engineers in safety
11	Understand the ethical concepts in three mile island disaster case study
12	Understand the ethical concepts in Chernobyl case study
13	Understand the collegiality and two sense of loyalty
14	Understand the professional rights and responsibilities and conflict of interest
15	Understand the collective bargaining and confidentiality
16	Understand the issues in acceptance of bribe, occupational crime and whistle blowing
17	Understand the globalization and cross cultural issues
18	Understand the ethical concepts in Bhopal gas tragedy case study
19	Understand the computer ethics and weapons development
20	Understand the Intellectual property rights

Modules	10 CS 005 - Database Management Systems Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the fundamentals of file and data base systems
2.	Understand the components of database system and various levels
3.	Analyze the various data models such as E-R model, Relational model, etc.
4.	Applying Relational Algebra commands and Relational Calculus to retrieve the data from database
5.	Understand the concepts of DML, DDL, DCL and DTL and applying queries for retrieving data
6.	Analyze secure data retrieval from the database
7.	Designing a data base using various Normal Forms
8.	Designing a database without redundancy
9.	Understand the primary and secondary storage devices
10.	Understand the utilization of secondary storage devices to store the information in files
11.	Understand the concepts of static and dynamic hashing to retrieve the data from the database
12.	Understand the primary and secondary indexing technique to retrieve the data from the database
13.	Understand the data transaction concepts with transaction properties
14.	Expected to know about the concepts concurrent access of data from a database
15.	Applying the mechanism to control concurrent access scheme
16.	Understand the techniques that ensure database consistency and transaction atomicity
17.	Comprehend the recent databases such as object oriented database, object oriented data model, etc
18.	Understand the data access from database reside in multiple locations
19.	Comprehend extended markup language structure, schema and document
20.	Understand the process of centralized data management and access

Modules	10 IT 511 - Telecommunication Systems Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the characteristics of transmission lines.
2.	Comprehend the types of antenna and the propagation of radio frequency waves.
3.	Understand the microwaves and some of the techniques and components unique to this field.
4.	Understand the principles of Radar.
5.	Gain knowledge about the satellite orbits, frequency allocation and launching.
6.	Identify the role of satellite subsystems.
7.	Understand the function of earth stations.
8.	Realize the applications of satellite communication systems.
9.	Differentiate the various optical fibers..
10.	Understand the operation of a Fiber optic data communication system.
11.	Comprehend the working principles of a Telephone and Facsimile system.
12.	Understand the application of Integrated services digital network.
13.	Realize the fundamental principles involved in generation of TV signal.
14.	Gain knowledge about the working principle of TV transmitter and receiver.
15.	Understand the function of a modern cable TV system.
16.	Realize the advantage of satellite TV and digital TV.
17.	Understand the concepts of the advanced mobile phone system.
18.	Comprehend the details of wireless LAN, Bluetooth and mesh wireless networks.
19.	Gain knowledge about the zigbee and infrared wireless networks.
20.	Understand the applications of Radio frequency Identification and mesh wireless networks.

Modules	10 IT 512 - Operating Systems Course Outcomes
	At the end of the course, the student will be able to
1.	Learn about the origin and evolution of computer systems
2.	Understand the difference between processes and threads.
3.	Acquire the knowledge of communication between processes and IPC systems
4.	Understand the issues and use of locks, semaphores and monitors for synchronizing
5.	Realize the different types of scheduling algorithms
6.	Acquire the knowledge of Deadlock and its working principle
7.	Understand the issues of scheduling of user-level processes/threads.
8.	Understand the system model and prevention of deadlocks
9.	Understand the concepts of deadlock in operating systems and how they can be managed / avoided.
10.	Gain the knowledge of critical-section and synchronization problem.
11.	Gain a knowledge of the principles of Segmentation and Swapping
12.	Acquire the knowledge of to steps in handling a page fault
13.	Recognize the concept of file access methods and file concept
14.	Students will acquire knowledge about the allocation methods and directory structure
15.	Recognize the concept of Paging activity and its causes
16.	Obtain the concept of free-space management
17.	Understand the disk scheduling algorithms such as first come first served, shortest seek time first, scan and look
18.	Obtain the concept of free-space management
19.	Identify the concept of file sharing
20.	Gain knowledge about the Linux system kernel model and memory management

Modules	10 IT 513 - Software Engineering Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the basic concepts of software engineering and Capability Maturity Model.
2.	Acquire knowledge in Water fall, Incremental, Evolutionary Model and Component Based Development Models.
3.	Understand Agile process, computer based system, verification & validation concepts.
4.	Recognise various Risks , Risk Projection and Refinement Techniques.
5.	Understand the basics of tasks involved in software development.
6.	Gather the requirements and analyse the requirement in software development.
7.	Develope use cases, negotiate and validate requirements.
8.	Understand the concepts of data, scenario, flow, class and behavior based analysis modeling.
9.	Understand the design process in software development .
10.	Realise the stages involved in architectural design.
11.	Understand the architectural mapping using data flow diagram.
12.	Understand the techniques involved in software configuration management.
13.	Recognize the approaches and issues in software testing.
14.	Understand techniques involved in testing object oriented softwares.
15.	Understand the concepts of White box, Basis path, Black box and Control Structure Testing
16.	Realise various testing techniques for specialized environments.
17.	Understand the quality, quality control and quality assurance concepts.
18.	Understand software project estimation and decomposition techniques.
19.	Perform the analysis of various estimation techniques.
20.	Understand the software reengineering and reverse engineering techniques.

Modules	10 IT 514 - Computer Networks Course Outcomes
	At the end of the course, the student will be able to
1.	To understand the basic components needed to connect a device with network and its types
2.	Different types of network connections techniques
3.	The stack of protocols and standards to be required for communicating all the nodes in the network.
4.	The configuration and characteristics of hardware devices required to connect the nodes into network
5.	Identifying different types of errors in network packets and correction techniques
6.	The procedures used to restrict the amount of data flow to control the and avoid network congestion
7.	A point to point protocol to connect the devices in network
8.	Communication protocols which run a network data flow efficiently by preventing collisions.
9.	To know the basic concepts, issues of connecting two or more networks
10.	Different types of packet transfer techniques in internetworks
11.	Assigning, classifying and utilizations of IP address.
12.	How packets can be routed from source to destinations and analyze the characteristics of different routing algorithms.
13.	An overview of Transport layer services
14.	Objective, Issues and differences of TCP and UDP protocols
15.	How transport layer handles flow control of the packets in intrnet
16.	Parameters of Quality of Service for transport layer
17.	Significance of DNS, HTTP, SMTP and FTP protocols
18.	How Internet works and types of documents handled in WWW
19.	Various security measures and algorithms
20.	Algorithms to ensure Authentication in Internet

Modules	10 CS 0P4 - Database Management Systems Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Learn about DDL commands
2.	Ability to apply Data Definition Language (DDL) commands in RDBMS
3.	Study about DML commands
4.	Workout Data Manipulation commands(DML) in RDBMS
5.	Learn about DCL commands
6.	Manipulate Data Control Language (DCL) commands in RDBMS
7.	Study about cursors
8.	Implement high-level language extension with Cursors
9.	Learn about triggers
10.	Demonstrate high level language extension with Triggers
11.	Study about cursors
12.	Implement Procedures using PL/SQL
13.	Learn about functions in PL/SQL
14.	Ability to write Functions in PL/SQL
15.	Study embedded SQL concepts
16.	Establish front and backend connectivity in Embedded SQL
17.	Study about integrity constraints
18.	Apply Integrity constraints in SQL.
19.	Learn about JDBC connectivity
20.	Use JDBC connection as a bridge between the application and actual database

Modules	10 IT 5P1 Network Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Would have obtained the ability to write Unix commands
2.	Develop ability to write ARP programming.
3.	Acquire the knowledge to write RARP programming
4.	Abel to Develop Application using to compare ARP&RARP
5.	Knowledge about the concept of Stop and Wait Protocol
6.	Implement problem using Selective Repeat ARQ
7.	Simulate banker's algorithm for deadlock avoidance.
8.	Obtain the knowledge about page replacement algorithm.
9.	Understand the concept of memory management.
10.	Know about installation of open source linux OS
11.	Gained knowledge about the configuration of TCP/IP
12.	Gained knowledge about installation of open office .
13.	Knowledge about the installation of printer and scanner devices
14.	Knowledge about the installation of user and group creation.
15.	Knowledge about the configuration of web browser
16.	Acquired the knowledge about configuration DNS,DHCP,Ethernet.
17.	Obtained the ability to write perl basic program
18.	Obtained the ability to write scheduling process using perl program
19.	Able to develop python program.
20.	Able to develop applications in python program.

Modules	10 IT 5P2 - Operating System and Open Source Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Would have obtained the ability to write Unix commands
2.	Develop ability to write shell programming.
3.	Acquire the knowledge to write program system calls.
4.	Abel to Develop Application using Inter Process Communication
5.	Knowledge about the concept of scheduling algorithm.
6.	Implement producer/consumer problem using semaphore
7.	Simulate banker's algorithm for deadlock avoidance.
8.	Obtain the knowledge about page replacement algorithm.
9.	Understand the concept of memory management.
10.	Know about installation of open source linux os
11.	Gained knowledge about the configuration of TCP/IP
12.	Gained knowledge about installation of open office .
13.	Knowledge about the installation of printer and scanner devices
14.	Knowledge about the installation of user and group creation.
15.	Knowledge about the configuration of web browser
16.	Acquired the knowledge about configuration DNS,DHCP,Ethernet.
17.	Obtained the ability to write perl basic program
18.	Obtained the ability to write scheduling process using perl program
19.	Able to develop python program.
20.	Able to develop applications in python program.

K.S.Rangasamy College of Technology - Autonomous Regulation					R 2010	
Department	Information Technology	Programme Code & Name	IT : B.Tech. Information Technology			
Semester VI						
Course Code	Course Name	Hours / Week			Credit	Maximum Marks

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT 611	OBJECT ORIENTED ANALYSIS AND DESIGN	3	1	0	4	50	50	100
Objective(s)	To understand the Object Oriented Life Cycle, know how to identify objects, relationships, services and attributes through UML, understand the use-case diagrams, know the Object Oriented Design process, and know about Software Quality and Usability.							
1	INTRODUCTION				Total Hrs		12	
An Overview of Object Oriented Systems Development - Object Basics – Object Oriented Systems Development Life Cycle.								
2	OBJECT ORIENTED METHODOLOGIES				Total Hrs		12	
Rumbaugh Methodology - Booch Methodology - Jacobson Methodology - Patterns – Frameworks – Unified Approach – Unified Modeling Language – Use case - Class Diagram - Interactive Diagram - Package Diagram - Collaboration Diagram - State Diagram - Activity Diagram.								
3	OBJECT ORIENTED ANALYSIS				Total Hrs		12	
Identifying use cases - Object Analysis - Classification – Identifying Object relationships - Attributes and Methods.								
4	OBJECT ORIENTED DESIGN				Total Hrs		12	
Design axioms - Designing Classes – Access Layer - Object Storage - Object Interoperability.								
5	SOFTWARE QUALITY AND USABILITY				Total Hrs		12	
Designing Interface Objects – Software Quality Assurance – System Usability - Measuring User Satisfaction.								
Total hours to be taught							60	
Text book (s) :								
1	Ali Bahrami, "Object Oriented Systems Development", Tata McGraw-Hill, 2002.							
2	Martin Fowler, "UML Distilled", Second Edition, PHI/Pearson Education, 2002.							
Reference (s) :								
1	Stephen R. Schach, "Introduction to Object Oriented Analysis and Design", Tata McGraw-Hill, 2003.							
2	James Rumbaugh, Ivar Jacobson, Grady Booch "The Unified Modeling Language Reference Manual", Addison Wesley, 1999.							
3	Hans-Erik Eriksson, Magnus Penker, Brain Lyons, David Fado, "UML Toolkit", OMG Press Wiley Publishing Inc., 2004.							

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT : B.Tech. Information Technology			
Semester VI							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 612	VISUAL PROGRAMMING	3	0	0	3	50	50	100

Objective(s)	To introduce the concepts of windows programming, introduce GUI programming using Microsoft Foundation Classes, enable the students to develop programs and simple applications using Visual C++.

1	WINDOWS PROGRAMMING	Total Hrs	9

Windows Environment – A Simple Windows Program – Windows and Messages – Creating the Window – Displaying the Window – Message Loop – the Window Procedure – Message Processing – Text Output – Painting and Repainting – Introduction to GDI – Device Context – The Keyboard-The Scroll Bar.

2	VISUAL C++ PROGRAMMING – INTRODUCTION	Total Hrs	9

Application Framework – MFC Library – Visual C++ Components – Event Handling – Mapping Modes – Colors – Fonts – Modal and Modeless Dialog – Windows Common Controls.

3	THE DOCUMENT AND VIEW ARCHITECTURE	Total Hrs	9

Menus – Keyboard Accelerators – Rich Edit Control – Toolbars – Status bars – Separating Document From Its View – Reading and Writing SDI and MDI Documents – Splitter Window and Multiple Views – Creating DLLs.

4	ACTIVEX AND OBJECT LINKING AND EMBEDDING (OLE)	Total Hrs	9

ActiveX Controls Vs. Ordinary Windows Controls – Installing ActiveX Controls – Calendar Control – Create ActiveX Control at Runtime – Component Object Model (COM) – OLE Drag and Drop – OLE Embedded Component and Containers.

5	ADVANCED CONCEPTS	Total Hrs	9

Database Management with Microsoft ODBC – Structured Query Language – MFC ODBC Classes – Sample Database Applications – DAO Concepts – Displaying Database Records in Scrolling View – VC++ Networking Issues – Winsock – WinInet – Building a Web Client – Internet Information Server – ISAPI Server Extension.

Total hours to be taught	45

Text book (s) :	
1	Charles Petzold, "Windows Programming", Microsoft press, 2003.
2	David J.Kruglinski, George Shepherd and Scot Wingo, "Programming Microsoft Visual C++", Fifth Edition, Microsoft press, 2006 Reprint.
Reference (s) :	
1	Steve Holtzner, "Visual C++ 6 Programming", Wiley Dreamtech India Pvt. Ltd., 2003.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name	IT : B.Tech. Information Technology				
Semester VI							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 613	WEB TECHNOLOGY	3	1	0	4	50	50	100

Objective(s)	Students will get an introduction about various Scripting Languages, students will be provided with an up-to-date survey of developments in Web Technologies. To help the students to know techniques involved in real-time Software development.

1	INTRODUCTION	Total Hrs	12

Introduction – History of the Internet and WWW-W3C-Web 2.0- Rich Internet Applications-Editing XHTML- First XHTML Example - W3C XHTML Validation Service -Headings -Linking -Images - Special Characters and Horizontal Rules - Lists - Tables - Forms - Internal Linking – meta Elements – Cascading Style Sheets(CSS) - Introduction - Inline Styles - Embedded Style Sheets - Conflicting Styles - Linking External Style Sheets - Positioning Elements - Backgrounds - Element Dimensions - Box Model and Text Flow - Media Types - Building a CSS Drop-Down Menu - User Style Sheets.

2	JAVASCRIPT: INTRODUCTION TO SCRIPTING	Total Hrs	12

Introduction - Simple Program- Obtaining User Input with prompt Dialogs - Memory Concepts - Arithmetic - Decision Making- Control Structures - Selection Statement - Repetition Statement - Formulating Algorithms Assignment Operators - Increment and Decrement Operators Control Statements II - for Repetition Statements(for and do…while) and Multiple-Selection Statement - break and continue Statements - Logical Operators Functions – Program Modules in JavaScript - Programmer-Defined Functions - Function Definitions - Random Number Generation - Examples - Scope Rules - JavaScript Global Functions - Recursion - Recursion vs. Iteration Arrays - Declaring and Allocating Arrays - Examples - References and Reference Parameters - Passing Arrays to Functions - Sorting and Searching - Multidimensional Arrays.

3	JAVASCRIPT: OBJECTS	Total Hrs	12

Introduction - Introduction to Object Technology - Math Object - Date Object - Boolean and Number Objects - document Object - window Object - Using Cookies - JavaScript Example - Using JSON to Represent Objects - - DOM - Modeling a Document: DOM Nodes and Trees -Traversing and Modifying a DOM Tree -DOM Collections - Dynamic Styles - Javascript Events - Registering Event Handlers -Event onload- Event onmousemove , Rollovers with onmouseover and onmouseout - Form Processing with onfocus, onblur onsubmit and onreset - Event Bubbling.

4	INTRODUCTION – AJAX ENABLED RIA, WEB SERVER AND PHP	Total Hrs	12

Introduction - Traditional Web Applications vs. Ajax Applications - Rich Internet Applications (RIAs) with Ajax History of Ajax - "Raw" Ajax Example Using the XMLHttpRequest Object - Web servers - HTTP Transactions - Multitier Application Architecture - Client-Side Scripting versus Server-Side Scripting Accessing Web Servers Microsoft Internet Information Services (IIS) - Apache HTTP Server - Requesting Documents – PHP - Basics - String Processing and Regular Expressions – Form Processing and Business Logic - Connecting to a Database - Using Cookies - Dynamic Content - Operator Precedence Chart.

5	JAVASERVER - FACES WEB APPLICATIONS	Total Hrs	12

Introduction - Java Web Technologies - Creating and Running a Simple Application in Netbeans - JSF Components - Session Tracking – Accessing Databases in Web Applications – Examples.

Total hours to be taught	60

Text book(s) :	
1	Deitel & Deitel, "Internet and World Wide Web – How to Program", 4th ed., Pearson Education Asia, 2009.

Reference (s) :	
1	Aferganatel, "Web Programming: Desktop Management", PHI, 2004.
2	Rajkamal, "Web Technology", Tata McGraw-Hill, 2001.

K.S.Rangasamy College of Technology - Autonomous Regulation					R 2010		
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Semester VI							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 614	CRYPTOGRAPHY AND NETWORK SECURITY	3	1	0	4	50	50	100
Objective(s)	To understand the principles of encryption algorithms, conventional and public key cryptography, have a detailed knowledge about authentication, hash functions and application level security mechanisms. To know the methods of conventional encryption, understand the concepts of public key encryption and number theory, understand authentication and Hash functions, know the network security tools and applications, understand the system level security used.							

1	INTRODUCTION		Total Hrs	12

OSI Security architecture – Classical encryption techniques – Cipher principles – Data Encryption Standard – Block cipher design principles– Advanced Encryption standard– Block cipher operation

2	PUBLIC KEY CRYPTOGRAPHY		Total Hrs	12

Key management - symmetric key distribution using symmetric encryption and asymmetric encryption – Distribution of public keys – Diffie - Hellman key exchange – Elliptic curve architecture and cryptography – Introduction to Number Theory–Prime numbers – Fermat's and euler's theorems – Public key cryptography and RSA.

3	HASH FUNCTION AND AUTHENTICATION		Total Hrs	12

Application of cryptographic Hash functions – Requirements and Security of hash functions –Secure Hash Algorithm – Message authentication codes – Authentication requirements – Authentication functions – HMAC - Digital signatures – Digital Signature Standard.

4	NETWORK AND INTERNET SECURITY		Total Hrs	12

User Authentication – Authentication principles –Authentication using symmetric encryption – Kerberos – Electronic mail security – PGP – S/MIME – IP security–IP security over view– IP security policy– Encapsulating security payload .

5	SYSTEM LEVEL SECURITY		Total Hrs	12

Intrusion detection – password management – Viruses and related Threats – Virus counter measures – Firewall design principles – Trusted systems.

Total hours to be taught	60

Text book(s) :	
1	William Stallings, "Cryptography And Network Security – Principles and Practices", Prentice Hall of India, Fifth Edition, 2011.

Reference (s) :	
1	William Stallings, "Cryptography And Network Security – Principles and Practices", Prentice Hall of India, Fourth Edition, 2010.
2	Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003.
3	Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			
Semester VI							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 615	SYSTEM SOFTWARE	3	0	0	3	50	50	100
Objective(s)	To understand the relationship between system software and machine architecture, to know the design and implementation of assemblers, to know the design and implementation of linkers and loaders, to have an understanding of macro processors, understanding compilers and Intermediate Code Generation And Code Optimization.							
1	INTRODUCTION				Total Hrs		8	
System software and machine architecture – The Simplified Instructional Computer (SIC) – Machine architecture – Data and instruction formats – addressing modes – instruction sets – I/O and programming.								
2	ASSEMBLERS				Total Hrs		10	
Basic assembler functions – A simple SIC assembler – Assembler algorithm and data structures – Machine dependent assembler features – Instruction formats and addressing modes – Program relocation – Machine independent assembler features – Literals – Symbol-defining statements – Expressions – One pass assemblers and Multi pass assemblers.								
3	LOADERS,LINKERS AND MACROS				Total Hrs		9	
Basic loader functions – Design of an Absolute Loader – A Simple Bootstrap Loader – Machine dependent loader features – Relocation – Program Linking- Linkage Editors – Dynamic Linking – Basic macro processor functions – Macro Definition and Expansion – Macro Processor Algorithm and data structures								
4	COMPILERS				Total Hrs		9	
Compilers – Analysis of the source program – Phases of a Compiler – Lexical Analysis – From a Regular Expression to NFA – From a Regular Expression to DFA – Syntax Analysis – Role of Parser – CFG – Non Recursive Predictive Parsing – LR Parsers.								
5	INTERMEDIATE CODE GENERATION AND CODE OPTIMIZATION				Total Hrs		9	
Three Address Code – Implementation of Three Address Code – Basic blocks and Flow Graphs – Peephole optimization – Principal sources of optimization								
Total hours to be taught							45	
Text book (s) :								
1	Leland L. Beck, "System Software – An Introduction to Systems Programming", 3rd Edition, Pearson Education Asia, 2006.							
2	Alfred V. Aho, Ravi Sethi Jeffrey D. Ullman, "Compilers- Principles, Techniques, and Tools" , Pearson Education Asia, 2007							
Reference (s) :								
1	D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 1999.							
2	Santanu Chattopadhyay, "System Software", Prentice Hall of India – 2007.							
3	David Galles, "Modern Compiler Design", Pearson Education Asia, 2007							

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Semester VI							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 6P1	VISUAL PROGRAMMING LABORATORY	0	0	3	2	50	50	100
Objective(s)	To teach the concepts of windows programming , dynamic controls, menu, tool bar, database connectivity and COM applications							

WINDOWS SDK / VISUAL C++

1. Writing code for keyboard and mouse events.

2. Dialog Based applications.

3. Dynamic controls.

4. Mapping Modes.

5. Windows programming to display text.

6. Windows programming to display simple drawings.

7. Bitmaps.

8. GDI objects.

9. Menu, Accelerator.

10. Tool bar, Tool tip.

11. Status bar.

12. Creating DLLs and using them.

13. Creating ActiveX control and using it.

14. COM Applications.

15. Data access through ODBC.

16. Data access through DAO.

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Information Technology		Programme Code & Name		IT : B.Tech. Information Technology			
Semester VI								
Course Code	Course Name		Hours / Week			Credit	Maximum Marks	

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT 6P2	CASE TOOLS LABORATORY	0	0	3	2	50	50	100
Objective(s)	To teach the concepts drawing Use Case diagrams, identifying objects and classing and develop class diagrams, activity diagrams, state chart diagrams, deployment diagrams.							

Students have to take up two or three of the experiments listed below with the following guidelines:

1. Defining draft plan
2. Create Preliminary investigation report
3. Define requirements
4. Record Terms in Glossary
5. Design Use Case diagrams
6. Identify potential objects and classes
7. Identify associations and operations to potential classes
8. Develop class diagrams, activity diagrams, state chart diagrams
9. Develop deployment diagrams,
10. Develop a prototype and validate it

SUGGESTED LIST OF APPLICATIONS:

1. Student Marks Analyzing System
2. Quiz System
3. Online Ticket Reservation System
4. Payroll System
5. Course Registration System
6. Expert Systems
7. ATM Systems
8. Stock Maintenance
9. Real-Time Scheduler
10. Remote Procedure Call Implementation
11. Banking System
12. Automation of Exam System

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Semester VI							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 6P3	WEB TECHNOLOGY LABORATORY	0	0	3	2	50	50	100
Objective(s)	Design and Develop a Website using Web Technology Tools to gain additional practice and experience in web design and development tools.							

Follow the steps given below:

1. Identify the Problem
2. Specify Software Requirements
3. Make a Simple web page containing almost all the tags of HTML, CSS and Javascript
4. Enhance the home page by providing links to other sample pages
5. Further enhance the website by providing User Registration Page. Collect the user details and Display a new web page showing Thanks for Registration. Also write appropriate functions to validate form inputs.
6. Identify appropriate server side technology that suits to your web site design
7. Modify your website which accepts dynamic response from the user and process the user inputs with appropriate server side technology and database

   Use anyone of the following concepts : User Sessions, Transaction Management, Sessions and session Management, Maintaining state information, Transaction Processing monitors – object Request Brokers, cryptography, Digital signature, Digital certificates, Security Socket Layer (SSL), Credit card Processing Models, Secure Electronic Transaction,3D Secure Protocol.

8. Test and validate the developed system

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			

		Semester VI						

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 TP 0P4	CAREER COMPETENCY DEVELOPMENT IV	0	0	2	0	100	00	100

Objective(s)	To enhance employability skills and to develop career competency

Unit – 1	Written and Oral Communication – Part 2	Hrs
Self Introduction – GD - Personal Interview Skills Practices on Reading Comprehension Level 2 – Paragraph Writing - News paper and Book Review Writing - Skimming and Scanning – Interpretation of Pictorial Representations - Sentence Completion - Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Editing Materials: Instructor Manual, Word power Made Easy Book, News Papers		4

Unit – 2	Verbal & Logical Reasoning – Part 2	
Analogies – Blood Relations – Seating Arrangements – Syllogism - Statements and Conclusions, Cause and Effect – Deriving Conclusions from Passages – Series Completion (Numbers, Alphabets & Figures) – Analytical Reasoning – Classification – Critical Reasoning Practices: Analogies – Blood Relations - Statement & Conclusions Materials: Instructor Manual, Verbal Reasoning by R.S.Aggarwal		8

Unit – 3	Quantitative Aptitude - Part – 5	
Geometry - Straight Line – Triangles – Quadrilaterals – Circles – Co-ordinate Geometry – Cube – Cone – Sphere. Materials: Instructor Manual, Aptitude book		6

Unit – 4	Data Interpretation and Analysis	
Data Interpretation based on Text – Data Interpretation based on Graphs and Tables. Graphs can be Column Graphs, Bar Graphs, Line Charts, Pie Chart, Graphs representing Area, Venn Diagram & Flow Charts. Materials: Instructor Manual, Aptitude Book		6

Unit – 5	Technical & Programming Skills – Part 2	
Programming Language C++ - Classes – Objects – Polymorphism – Inheritance – Abstraction		6

	Total	30

Evaluation Criteria

S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	15 Questions each from Unit 1, 2, 3, 4 & 5 (External Evaluation)	60
2	Evaluation 2 - Oral Communication	GD and HR Interview (External Evaluation by English, MBA Dept.)	20
3	Evaluation 3 – Technical Interview	Internal Evaluation by the Dept. – 3 Core Subjects	20
		Total	100

Reference Books
1. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, "Quantitative Aptitude", TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications

Note:
- Instructor can cover the syllabus by Class room activities and Assignments (5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough Work pages
- Each Assignment has 20 questions from Unit 1,2,3,4,5 and 5 questions from Unit 1(Oral Communication) & Unit 5(Programs)
- Evaluation has to be conducted as like Lab Examination.

VI Semester - Course Outcomes

Modules	10 IT 611 - Object Oriented Analysis and Design Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the role of requirements engineering in software development
2.	Explore a domain to obtain information sufficient to specify a software system
3.	Gain knowledge about object-oriented software development process, including object-oriented methodologies, workflows and explain the benefits of each.
4.	Understand the role of and develop an introductory competency in the following software engineering modeling tools or methods: • Use Case diagrams and flows • Class diagrams • Sequence diagrams • State diagrams • Architecture generation from a Class model
5.	Obtained the information about system requirements to determine the use cases, domain model of the problem.
6.	Create use case documents that capture requirements for a software system.
7.	Perform software analysis and record the results using UML notation.
8.	Create class diagrams that model both the domain model and design model of a software system.
9.	Understand the benefit of patterns in analysis and design
10.	Understand how to model requirements with Use Cases and how to design the interface between the classes and objects.
11.	Describe how to create interaction diagrams that models the dynamic aspects of a software system, dynamic behavior and structure of the design.
12.	Understand the facets of the Unified Process approach to designing and building a software system.
13.	Describe how design patterns facilitate development and list several of the most popular patterns.
14.	Develop the skills to determine which processes and OOAD techniques should be applied to a given project and design the Axioms and corollaries
15.	Understanding of the application of OOAD practices from a software project management perspective and build a model for the user interface (UI) of a software application
16.	Create a system architecture (the Architecture model) supporting the nonfunctional requirements (NFRs) and development constraints
17.	Create a system design (the Solution model) supporting the functional requirements (FRs)
18.	Identify and analyze I/O's for the User Interface design
19.	Familiar with the roles and contribute in a professional manner to a software engineering team.
20.	Gain knowledge about how to measure the Level of User satisfaction and software quality assurance.

Modules	**10 IT 612 - Visual Programming** **Course Outcomes**
	At the end of the course, the student will be able to
1.	Familiar with the windows programming architecture
2.	create the icons using GDI bitmap in windows
3.	Recognize the different approaches to text output, keyboard and scrollbar
4.	Identify with the creations of menus and short cut keys and text editing features in windows application
5.	Realize the concept of Microsoft Foundation Class(MFC) application framework
6.	Understand the visual c++ components such as resource editors, c/c++ compiler, source code editor and debugger
7.	Gain knowledge about event handling and the different mapping modes such as MM_TEXT, fixed-scale and variable-scale
8.	Create dialog boxes for opening, finding and replacing files in documents
9.	Understand the customization of the toolbar and status bar in the application
10.	Build the application for reading and writing the single and multiple documents by serialization
11.	Emphasize the selection and presentation of splitter window and multiple views
12.	Discover the fundamental concepts of import and export the DLL programs
13.	Develop a dialog box for providing the user interaction with database connectivity
14.	Identify with object linking and embedding with component and its container
15.	Develop a database for the particular scenario using ODBC
16.	Gain knowledge about the operations of OLE DB provider and consumer
17.	Understand the TCP / IP for transferring data from client and server.
18.	Execute the Winsock and WinInet network programming
19.	Identify with the distributions of HTML document
20.	Execution of client server technology

Modules	**10 IT 613 - Web Technology** **Course Outcomes**
	At the end of the course, the student will be able to
1.	Understand the basics of Internet and WWW
2.	Know about Rich Internet Applications.
3.	Learn how to develop web pages using XHTML
4.	Study about designing web pages using Cascading Style Sheets
5.	Understand the basics of java script
6.	Gain knowledge of Java script control structures and operators
7.	Learn how to validate the web pages using java script looping statements
8.	Validate HTML forms in web pages using Java script functions and arrays
9.	Understand the basic concept on a variety of java objects.
10.	Learn how to design web pages using document object models
11.	Create web pages with dynamic styles and dynamic positions
12.	Construct web pages using java script events
13.	Understand the differences between traditional web applications and Ajax applications
14.	Learn about history of Ajax
15.	Have knowledge about different web servers
16.	Learn how to design web pages using PHP with database connectivity
17.	Understand the basics of java web technologies
18.	Create and run simple applications in Net Beans
19.	Understand the basics of JSF components and Session tracking
20.	Access databases from different web applications

Modules	10 IT 614 - Cryptography and Network Security Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the importance of security.
2.	Make out the presentation how data in blocks are encrypted and decrypted
3.	Understand the principles and practices of cryptographic encryption techniques.
4.	Students will have the basic knowledge about different methods of conventional encryption.
5.	To know about different types of key management techniques and methods
6.	Elliptic curve architecture initiates ECC which helps to learn the drawbacks over RSA algorithm
7.	To elucidate about the key encryption and the RSA algorithm
8.	Students will have the knowledge about the concepts of public key encryption and number theory.
9.	Students will acquire knowledge about authentication functions, message authentication codes and different hash algorithms.
10.	To expel the third party penetration in a mail transfer between two parties Make sure that authentication and confidentiality is achieved by hash function
11.	Understand the need, advantages and applications of DSS.
12.	Students will acquire knowledge about network security tools and authentication applications.
13.	Students will acquire knowledge about the authentication application
14.	Expected to Learn about the concept of IP Security
15.	Gain knowledge about the EMAIL security using the Authentication parameter.
16.	It profiles the behaviors of intruders and authorized users
17.	Gain knowledge about the different password management techniques
18.	Obtain knowledge about various kinds of virus and threats
19.	It intends to learn about the firewall principles and techniques
20.	Acquire the knowledge of Trusted systems in system level security.

Modules	10 IT 615 - System Software Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the relationship between System Software
2.	Illustrate the Machine Architecture and demonstrate SIC architecture.
3.	Describe the main features, instruction sets
4.	Apply addressing modes and develop I/O and Assembly-Level programming
5.	
6.	Understand the fundamental operations of Assembler
7.	Understand the basic Assembler Structure with hardware considerations
8.	Understand the Machine-Independent Assembler language features
9.	Learn the alternative design options for an Assembler such as One-Pass and Multi-pass Assembler
10.	Apply and design the fundamental functions of a Loader
11.	Understand the concept of Relocation and Linking.
12.	Understand the basic concepts of Macros
13.	Apply Macros for code reduction and implement data structures involved in macro processor.
14.	Illustrate the basics of compiler, various forms of source program, phases of compilers
15.	Understand the lexical analysis and design a scanner.
16.	Study the functions of parser, usage of grammar
17.	identify the similarities and differences among various parsing techniques and grammar transformation techniques.
18.	Understand the intermediate representation of a program
19.	Perform the analysis needed for the local optimization
20.	Perform global optimization by understand how the control could flow during execution
21.	Function-Preserving Transformation and its types ,Loop concept and its types, structure preserving types

Modules	10 IT 6P1 - Visual Programming Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the principles and practice of Writing code for keyboard and mouse events
2.	Make design in the construction of Dynamic controls
3.	Describe the various control s available in VC++
4.	Understand the principles of Mapping Modes
5.	Explain the concept of Windows programming
6.	Explain the concept of Windows programming to display text
7.	Understand the principles of Windows programming to display simple drawings
8.	Understand the principles of GDI objects
9.	Be able to make use of GDI objects
10.	Understand how to include and use Menu and items
11.	Understand how to include keyboard Accelerator to Menu items
12.	Explain how to use keyboard Accelerator to Menu items
13.	Explain the concept of Tool bar, Tool tip
14.	Understand the concept of status bar
15.	Explain the concept of DLL and how to use it
16.	Be able to make use of ActiveX control and use it in application
17.	Understand the concept of Component Object Model
18.	Understand the principles and practice of COM applications
19.	Explain the concept of ODBC and DAO
20.	Understand the principles and practice of ODBC and DAO connectivity

Modules	10 IT 6P2 - CASE Tools Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Develop a problem statement.
2.	Understand the need to get a complete written description of the problem
3.	Understand the use of method of object-decomposition to identify the key abstractions
4.	Specify the relationship between objects and the relationship between classes
5.	Develop an IEEE standard SRS document. Also develop risk management and project plan (Gantt chart).
6.	Identify Use Cases and develop the Use Case model.
7.	Identify the business activities and develop an UML Activity diagram.
8.	Map the abstractions into classes and design the class interface
9.	Identity the conceptual classes and develop a domain model with UML Class diagram.
10.	Be using the identified scenarios find the interaction between objects and represent those using UML Interaction diagrams.
11.	Draw the State Chart diagram.
12.	Identify the User Interface, Domain objects, and Technical services.
13.	Develop architecture diagram with UML package diagram notation.
14.	Implement the User Interface layer.
15.	Draw Component and Deployment diagrams.
16.	Apply software metrics to determine the quality of your classes
17.	Integrate and deploy a prototype and validate it
18.	Compare and contrast the fitness of existing CASE Tools to the needs of specific software development context.
19.	Design and construct new CASE tools to automate software development activities.
20.	Illustrate two different approaches for a CASE tools support to software development processes.

Modules	10 IT 6P3 Web Technology Laboratory Course Outcomes
	At the end of the course, the student will be able tol
1.	Understand the problem and identify the software requirements
2.	Ability to design a static web page using HTML
3.	Have a skill to write coding for Frames, Tables and lists
4.	Ability to write HTML coding to include audio and video files
5.	Ability to apply different styles on web page
6.	Ability to create links to other sample pages
7.	Ability to write codng to process user inputs
8.	Ability to write the Javascript coding to validate the user inputs.
9.	Have a skill to write program using Javascript cookies
10.	Identification of appropriate server side technology
11.	Have a skill to connect user input to server side technology
12.	Have a skill to write a program for server side technology
13.	Capable to connect the server side technology with database
14.	Have a skill to write programs using Ajax
15.	Ability to write program for server side cookies
16.	Ability to develop a program to create user sessions and session management.
17.	Have a skill to connect databases with server side programs
18.	Ability to create a website for Secure Electronic Transaction
19.	Understand the various steps involved in testing to complete the application
20.	Test and validate the developed system

K.S.Rangasamy College of Technology - Autonomous Regulation					R 2010		
Department	Information Technology	Programme code & Name		IT: B.Tech. Information Technology			
Semester VII							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 HS 003	PRINCIPLES OF MANAGEMENT	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.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name	IT: B.Tech. Information Technology				
Semester VII							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 001	MOBILE COMPUTING (CS, IT)	3	0	0	3	50	50	100
Objective(s)	To learn the basics of Wireless voice and data communications technologies. To build working knowledge on various telephone and satellite networks. To study the working principles of wireless LAN and its standards. To build knowledge on various Mobile Computing Algorithms. To build skills in working with Wireless Application Protocols to develop mobile content applications.							
1	WIRELESS COMMUNICATION FUNDAMENTALS				Total Hrs	9		
Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks								
2	TELECOMMUNICATION NETWORKS				Total Hrs	11		
Telecommunication systems – GSM – GPRS – DECT – UMTS – IMT-2000 –Satellite Systems - Broadcast Systems – DAB - DVB.								
3	WIRELESS LAN				Total Hrs	9		
Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a - 802.11b standards – HIPERLAN – Blue Tooth.								
4	MOBILE NETWORK LAYER				Total Hrs	9		
Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR –Least Interference Routing- Hierarchical-Geographic Position Assisted Ad Hoc Routing .								
5	TRANSPORT AND APPLICATION LAYERS				Total Hrs	7		
Traditional TCP – Classical TCP improvements – WAP- Case study - Android								
Total hours to be taught						45		
Text book (s) :								
1	Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2008.							
Reference (s) :								
1	William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002.							
2	Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", PHI/Pearson Education, 2003.							
3	Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003.							
4	Hazysztof Wesolowshi, "Mobile Communication Systems", John Wiley and Sons Ltd, 2002.							

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Semester VII							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 IT 711	COMPONENT BASED TECHNOLOGY	3	1	0	4	50	50	100
Objective(s)	To introduces in depth JAVA, CORBA and .Net Components, To deal with fundamental properties of components technology, architecture and middleware, To learn Component Frameworks and Development in depth.						
1	INTRODUCTION				Total Hrs		12
Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middleware.							
2	JAVA BASED COMPONENT TECHNOLOGIES				Total Hrs		12
Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP.							
3	CORBA COMPONENT TECHNOLOGIES				Total Hrs		12
Java and CORBA – Interface Definition language – Object Request Broker – system object model – portable object adapter – CORBA services – CORBA component model – containers – application server – model driven architecture.							
4	. NET BASED COMPONENT TECHNOLOGIES				Total Hrs		12
COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces – connectable objects – OLE containers and servers – Active X controls – .NET components - assemblies – appdomains – contexts – reflection – remoting.							
5	COMPONENT FRAMEWORKS AND DEVELOPMENT				Total Hrs		12
Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component framework – directory objects – cross-development environment – component-oriented programming – Component design and implementation tools – testing tools - assembly tools.							
Total hours to be taught							60
Text book :							
1	Clemens Szyperski, "Component Software: Beyond Object-Oriented Programming", Pearson Education publishers, Second Edition, 2002.						
Reference (s) :							
1	Ed Roman, "Mastering Enterprise Java Beans", John Wiley & Sons Inc., 1999.						
2	Mowbray, "Inside CORBA", Pearson Education, 2003.						
3	Freeze, "Visual Basic Development Guide for COM & COM+", BPB Publication, 2001.						
4	Hortsamann, Cornell, "CORE JAVA Vol-II" Sun Press, 2002.						
5	G.Sudha Sadasivam, "Component - Based Technology", Wiley India Pvt. Ltd, 2008						
6	Ramesh and Raja Sekaran, "Component Based Technology", Sams Publishers, Chennai, 2007						

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010	
Department	Information Technology	Programme Code &Name			IT: B.Tech. Information Technology			
Semester VII								

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 712	DATA WAREHOUSING AND MINING	3	1	0	4	50	50	100

Objective(s)	To serve as an introductory course to under graduate students to learn the fundamental concepts and modern techniques for data mining. To focus on the key tasks of data mining, including data preparation, classification, clustering, association rule mining, and evaluation. To introduce the concept of data warehousing with special emphasis on architecture and design.

1	INTRODUCTION		Total Hrs	12
Introduction, Data Mining, Kinds of data & pattern, Technologies, Applications, Issues, Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Measuring Data Similarity and Dissimilarity.				
2	DATA PREPROCESSING, DATA WAREHOUSING		Total Hrs	12
Data Preprocessing, Overview, Cleaning, Integration, Reduction, Transformation, Data Discretization, Data Warehouse: Basic Concepts, Data Warehouse Modeling, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction.				
3	PATTERN MINING		Total Hrs	12
Basic Concepts, Frequent Itemset Mining Methods, Pattern Evaluation Methods, Pattern Mining: A Road Map, Pattern Mining in Multilevel, Multidimensional Space.				
4	CLASSIFICATION AND CLUSTERING		Total Hrs	12
Classification, Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, Bayesian Belief Networks, Classification by Backpropagation, Support Vector Machines, k-Nearest-Neighbor Classifiers, Clustering, Cluster Analysis, Partitioning Methods, Hierarchical Methods.				
5	OUTLIER DETECTION AND DATA MINING TRENDS		Total Hrs	12
Outliers and Outlier Analysis, Outlier Detection Methods, Statistical Approaches, Mining Complex Data Types, Other Methodologies of Data Mining, Data Mining Applications, Data Mining and Society, Data Mining Trends.				
Total hours to be taught			60	

Text book :	
1	Jiawei Han, Micheline Kamber, Jian Pei, "Data Mining: Concepts and Techniques", 3rd Edition, Morgan Kaufmann Publishers, 2012.
Reference (s) :	
1	David Hand, Heikki Manila, Padhraic Symth, "Principles of Data Mining", PHI 2012.
2	Margaret H.Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education, 2006
3	Alex Berson, Stephen J.Smith, "Data Warehousing, Data Mining & OLAP", MeGraw-Hill Edition, 2007.

K.S.Rangasamy College of Technology - Autonomous Regulation					R 2010	
Department	Information Technology	Programme Code &Name	IT: B.Tech. Information Technology			
Semester VII						

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 713	COMPUTER GRAPHICS AND MULTIMEDIA	3	0	0	3	50	50	100

Objective(s)	To impart the fundamental concepts of Computer Graphics and Multimedia, to study the graphics techniques and algorithms, to study the multimedia concepts and various I/O technologies, to enable the students to develop their creativity		
1	OUTPUT PRIMITIVES	Total Hrs	9

Overview of Graphics System – Line Drawing Algorithms - Circle and Ellipse Generating Algorithms –Two-Dimensional Geometric Transformations – Two-Dimensional Viewing.

2	THREE-DIMENSIONAL CONCEPTS	Total Hrs	9

Three-Dimensional Object Representations – Polygon surfaces, Spline surfaces,Octrees – Three-Dimensional Geometric and Modeling Transformations – Color models – Computer Animation

3	MULTIMEDIA SYSTEMS DESIGN	Total Hrs	9

An Introduction – Multimedia Applications – Multimedia System Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia Systems – Multimedia Databases – Binary Image Compression Schemes – Color, Grayscale and Still-Video Image Compression – Video Image Compression.

4	MULTIMEDIA FILE HANDLING	Total Hrs	9

Data and File Format Standards –TIFF, RIFF, MIDI, TWAIN File Formats – Multimedia Input/Output Technologies – Digital Voice and Audio – Video Image and Animation – Full Motion Video – Storage and Retrieval Technologies – Magnetic Media Technology – Optical Media.

5	MULTIMEDIA AUTHORING AND HYPERMEDIA MESSAGING	Total Hrs	9

Multimedia Authoring Systems – Hypermedia Application Design Considerations – User Interface Design– Object Display/Playback Issues – Hypermedia Messaging – Mobile Messaging – Hypermedia Message Components – Hypermedia Linking and Embedding – Creating Hypermedia Messages –Integrated Document management – Components of Distributed Multimedia Systems.

Total hours to be taught	45

Text book (s) :	
1	Donald Hearn and Pauline Baker M, "Computer Graphics C Version", Pearson Education, 2011.
2	Prabhat K.Andleigh and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2009.

Reference (s) :	
1	Judith Jeffcoate, "Multimedia in practice technology and Applications", PHI,1998.
2	Foley, Vandam, Feiner, Huges, "Computer Graphics: Principles & Practice", Pearson Education, second edition 2003.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Semester VII							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT 7P1	SOFTWARE COMPONENTS LABORATORY	0	0	3	2	50	50	100
Objective(s)	To study about the COM component, to develop EJB, J2EE,CORBA and some VB applications							

LIST OF EXPERIMENTS

1. COM COMPONENT: Development of simple com components in VB and use them in applications. [2 example].

2. ENTERPRISE JAVA BEANS: Deploying EJB for simple arithmetic operator.

3. RMI: Deploying RMI for client server applications. [2 Experiments].

4. Creation Of DLL Using VB And Deploy it in Java [2 Experiments]

5. Naming Services In CORBA

6. DSI, DII IN CORBA.

7. INTER ORB IN COMMUNICATION [IIOP, IOR]

8. STUDYING J2EE SERVER.

9. SIMPLE APPLICATION USING CORBA.

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Semester VII							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 7P2	GRAPHICS AND MULTIMEDIA LABORATORY	0	0	3	2	50	50	100
Objective(s)	To study about DDA algorithm, 2D Transformations, Projections of 3D images, animation and Preparation of E-book publishing material							

LIST OF EXPERIMENTS

1.   DDA and Bresenham's line drawing algorithms for line.

2.   Mid-point circle and ellipse generation algorithms.

3.   2D Transformations such as translation, rotation, scaling, reflection and sharing.

4.   Cohen-Sutherland 2D clipping

5.   3D Transformations such as translation, rotation and scaling.

6.   Projections of 3D images.

7.   Conversions between color models.

8.   Text compression.

9.   Simple animation.

10.   Preparation of E-book publishing material.

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010	
Department	Information Technology	Programme Code & Name			IT: B.Tech. Information Technology			
Semester VII								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 7P3	PROJECT WORK – PHASE I	0	0	4	2	100	00	100
Objective(s)	Imparting the 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 rele4vant to their project work and placing this as their beginning stage for their final presentation.							
Methodology	Three reviews have to be conducted by the committee of minimum of three members one of which should be the guide Problem should be selected Students have to collect about 20 papers related to their work Reports has to be prepared by the students as per the format in Annexure – 1 Preliminary implementation can be done if possible Internal evaluation has to be done for 100 Marks							
Total hours to be taught		60						

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010
Department	Information Technology	Programme Code & Name	IT: B.Tech. Information Technology			
Semester VII						

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 TP 0P5	Career Competency Development V	0	0	2	0	100	00	100
Objective(s)	To enhance employability skills and to develop career competency							

Unit – 1	Written and Oral Communication	Hrs
Self Introduction – GD – HR Interview Skills – Corporate Profile Review Practices on Company Based Questions and Competitive Exams Materials: Instructor Manual		6
Unit – 2	Verbal & Logical Reasoning	
Practices on Company Based Questions and Competitive Exams Materials: Instructor Manual		6
Unit – 3	Quantitative Aptitude	
Practices on Company Based Questions and Competitive Exams Materials: Instructor Manual		6
Unit – 4	Data Interpretation and Analysis	
Practices on Company Based Questions and Competitive Exams Materials: Instructor Manual		6
Unit – 5	Programming & Technical Skills – Part 3	
Data Structure - Arrays – Linked List – Stack – Queues – Tree – Graph Practices on Algorithms and Objective Type Questions Materials: Instructor Manual		6
	Total	30

Evaluation Criteria

S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	15 Questions each from Unit 1, 2,3, 4 & 5 (External Evaluation)	60
2	Evaluation 2 - Oral Communication	GD and HR Interview (External Evaluation by English, MBA Dept.)	20
3	Evaluation 3 – Technical Interview	Internal Evaluation by the Dept. – 3 Core Subjects	20
		Total	100

Reference Books
1. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, "Quantitative Aptitude", TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL PUBlications

Note:
- Instructor can cover the syllabus by Class room activities and Assignments(5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough work pages
- Each Assignment has 20 questions for Unit 1,2,3,4 & 5 and Unit 5 and 5 questions from Unit 5(Algorithms) & Unit 1(Oral Communication)
- Evaluation has to be conducted as like Lab Examination.

VII Semester - Course Outcomes

Module	10 HS 003- Principles of Management Course Outcomes
	At the end of the course, the student will be able to
1	Understanding the basic concepts of management
2	Understanding the contributions of management gurus
3	Knowledge on management functions
4	Gaining the knowledge on types of business organization
5	Gaining knowledge about the various types of planning
6	Knowledge on setting objectives and forecasting
7	Understanding the process of management by objectives
8	Understanding the strategies, policies & planning premises, decision making
9	Exploring the difference between formal and informal organization,
10	Knowing the various types of organization chart, structure and its process
11	Understanding the departmentation by different strategies
12	Knowledge on Line & staff authority, Benefits and its limitation
13	Exploring decentralization & delegation of authority, selection process, HRD techniques
14	Understanding nature and purpose of directing
15	Understanding about the concept and types of leadership
16	Evaluating the motivation theories and motivational techniques
17	Exploring the importance of communication, process, barriers and electronic communication
18	Learning the different process of controlling, budgeting
19	Knowing about the globalization and liberalization
20	Gaining knowledge about the international management and global theory of management

Modules	10IT001-Mobile Computing Course Outcomes
	At the end of the course, the student will be able to
1.	Gain Knowledge in basic facts about frequencies for radio transmission, regulations, signals and antennas
2.	Obtain idea about signal and antennas
3.	Identify the reason for need of special MAC for wireless network
4.	Understand the separation of different users with the help of MAC scheme.
5.	Analyze the second generation digital cellular network , its architecture
6.	Know the importance of data oriented networks
7.	Recognize the role of unidirectional Audio broadcast systems within mobile communication scenario
8.	Realize the role of unidirectional Video broadcast systems within mobile communication scenario
9.	Observe various WLAN products , its system and protocol architecture
10.	Understand MAC Management in Wireless LAN
11.	Examine the basics and various phases of HIPERLAN
12.	Know about Bluetooth architecture, protocol stack, security
13.	Identify the requirements of Mobile IP that extents support of the mobility of hosts
14.	Idea on Dynamic Host Configuration
15.	Gain knowledge on various types of routing protocols like DSDV,DSR
16.	Study about other Ad Hoc routing protocols
17.	Review about Transmission Control Protocol
18.	Acquire the knowledge about Enhanced TCP to support mobility
19.	Obtain the knowledge about WAP and its components, interfaces and architecture
20.	Learn about Android

Modules	10IT711-Component based Technology Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the basics of components and software components
2.	Gain knowledge about the fundamental properties of component technology
3.	Familiar with callbacks with example application
4.	Develop the component architecture and middleware technology
5.	Analyze the fundamental concepts of threads along with its states and types
6.	Design and construct an java beans with BDK tool
7.	Understand the EJB component architecture and Distributed Object models
8.	Implement the Design policy of Remote method invocation and interoperability of RMI with CORBA
9.	Distinguish between Java and CORBA
10.	Familiar with the fundamental functions of ORB with its technologies
11.	Analyze the services of CORBA and CORBA component model
12.	Understand the fundamental concepts of COM and interfaces in COM
13.	Implement the types of interfaces in COM
14.	Identify the basic concepts of OLE containers with its Server and the basics of ActiveX controls
15.	Gain knowledge about assemblies, appdomains, contexts, reflection and remoting
16.	Understand the connector life cycle and contexts
17.	Analyze the difference between CCM and EJB
18.	Implement the architecture and characteristics of Black Box component
19.	Familiar with the components oriented programming and cross-development techniques
20.	Identify and use the appropriate component design, implementation ,testing and assembly tools

Modules	10IT712-Data Warehousing and Mining Course Outcomes
	At the end of the course, the student will be able to
1.	Outline the concept of Data Warehouse.
2.	Analyze the Multidimensional Data Model.
3.	Know the Data Warehouse Architecture.
4.	Implementation of Data Warehousing to Data Mining.
5.	Identify Preprocessing techniques like Cleaning, Integration.
6.	Identify Transformation, Reduction, Discretization.
7.	Know the Concept Hierarchy, Generation, Concept Description, Data Generalization.
8.	Analyze Characterizations, Class Comparisons, Descriptive Statistical Measures.
9.	Understand Association Rule Mining and its types.
10.	Elaborate Single-Dimensional Boolean Association Rules from Transactional Databases.
11.	Identify Multilevel Association Rules from Transaction Databases.
12.	Analyze Classification and Prediction techniques and its issues.
13.	Explain Decision Tree Induction.
14.	Elaborate Bayesian Classification.
15.	Identify Association Rule Based, Other Classification Methods.
16.	Understand Prediction, Classifier Accuracy.
17.	Enumerate Cluster Analysis, Types of data, Categorization of methods.
18.	Analyze Hierarchical Methods-BIRCH, Partitioning methods.
19.	Classify and clarify Spatial Databases, Multimedia Databases, Text Databases, WW W.
20.	Identify various applications and trends in Data Mining.

Modules	10IT713-Computer Graphics and Multimedia Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the basics of Graphic systems
2.	Apply the algorithms for drawing a straight line,Ellipse etc.
3.	Applying the 2D transformations on the object to perform manipulation.
4.	Appending the object viewing concept with transformation.
5.	Understand the production of realistic display of scenes and its various kinds of representations of
6.	Understand the concept of viewing 3D object and its representation.
7.	Apply constitutive equations for transform the object in 2D and 3D
8.	Applying the 3D transformations on the object to perform manipulation
9.	Understand the integration of large variety of technologies in real time.
10.	Upgrading of the recent multimedia technologies.
11.	Select the most appropriate the storage technique to retrieve data from multimedia system.
12.	Apply the compression technique both in video and audio.
13.	Understand the different formats of multimedia.
14.	Learn about the I/O technology for multimedia.
15.	Identify and design concept of digitized audio and compression of voice.
16.	Understand the concept of Magnetic media and optical media .
17.	Design a multimedia system which is user friendly.
18.	Understand the concept of Hypermedia and Mobile messaging.
19.	Understand the functions of managing the integration of DOL.
20.	Apply the distribution concept in the multimedia technology.

Modules	10IT7P1-Software Components Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Make simple component design in VB
2.	Create banner using ActiveX control in VB
3.	Develop an VB application for reversing a string in VB ActiveX control
4.	Perform number conversion application using COM / DCOM in ActiveX DLL
5.	Create spell checking application using COM / DCOM(ActiveX EXE)
6.	Understand the concept of JAR files
7.	Make an application to deploy a Multimedia File
8.	Familiar with programming aspects of RMI
9.	Design an RMI to perform simple arithmetic operation for client server application
10.	Deploy RMI to perform file transfer for client server applications
11.	Create DLL using VB and deploy it in java
12.	Gain knowledge about bean and its applications
13.	Develop an application for customized beans.
14.	Design a calculator using EJB.
15.	Familiar with the aspects of CORBA
16.	Identify and design various naming services in CORBA
17.	Create an CORBA – palindrome application.
18.	Implement DSI and DII in CORBA
19.	Develop inter ORB communication using CORBA
20.	Gain knowledge about working principles of J2EE server

Modules	10IT7P2-Graphics and Multimedia Laboratory Course Outcomes
	At the end of the course, the student will be able to
1.	Ability to generate lines using DDA and Bresenham's line drawing algorithms.
2.	Apply the procedure to draw line into the screen.
3.	Apply the skill to generate circles and ellipses.
4.	Embed the logic and procedure to draw circle and Ellipse.
5.	Acquired the proficiency to perform 2D translation, rotation and scaling.
6.	Apply the transformation metrics and perform the transformation on 2D object
7.	Understand the knowledge about cohen-sutherland 2D clipping.
8.	Clip the lines by applying the various algorithms,
9.	Acquired the proficiency to perform 3D translation, rotation and scaling.
10.	Apply the transformation metrics and perform the transformation on 3D object
11.	Understand the dexterity in projections of 3D images.
12.	Project the 3D object on various direction by representing the objects
13.	Understand knowledge about conversion between colour models
14.	Apply the various colour models for the 2D and 3D objects
15.	Attained the expertise in text compression.
16.	Compress the various image and text by using procedure
17.	Acquired the knowledge about the basic principles of Animation.
18.	Design the object using output primitives and apply animation on it
19.	Understand the handiness in preparation of E-book publishing material.
20.	Understand the concept on overall designing and manipulation.

K.S.Rangasamy College of Technology - Autonomous Regulation					R 2010	
Department	Information Technology	Programme Code & Name	IT: B.Tech. Information Technology			
Semester VIII						

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 HS 002	TOTAL QUALITY MANAGEMENT	3	0	0	3	50	50	100

Objective(s)	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.

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 Circle, 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 9001:2008 ISO 14000 Quality Systems, Elements Concepts, Implementation, Documentation, Quality Auditing, Requirements and Benefits, Non Conformance report, Case Studies on Educational System.

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.
2	Feigenbaum.A.V. "Total Quality Management", McGraw Hill, 1991.
3	Jayakumar.V, Total Quality Management", Lakshmi Publications, 2006.
4	Suburaj, Ramasamy "Total Quality Management", Tata McGraw Hill, 2005.

K.S. Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Semester VIII							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT 811	SOFTWARE QUALITY ASSURANCE AND TESTING	3	0	0	3	50	50	100

Objective(s)	To learn techniques for ensuring software quality, Practices that support the production of quality software, Software testing techniques, Life-cycle models for requirements, defects, test cases, and test results, Process models for units, integration, system, and acceptance testing.

1	FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE	Total Hrs	9

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management

2	MANAGING SOFTWARE QUALITY	Total Hrs	9

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management

3	SOFTWARE TESTING METHODOLOGY	Total Hrs	9

Economics of System Development Life Cycle (SDLC) Testing-Software Testing Methodology Defects hard to find, verification and validation, functional and structural testing, workbench concept, eight considerations in developing testing methodologies, testing tactics checklist

4	SOFTWARE TESTING TECHNIQUES	Total Hrs	9

Black Box, Boundary value, Bottom up, Branch coverage, Cause-Effect graphing, CRUD, Database, Exception, Gray Box , Histograms, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk based Testing, Regression Testing, Structured Walkthroughs, Thread Testing, Performance Testing, White Box Testing

5	SOFTWARE TESTING TOOLS	Total Hrs	9

Taxonomy of Testing tools, Methodology to evaluate automated testing tools, Load Runner, Win runner and Rational Testing Tools, Java Testing Tools.

Total hours to be taught	45

Text book (s) :	
1	Watts S Humphrey, " Managing the Software Process", Pearson Education Inc.,2007
2	William E. Perry ,"Effective Methods for Software Testing", Wiley, 2nd Edition 2006

Reference (s) :	
1	Mordechai Ben Menachem, Garry S. Marliss, "Software Quality", Thomson Learning publication,2000
2	Piyu Tripathy, Sagar Naik, "Software Testing and Quality Assurance: Theory and Practice", Wiley , 2008

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010
Department	Information Technology	Programme code & Name		IT: B.Tech. Information Technology			
Semester VIII							
Course Code	Course Name	Hours/Week			Credit	Maximum Marks	

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT 8P1	PROJECT WORK – PHASE II	0	0	16	8	50	50	100
Objective(s)	Enabling and strengthening the students to carry out the project on their own and to implement their innovative ideas to forefront the risk issues and to retrieve the hazards by adopting suitable assessment methodologies and stating it to global.							
Methodology	Three reviews have to be conducted by the committee of minimum of three members one of which should be the guide 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 They should publish the paper preferably in the journals / conference Final review will be done by the committee that consists of minimum of three members one of which should be the guide (If possible include one external expert examiner within the college) The Report should be submitted by the students around at the end of April.							
Total hours to be taught	240							

VIII Semester - Course Outcomes

Modules	10HS002-Total Quality Management Specific Course Outcomes
	At the end of the course, the student will be able to
1.	Outline the various definitions & dimensions of quality and quality planning
2.	Understand Quality cost & use the various analysis techniques for Quality Cost
3.	Know the concepts and principles of TQM & its Barriers to implementation
4.	Have knowledge of Deming Philosophy.
5.	Identify the importance of Employee involvement and customer satisfaction
6.	Understand the basic ideas and concepts of various continuous process improvement methods
7.	Understand the role of supplier partnership in TQM
8.	Analyze and understand the different performance measures strategy
9.	Use a range of basic statistical tools to control and improve processes
10.	Differentiate control chart for variables and attributes and select appropriate charts for different
11.	Explain the role of six sigma in quality improvement
12.	Identify and understand the purpose of new seven management tools
13.	Understand and acquaint with various types of benchmarking
14.	Translate the voice of the customer into the product design
15.	Understand the concept and objectives of TPM
16.	Differentiate design and process FMEA and realize the benefits of using FMEA
17.	Classify and clarify the various ISO 9000 series of standards
18.	Analyze the features, types, and stages of quality auditing
19.	Understand the concept, necessity, and benefits of documentation
20.	Appreciate the importance of ISO 14000 standards in the present scenario

Modules	10IT811-Software Quality Assurance Course Outcomes
	At the end of the course, the student will be able to
1.	Study the Concept of SQA plan and SQA considerations
2.	Understand the Quality Management and Software Configuration Management
3.	Acquire the knowledge of managing software quality
4.	Obtain a knowledge of the Defect Prevention
5.	Acquire the knowledge of work bench concept and developing testing methodologies
6.	Obtain knowledge of Software Testing Methodology Defects hard to find, verification and validation
7.	Gain a knowledge of White Box Testing and Performance Testing
8.	Obtain a knowledge of Black Box Testing and Cause-Effect graphing
9.	Study the challenges of Methodology to evaluate automated testing tools
10.	Analyze the existing solutions for Java Testing Tools.
11.	Understand the concept of role of SQA
12.	Study the challenges of the SQA people
13.	Analyze the existing solutions for software quality assurance
14.	Understand the concept of managing software organizations
15.	Study the role of Economics of System Development Lifecycle
16.	Understand the concept of testing tactics checklist
17.	Study the role of Effect graphing and Pareto Analysis
18.	Analyze the existing solutions for Structured Walkthroughs and Thread Testing
19.	Understand the concept of the taxonomy of Testing tools
20.	Analyze the existing solutions for Win runner and Rational Testing Tools

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Elective I							

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 IT E11	ADVANCED COMPUTER NETWORKS	3	0	0	3	50	50	100

Objective(s)	To know about IP layer protocols, know about Transport Layer Protocols, know about Routing and applications layer protocols, know about Recent Trends in Networks.

1	INTERNET PROTOCOLS	Total Hrs	9

The OSI model and the TCP/IP protocol suite – IP addresses: classful addressing, classless addressing – delivery, forwarding and routing of IP Packets – ARP and RARP – Internet Protocol – Internet Control Message Protocol – Internet Group Management Protocol.

2	TCP, UDP and SOCKET PROGRAMMING	Total Hrs	9

User Datagram Protocol – Transmission Control Protocol – Stream Control Transmission Protocol – Sockets Introduction – Socket Address Structure – Elementary TCP Sockets – Sending and Receiving – Socket Options – TCP Echo Client Server – UDP Echo Clint Server.

3	ROUTING PROTOCOLS	Total Hrs	9

Unicast Routing protocols –RIP, OSPF and BGP –Host Configuration – BOOTP, DHCP.

4	CIRCUIT SWITCHED NETWORKS	Total Hrs	9

SONET – DWDM – Fiber to the Home – DSL – CATV – ISDN - BISDN.

5	RECENT TRENDS	Total Hrs	9

Optical Networks - Cross connects - LANS - Voice Over IP – Multimedia Networks.

Total hours to be taught	45

Text book(s) :

1	Behrouz A.Forouzan, "TCP/IP protocol Suite". Third Edition, Tata McGraw Hill, New Delhi, 2007.
2	Walrand,J. Varaiya, "High Performance Communication Network", Morgan Kauffman – Harcout Asia Pvt Ltd,2nd Edition,2000.

Reference(s) :

1	Douglas E.Comer, "Internetworking with TCP/IP, Principles, Protocols, and Architecture", Fifth Edition, Prentice Hall, New Delhi, 2007.
2	Richard Stevens.w, "Unix Network Programming", Third Edition, Prentice Hall, New Delhi, 2003.
3	William Stallings ISDN & Broadband ISDN with frame Relay & ATM, PHI 4th Edtion 2000.
4	Bates & Donald W.Gregory, "Voice & Data Communications Handbook", Mc-Graw Hill Edition, 3rd edition, 2000.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology		
Elective I						

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 IT E12	WIRELESS MOBILE NETWORKING	3	0	0	3	50	50	100

Objective(s)	To learn the basics of Routing and protocols in Adhoc and Sensor Networks, To learn Wireless Broadband Networks Technology Overview, Platforms and Standards. To learn management, testing and troubleshooting in Wireless Broadband Networks working principles of wireless LAN, its standards,to learn latest wireless networks.

1	AD HOC NETWORKS		Total Hrs	9
Characteristics and Applications of Ad hoc Networks, Routing – Need for routing and routing classifications, Table Driven Routing Protocols, Source Initiated On-Demand Routing Protocols,, Hybrid Protocols – Zone Routing, Fisheye Routing, LANMAR for MANET with group mobility, Location Added Routing, Distance Routing Effects, Microdiscovery and Power Aware Routing				
2	SENSOR NETWORKS		Total Hrs	9
Wireless Sensor Networks, DARPA Efforts, Classification, Fundamentals of MAC, Flat routing – Directed Diffusion, SPIN, COGUR, Hierarchical Routing, Cluster base routing, Scalable Coordination, LEACH, TEEN, APTEEN and Adapting to the dynamic nature of Wireless Sensor Networks				
3	WIRELESS BROADBAND NETWORKS TECHNOLOGY OVERVIEW, PLATFORMS AND STANDARDS		Total Hrs	9
Wireless broadband fundamentals and Fixed Wireless Broadband Systems, Platforms- Enhanced Copper, Fibre Optic and HFC, 3G Cellular, Satellites, ATM and Relay Technologies, HiperLAN2 Standard, Global 3G CDMA Standard, CDMA Harmonization G3G Proposal for Protocol Layers				
4	MANAGING WIRELESS NETWORKS AND TESTING		Total Hrs	9
Managing Wireless Broadband Operations Management of LMDS Systems and their Application, Principles of operations Management, LMDS Versus Other Access technologies, Applications, Testing Wireless Satellite Networks and Fixed Wireless Broadband Networks.				
5	ADVANCED WIRELESS NETWORKS		Total Hrs	9
Wireless. Broadband Network Applications: Teleservices Model and Adaptive QoS Parameters, Modeling of Wireless. Broadband Applications, Multicomponent Model, Residential High speed Internet Wireless Broadband Satellite Systems, Next Generation Wireless Broadband Networks – 3G, Harmonized 3G, 3G CDMA, Smart Phones and 3G Evolution.				
Total hours to be taught				45

Text book (s):	
1	Joh R. Vacca, "Wireless Broadband Networks Handbook 3G, LMDS and Wireless Internet" Tata McGraw-Hill, 2001.
2	D.P. Agrawal and Qing-An zeng, "Introduction to Wireless and Mobile Systems" Thomson Learning, 2003.
Reference(s) :	
1	Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley, 2003
2	Kavesh Pahlavan and Prashant Krishnamurty - "Principles of Wireless Networks – A unified Approach", Pearson Education, 2002

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Elective I							

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 IT E13	SOFTWARE QUALITY MANAGEMENT	3	0	0	3	50	50	100

Objective(s)	Software quality models. Quality measurement and metrics, Quality plan, implementation and documentation, Quality tools including CASE tools, Quality control and reliability of quality process, Quality management system models, Complexity metrics and Customer Satisfaction, International quality standards – ISO, CMM

1	INTRODUCTION TO SOFTWARE QUALITY	Total Hrs	9

Software Quality – Hierarchical models of Boehm and McCall – Quality measurement – Metrics measurement and analysis – Gilb's approach – GQM Model

2	SOFTWARE QUALITY ASSURANCE	Total Hrs	9

Quality tasks – SQA plan – Teams – Characteristics – Implementation – Documentation – Reviews and Audits.

3	QUALITY CONTROL AND RELIABILITY	Total Hrs	9

Tools for Quality – Ishikawa's basic tools – CASE tools – Defect prevention and removal – Reliability models – Rayleigh model – Reliability growth models for quality assessment

4	QUALITY MANAGEMENT SYSTEM	Total Hrs	9

Elements of QMS – Rayleigh model framework – Reliability Growth models for QMS – Complexity metrics and Models – Customer satisfaction analysis.

5	QUALITY STANDARDS	Total Hrs	9

Need for standards – ISO 9000 Series – ISO 9000-3 for software development – CMM and CMMI – Six Sigma Concepts.

Total hours to be taught	45

Text book (s):	
1	Allan C. Gillies, "Software Quality: Theory and Management", Thomson Learning, 2003.
2	Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Pearson Education (Singapore) Pte Ltd., 2002.

Reference(s) :	
1	Norman E. Fenton and Shari Lawrence Pfleeger, "Software Metrics" Thomson, 2003
2	Mordechai Ben – Menachem and Garry S.Marliss, "Software Quality", Thomson Asia Pte Ltd, 2003.
3	Mary Beth Chrissis, Mike Konrad and Sandy Shrum, "CMMI", Pearson Education (Singapore) Pte Ltd, 2003.
4	ISO 9000-3 "Notes for the application of the ISO 9001 Standard to software development".

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Elective I							

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 IT E14	ADVANCED MICROPROCESSORS	3	0	0	3	50	50	100

Objective(s)	To explain the microprocessor architecture and addressing modes of MOTOROLA 68000 microprocessor and Advanced RISC architecture.

1	MICROPROCESSOR ARCHITECTURE	Total Hrs	9

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.

2	THE MOTOROLA MC68000 FAMILY	Total Hrs	9

The MC 6800 architecture-CPU register –Data formats-Addressing modes-Instruction set and assembly Directives-Memory management-Instruction and Data Caches-Exception Processing.

3	ADVANCED RISC MICROPROCESSORS	Total Hrs	9

RISC versus CISC-RISC properties-RISC evaluation—Advanced RISC microprocessor-DEC Alpha-The Power PC family-The sun SPARC family-The MIPS Rx000 family.

4	HIGH PERFORMANCE RISC ARCHITECTURE :ARM	Total Hrs	9

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.

5	ARM PROCESSOR FAMILY	Total Hrs	9

ARM organization and implementation – The ARM instruction set - The thumb instruction set – ARM CPU cores.

Total hours to be taught	45

Text book (s):	
1	Steve Furber , " ARM System On Chip architecture" - Addison Wesley , Second Edition,2009
2	Daniel Tabak, "Advanced Microprocessors", Tata McGraw Hill. Inc. Second Edition,1995
3	Badri Ram, "Advanced microprocessors and interfacing"', Tata McGraw Hill, 2007.

Reference(s) :	
1	Jonathan W.Valvano, "Embedded Microcomputer Systems, Real Time Interfacin", Published by Thomson Brooks/Col, 2002.
2	Raj Kamal, "Embedded Systems. Architecture, Programming and Design", Tata McGraw Hill. 2003.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010
Department	Information Technology	Programme Code & Name	IT: B.Tech. Information Technology			
Elective I						

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 IT E15	KNOWLEDGE BASED DECISION SUPPORT SYSTEMS	3	0	0	3	50	50	100

Objective(s)	The course has been so designed as to include. Development of support system Methods of managing knowledge Intelligent decision system development

1	INTRODUCTION	Total Hrs	9

Decision making, Systems, Modeling, and support – Introduction and Definition – Systems – Models – Modeling process – Decision making: The intelligence phase – The design phase - The choice phase – Evaluation: The implementation phase –Alternative Decision – Making models – Decision support systems – Decision makers - Case applications.

2	DECISION SUPPORT SYSTEM DEVELOPMENT	Total Hrs	9

Decision Support System Development: Introduction - Life cycle – Methodologies – prototype – Technology Levels and Tools – Development platforms – Tool selection – Developing DSS Enterprise systems: Concepts and Definition – Evolution of information systems – Information needs – Characteristics and capabilities – Comparing and Integrating EIS and DSS – EIS data access, Data Warehouse, OLAP, Multidimensional analysis, presentation and the web – Including soft information enterprise on systems - Organizational DSS – supply and value chains and decision support – supply chain problems and solutions – computerized systems MRP, ERP, SCM – frontline decision support systems.

3	KNOWLEDGE MANAGEMENT	Total Hrs	9

Introduction – Organizational learning and memory – Knowledge management –Development –methods, Technologies, and Tools – success –Knowledge management and Artificial intelligence – Electronic document management.Knowledge acquisition and validation: Knowledge engineering – Scope – Acquisition methods - Interviews – Tracking methods – Observation and other methods – Grid analysis – Machine Learning: Rule induction, case-based reasoning – Neural computing – Intelligent agents – Selection of an appropriate knowledge acquisition methods – Multiple experts – Validation and verification of the knowledge base – Analysis, coding, documenting, and diagramming – Numeric and documented knowledge acquisition – Knowledge acquisition and the Internet/Intranets.

4	INTELLIGENT SYSTEM DEVELOPMENT	Total Hrs	9

Inference Techniques: Reasoning in artificial intelligence – Inference with rules: The Inference tree – Inference with frames – Model-based and case-based reasoning - Explanation and Meta knowledge – Inference with uncertainty – Representing uncertainty – Probabilities and related approaches – Theory of certainty – Approximate reasoning using fuzzy logic. Intelligent Systems Development: Prototyping: Project Initialization – System analysis and design – Software classification: Building expert systems with tools – Shells and environments – Software selection – Hardware –Rapid prototyping and a demonstration prototype - System development –Implementation

5	MANAGEMENT SUPPORT SYSTEMS	Total Hrs	9

Implementing and integrating management support systems – Implementation: The major issues - Strategies – System integration – Generic models MSS, DSS, ES – Integrating EIS, DSS and ES, and global integration – Intelligent DSS – Intelligent modeling and model management – Examples of integrated systems – Problems and issues in integration. Impacts of Management Support Systems – Introduction – overview – Organizational structure and related areas – MSS support to business process reengineering – Personnel management issues – Impact on individuals – Productivity, quality, and competitiveness

Total hours to be taught	45

Text book(s) :	
1	Efrain Turban, Jay E.Aronson, "Decision Support Systems and Intelligent Systems" 6th Edition, Pearson Education, 2001.

Reference(s) :	
1	Ganesh Natarajan, Sandhya Shekhar, "Knowledge management – Enabling Business Growth", Tata McGraw Hill, 2002.
2	George M.Marakas, "Decision Support System", Prentice Hall, India, 2003.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Elective I							

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 IT E16	ADVANCED COMPUTER ARCHITECTURE	3	0	0	3	50	50	100

Objective(s)	To study the ISA design, instruction pipelining and performance related issues, to do a detailed study of ILP with dynamic approaches, to do a detailed study of ILP with software approaches, to study the different multiprocessor architectures and related issues, to study the Memory and I/O systems and their performance issues.

1	INTRODUCTION	Total Hrs	9

Fundamentals of Computer Design – Measuring and reporting performance – Quantitative principles of computer design. Instruction set principles – Classifying ISA – Design issues. Pipelining – Basic concepts – Hazards – Implementation – Multicycle operations.

2	INSTRUCTION LEVEL PARALLELISM WITH DYNAMIC APPROACHES	Total Hrs	9

Concepts – Dynamic Scheduling – Dynamic hardware prediction – Multiple issues – Hardware based speculation – Limitations of ILP.

3	INSTRUCTION LEVEL PARALLELISM WITH SOFTWARE APPROACHES	Total Hrs	9

Compiler techniques for exposing ILP – Static branch prediction – VLIW – Advanced compiler support – Hardware support for exposing more parallelism – Hardware versus software speculation mechanisms

4	MEMORY AND I/O	Total Hrs	9

Cache performance – Reducing cache miss penalty and miss rate – Reducing hit time – Main memory and performance – Memory technology. Types of storage devices – Buses – RAID – Reliability, availability and dependability – I/O performance measures – Designing an I/O system.

5	MULTIPROCESSORS AND THREAD LEVEL PARALLELISM	Total Hrs	9

Symmetric and distributed shared memory architectures – Performance issues – Synchronization – Models of memory consistency – Multithreading.

Total hours to be taught	45

Text book(s) :

1	John L. Hennessey and David A. Patterson, "Computer Architecture: A Quantitative Approach", Morgan Kaufmann, 2011, Fifth Edition.

Reference(s) :

1	D.Sima, T.Fountain and P.Kacsuk,"Advanced Computer Architectures: A Design Space Approach", Addison Wesley, 2003.
2	Kai Hwang and Zhi.Wei Xu, "Scalable Parallel Computing", Tata McGraw-Hill, New Delhi, 2003.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology		
Elective I						

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 IT E17	ADVANCED DATABASES	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, make a study of SQL and relational database design, know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure have an introductory knowledge about the emerging trends in the area of distributed DB- OO DB.

1	DATABASE MANAGEMENT	Total Hrs	9

Relational Data Model – SQL - Database Design - Entity-Relationship Model –Relational Normalization – Embedded SQL – Dynamic SQL – JDBC – ODBC.

2	ADVANCED DATABASES	Total Hrs	9

Object Databases - Conceptual Object Data Model – XML and Web Data – XML Schema – Distributed Data bases – OLAP and Data Mining – ROLAP and MOLAP

3	QUERY AND TRANSACTION PROCESSING	Total Hrs	9

Query Processing Basics – Heuristic Optimization – Cost, Size Estimation - Models of Transactions – Architecture – Transaction Processing in a Centralized and Distributed System – TP Monitor.

4	IMPLEMENTING AND ISOLATION	Total Hrs	9

Schedules – Concurrency Control – Objects and Semantic Commutativity – Locking – Crash, Abort and Media Failure – Recovery – Atomic Termination – Distributed Deadlock – Global Serialization – Replicated Databases – Distributed Transactions in Real World.

5	DATABASE DESIGN ISSUES	Total Hrs	9

Security – Encryption – Digital Signatures – Authorization – Authenticated RPC -Integrity - Consistency - Database Tuning - Optimization and Research Issues.

Total hours to be taught	45

Text book(s) :	
1	Abraham Silberschatz, Henry. F. Korth, S.Sudharsan, "Database System Concepts", 6th Edition., Tata McGraw Hill, 2011
2	R. Elmasri and S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Addison Wesley, 2009
Reference(s) :	
1	Philip M. Lewis, Arthur Bernstein, Michael Kifer, "Databases and Transaction Processing: An Application-Oriented Approach", Addison-Wesley, 2007
2	Raghu Ramakrishnan & Johannes Gehrke, "Database Management Systems", 3rd Edition, TMH, 2003

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010
Department	Information Technology	Programme Code & Name		IT : B.Tech. Information Technology			
Elective I							
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT E18	DISCRETE AND NUMERICAL METHODS	3	2	0	4	50	50	100

Objective(s)	At the end of the course, students would have knowledge of the concepts needed to test the logic of a program, gain knowledge which has application in expert system, data base and a basic for the prolog language. An understanding in identifying patterns on many levels be aware of a class of functions which transform a finite set into another finite set which relates to input output functions in systems. This course gives a complete procedure for solving different kinds of problems occur in engineering numerically. Be exposed the course, the students would be acquainted with the basic concepts in numerical methods and their uses.

1	PROPOSITIONAL CALCULUS	Total Hrs	12

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Logical equivalences and implications – Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments - Validity of arguments - Predicates – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization – Validity of arguments.

2	SET THEORY	Total Hrs	12

Basic concepts – Notations – Subset – Algebra of sets – The power set – Ordered pairs and Cartesian product – Relations on sets –Types of relations and their properties – Relational matrix and the graph of a relation – Equivalence relations –Recurrence relations – Generating function to solve recurrence relation.

3	GRAPH THEORY	Total Hrs	12

Introduction of graph – Types of network graph theory- Sub graph with   graph elements- graph theory with minimum spanning tree- shortest path algorithm -Depth first search algorithm-Clustering algorithm for network graph theory.

4	SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS	Total Hrs	12

Linear interpolation methods (method of false position) - Newton's 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- Relaxation method.

5	NUMERICAL DIFFERENTIATION AND INTEGRATION	Total Hrs	12

Numerical integration by Trapezoidal and Simpson's 1/3 and 3/8 rules - Romberg's method - Two and three point Gaussian quadrature formulas - Taylor Series methods - Euler and Modified Euler methods - Fourth order Runge-Kutta method for solving first order equations.

Total hours to be taught	60

Text book (s) :	
1	Subramaniam. N., "Discrete Mathematics" SCM Publications, Erode, Third edition, 2010.
2	Kandasamy, P.Thilakavthy, K and Gunavathy, K. "Numerical Methods." S.Chand and Co. New Delhi, 1999.

Reference(s):	
1	Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, "Discrete Mathematical Structures", Fourth Indian reprint,Pearson Education Pvt Ltd., New Delhi, 2003.
2	Kenneth H.Rosen, "Discrete Mathematics and its Applications", Fifth Edition, Tata McGraw – Hill Pub. Co. Ltd.,New Delhi, 2003.
3	Trembly J.P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 2003.
4	Nar.singh Deo, "Graph theory with application to Engg and computer science" PHI Learning, New Delhi,2012

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Elective II							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E21	CLOUD COMPUTING (CS, IT)	3	0	0	3	50	50	100

Objective(s)	Be able to understand what the current challenges are in cloud computing and be able to understand how to design and implement cloud-based applications.

1	INTRODUCTION	Total Hrs	8

Cloud computing basics: Defining Cloud computing –Cloud Types - Characteristics of Cloud computing – Assessing the role of Open Standards - Measuring the cloud's value - Cloud Architecture: Exploring the cloud computing stack.

2	CLOUD SERVICES AND APPLICATIONS	Total Hrs	10

Understanding Services and Applications by Type: Defining Infrastructure as a service- Defining Platform as a Service- Defining software as a Service – Defining Identity as a Service, Understanding Abstraction and virtualization: Virtualization Technologies – Load Balancing and virtualization-Understanding Hypervisors-Machine Imaging – Porting applications

3	CLOUD PLATFORMS	Total Hrs	9

Platform as a Service: PaaS Applications Frameworks – Using Amazon Web Services: Amazon Web service components and Services – Working with Elastic Compute Cloud (EC2) – Working with Amazon Storage systems- Understanding Amazon Database Services

4	CLOUD SECURITY	Total Hrs	9

Microsoft Cloud Services: Exploring Microsoft Cloud services – Windows Azure Platform,
Cloud Security: Securing the cloud – Securing Data –Establishing Identity and Presence

5	SERVICE ORIENTED ARCHITECTURE AND CLOUD STORAGE	Total Hrs	9

Service Oriented Architecture: Introducing service Oriented Architecture - SOA Communications –Managing and Monitoring SOA. Cloud storage: Provisioning Cloud Storage- Exploring Cloud Backup Solutions.

Total hours to be taught	45

Text book :	
1	Barrie Sosinsky, "Cloud Computing Bible". Wiley Publishing, 2011.

Reference (s) :	
1	Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs". Emereo Pty Limited, 2008.
2	George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud". [First Edition]Publisher - Orelly's, 2009

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech.Information Technology			
Elective II							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT E22	GRID COMPUTING	3	0	0	3	50	50	100

Objective(s)	To understand the concept of grid computing. To know the application of grid computing. To understanding the technology and tool kits to facilitated the grid computing.		
1	GRID COMPUTING	Total Hrs	9
Introduction - Definition - Scope of grid computing			
2	GRID COMPUTING INITIATIVES	Total Hrs	9
Grid Computing Organizations and their roles – Grid Computing anatomy – Grid Computing road map.			
3	GRID COMPUTING APPLICATIONS	Total Hrs	9
Merging the Grid sources – Architecture with the Web Devices Architecture.			
4	TECHNOLOGIES	Total Hrs	9
OGSA – Sample use cases – OGSA platform components – OGSI – Introduction, Grid Services , A high-level Introduction to OGSI , Technical details of OGSI Specification –OGSA Basic Services			
5	GRID COMPUTING TOOL KITS	Total Hrs	9
Globus Toolkit – Architecture, Programming model, High level services			
Total hours to be taught			45
Text book :			
1	Joshy Joseph & Craig Fellenstein, "Grid Computing", PHI, PTR-2004.		
Reference (s) :			
1	Ahmar Abbas, "Grid Computing: A Practical Guide to technology and Applications", Charles River media – 2003.		
2	D.Janakiram, "Grid Computing": A Research Monograph, Tata McGraw-Hill,2005		

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name	IT: B.Tech. Information Technology				
Elective II							

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 IT E23	SOFTWARE PROJECT MANAGEMENT	3	0	0	3	50	50	100

Objective(s)	To understand the roles of the project manager To understand the threats and opportunities in project management To gain Expertise in size, effort and cost estimation techniques To understand the techniques available with which a project's aims and objectives, timetable, activities, resources and risks can be kept under control To understand the social and political problems a project will encounter against which the technical problems pale into insignificance and to begin to Understand how to approach non-technical problems To Appreciate of other management issues like team structure, group dynamics To understand communication

1	INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT	Total Hrs	9

Project Definition – Contract Management – Activities Covered by Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

2	PROGRAMME MANAGEMENT AND PROJECT EVALUATION	Total Hrs	9

Introduction – Programme Management - Strategic Programme Management – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation. – software effort

3	ACTIVITY PLANNING AND RISK MANAGEMENT	Total Hrs	9

Objectives – Project Schedule – Sequencing and Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Risk Identification – Risk Assessment – Risk Planning and Control.

4	MONITORING AND CONTROL	Total Hrs	9

Resource allocation - identifying and scheduling resources – publishing resource and cost schedule – scheduling sequence - Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Priortizing Monitoring –Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

5	MANAGING PEOPLE AND ORGANIZING TEAMS	Total Hrs	9

Introduction – Understanding Behavior – Organizational Behaviour - Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress – Health And Safety – Case Studies.

Total hours to be taught	45

Text book :	
1	Bob Hughes, Mikecotterell, "Software Project Management", Fourth Edition, Tata McGraw Hill, 2006.

References :	
1	Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.2002.
2	Royce, "Software Project Management", Pearson Education, 1999.
3	Jalote, "Software Project Management in Practice", Pearson Education,
4	Robert T. Futrell, Donald F. Shefer and Linda I. Shefer, "Quality Software Project Management", Pearson Education, 2003.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Elective II							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT E24	DESIGN OF EMBEDDED SYSTEMS	3	0	0	3	50	50	100

Objective(s)	Introduce to features that build an embedded system, To help the understanding of the interaction that the various components within an embedded system have with each other, Techniques of interfacing between processors & peripheral device related to embedded processing, To enable writing of efficient programs on any dedicated processor, To present in lucid manner the basic concepts of systems programming like operating system, assembler compilers etc, and to understand the management task needed for developing embedded system.

1	INTRODUCTION TO EMBEDDED SYSTEMS	Total Hrs	9

Introduction to functional building blocks of embedded systems – Register, memory devices, ports, timer, interrupt controllers using circuit block diagram representation for each category.

2	PROCESSOR AND MEMORY ORGANIZATION	Total Hrs	9

Structural units in a processor; selection of processor & memory devices; shared memory; DMA; interfacing processor, memory and I/O units; memory management – Cache mapping techniques, dynamic allocation - Fragmentation.

3	DEVICES & BUSES FOR DEVICES NETWORK	Total Hrs	9

I/O devices; timer & counting devices; serial communication using I2C, CAN, USB buses; parallel communication using ISA, PCI, PCI/X buses, arm bus; interfacing with devices/ports, device drivers in a system – Serial port & parallel port.

4	I/O PROGRAMMING SCHEDULE MECHANISM	Total Hrs	9

Intel I/O instruction – Transfer rate, latency; interrupt driven I/O - Non-maskable interrupts; software interrupts, writing interrupt service routine in C & assembly languages; preventing interrupt overrun; disability interrupts. Multi threaded programming – Context switching, premature & non-premature multitasking, semaphores. Scheduling – Thread states, pending threads, context switching, round robin scheduling, priority based scheduling, assigning priorities, deadlock, watchdog timers.

5	REAL TIME OPERATING SYSTEM (RTOS)	Total Hrs	9

Introduction to basic concepts of RTOS, Basics of real time & embedded system operating systems, RTOS – Interrupt handling, task scheduling; embedded system design issues in system development process – Action plan, use of the target system, emulator, use of software tools.

Total hours to be taught	45

Textbook :

1	Rajkamal, 'Embedded System – Architecture, Programming, Design', Tata McGraw Hill, 2006.
2	Daniel W. Lewis 'Fundamentals of Embedded Software', Prentice Hall of India, 2004.

Reference (s) :

1	Steve Heath, Embedded Systems Design, Second Edition-2003, Newnes.
2	David E.Simon, An Embedded Software Primer, Pearson Education, 2004.
3	Wayne Wolf, Computers as Components; Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001.
4	Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware /Software Introduction, John Wiley, 2002.

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology				
Elective II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E25	PERVASIVE COMPUTING	3	0	0	3	50	50	100
Objective(s)	Be able to understanding the basics of pervasive computing and its application, voice enabling usage and user interface issues along with introducing how PDA is supported in pervasive environment							
1	INTRODUCTION				Total Hrs		8	
Pervasive Computing Application - Pervasive Computing devices and Interfaces -Device technology trends, Connecting issues and protocols.								
2	PERVASIVE COMPUTING AND WEB BASED APPLICATIONS				Total Hrs		10	
Pervasive Computing and web based Applications - XML and its role in Pervasive Computing - Wireless Application Protocol (WAP) Architecture and Security – Wireless Mark-Up language (WML) – Introduction								
3	VOICE ENABLING PERVASIVE COMPUTING				Total Hrs		9	
Voice Enabling Pervasive Computing - Voice Standards - Speech Applications in Pervasive Computing and security.								
4	PDA IN PERVASIVE COMPUTING				Total Hrs		9	
PDA in Pervasive Computing – Introduction - PDA software Components, Standards, emerging trends - PDA Device characteristics - PDA Based Access Architecture.								
5	USER INTERFACE ISSUES IN PERVASIVE COMPUTING				Total Hrs		9	
User Interface Issues in Pervasive Computing, Architecture - Smart Card- based Authentication Mechanisms - Wearable computing Architecture.								
Total hours to be taught							45	
Text book :								
1	Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec & Klaus Rindtorff. Pervasive Computing Technology and Architecture of Mobile Internet Applications, Pearson Education, 2005.								
Reference (s) :								
1	Uwe Hansman, Lothat Merk, Martin S Nicklous & Thomas Stober: Principles of Mobile Computing, Second Edition, Springer- Verlag, New Delhi, 2003.								
2	Rahul Banerjee: Internetworking Technologies: An Engineering Perspective, Prentice –Hall of India, New Delhi, 2003. (ISBN 81-203-2185-5)								
3	Rahul Banerjee: Lecture Notes in Pervasive Computing, Outline Notes, BITS-Pilani, 2003.								

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Elective II							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E26	C# AND .NET	3	0	0	3	50	50	100

Objective(s)	The student will gain knowledge in the concepts of the .NET framework as a whole and the technologies that constitute the framework. The student will gain programming skills in C# both in basic and advanced levels. By building sample applications, the student will get experience and be ready for large–scale projects.

1	INTRODUCTION TO C#		Total Hrs	8

Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.

2	OBJECT ORIENTED ASPECTS OF C#		Total Hrs	9

Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.

3	APPLICATION DEVELOPMENT ON .NET		Total Hrs	8

Building Windows Applications, Accessing Data with ADO.NET.

4	WEB BASED APPLICATION DEVELOPMENT ON .NET		Total Hrs	8

Programming Web Applications with Web Forms, Programming Web Services.

5	THE CLR AND THE .NET FRAMEWORK		Total Hrs	12

Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using SingleCall, Threads.

Total hours to be taught	45

Text book (s) :	
1	E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, Second Edition, 2009.
2	J. Liberty, "Programming C#", 4th ed., O'Reilly, 2007.

Reference (s) :	
1	Herbert Schildt, "The Complete Reference: C# 2.0" Tata McGraw-Hill, Second Edition,2005
2	Robinson et al, "Professional C#", 3rd Edition, Wrox Press, 2004.
3	Andrew Troelsen, "Pro C# 2005 and the.NET 2.0 Platform" ,3rd Edition, Apress,2005
4	"Understanding .NET 2/E" ,David Chappell, Pearson Education, Second Edition,2006.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			
Elective II							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E27	MOBILE APPLICATION DEVELOPMENT(Infosys)	3	0	0	3	50	50	100

Objective(s)	Appreciate the Mobility landscape, to familiarize with Mobile apps development aspects, to design and develop mobile apps, using Android as development platform, with key focus on user experience design, native data handling and background tasks and notifications, to appreciation of nuances such as native hardware play, location awareness, graphics, and multimedia, to perform testing, signing, packaging and distribution of mobile apps

1	GETTING STARTED WITH MOBILITY	Total Hrs	9

Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, setting up the mobile app development environment along with an emulator, a case study on Mobile app development

2	BUILDING BLOCKS OF MOBILE APPS	Total Hrs	9

App user interface designing – mobile UI resources (Layout, UI elements, Draw-able, Menu), Activity- states and life cycle,interaction amongst activities, App functionality beyond user interface - Threads, Async task, Services

3	BUILDING BLOCKS OF MOBILE APPS	Total Hrs	9

states and lifecycle, Notifications, Broadcast receivers, Telephony and SMS APIs, Native data handling – on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access (via Internet/Intranet)

4	SPRUCING UP MOBILE APPS	Total Hrs	9

Graphics and animation – custom views, canvas, animation APIs, multimedia – audio/video playback and record, location awareness, and native hardware access (sensors such as accelerometer and gyroscope)

5	TESTING & TAKING MOBILE APPS TO MARKET	Total Hrs	9

Debugging mobile apps, White box testing, Black box testing, and test automation of mobile apps, JUnit for Android, Robotium, MonkeyTalk - Versioning, signing and packaging mobile apps, distributing apps on mobile market place

Total hours to be taught	45

Text book :	
1	Frank Ableson,Sen R, Chrisking, "Android In Action" Dreamtech Press, New Delhi,3rd Edition,2012.

Reference (s) :	
1	Dimarzio J F "Android; A Programmer's Guide", Tata Mcgraw Hill Education Pvt ltd ,2010.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT : B.Tech. Information Technology			
Elective III							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E31	INFORMATION RETRIEVAL TECHNIQUES	3	0	0	3	50	50	100

Objective(s)	To study the Basic retrieval techniques of information ; to study dynamic approaches for retrieval; to study the clustering and pattern matching methods; to study web search techniques catering retrieval process

1	INTRODUCTION	Total Hrs	9

Basic Concepts – Retrieval Process – Modeling – Classic Information Retrieval- Algebraic and Probabilistic Models – Retrieval Performance Evaluation

2	QUERY LANGUAGES AND OPERATIONS	Total Hrs	9

Languages – Key Word based Querying – Pattern Matching – Structural Queries – Query Operations – User Relevance Feedback – Local and Global Analysis – Text and Multimedia languages

3	TEXT OPERATIONS,INDEXING AND SEARCHING	Total Hrs	9

Document Preprocessing – Clustering – Text Compression - Indexing and Searching – Inverted files – Boolean Queries – Sequential searching – Pattern matching – User Interface and Visualization – Human Computer Interaction

4	MULTIMEDIA MODELS, INDEXING AND SEARCHING	Total Hrs	9

Data Models – Query Languages – Spatial Access Methods – Generic Multimedia Indexing Approach – One Dimensional Time Series – Two Dimensional Color Images – Feature Extraction

5	SEARCHING THE WEB AND LIBRARIES	Total Hrs	9

Searching the Web – Challenges – Characterizing the Web – Search Engines – Browsing – Meta-searchers – Online IR systems –Digital Libraries – Architectural Issues – Document Models, Representations and Access

Total hours to be taught	45

Text book :	
1	Ricardo Baeza-Yate, Berthier Ribeiro-Neto, "Modern Information Retrieval", Pearson Education Asia, 2nd edition,2005.

Reference (s) :	
1	G.G. Chowdhury, "Introduction to Modern Information Retrieval", Neal-Schuman Publishers; 2nd edition, 2003.
2	Daniel Jurafsky and James H. Martin, "Speech and Language Processing", Pearson Education, 2000.
3	David A. Grossman, Ophir Frieder, "Information Retrieval: Algorithms, and Heuristics", Academic Press, 2000.
4	Charles T. Meadow, Bert R. Boyce, Donald H. Kraft, "Text Information Retrieval Systems", Academic Press, 2000.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010
Department	Information Technology	Programme Code &Name	IT: B.Tech. Information Technology			
Elective III						

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E32	SOFTWARE TESTING	3	0	0	3	50	50	100

Objective(s)	To explain the basics of software testing. To highlight the strategies for software testing. To stress the need and conduct of testing levels. To identify the issues in testing management. To bring out the ways and means of controlling and monitoring testing activity

1	INTRODUCTION		Total Hrs	8

Testing as an Engineering Activity, Role of Process in Software Quality, Testing as a Process, Basic Definitions, Software Testing Principles, The Tester's Role in a Software Development Organization, Origins of Defects, Defect Classes, The Defect Repository and Test Design, Defect Examples, Developer/Tester Support for Developing a Defect Repository

2	TEST CASE DESIGN		Total Hrs	10

Introduction to Testing Design Strategies, The Smarter Tester, Test Case Design Strategies, Using Black Box Approach to Test Case Design, Random Testing, Boundary Value Analysis, Other Black-box Test Design Approaches, Black-box testing and COTS, Using White-Box Approach to Test design, Test Adequacy Criteria, , Paths:Their Role in White-box Based Test Design, Additional White Box Test Design Approaches

3	LEVELS OF TESTING		Total Hrs	9

The Need for Levels of Testing, Unit Test, Unit Test Planning, Designing the Unit Tests. The Class as a Testable Unit, The Test Harness, Running the Unit tests and Recording results, Integration tests, Designing Integration Tests, Integration Test Planning, System Test – The Different Types, Regression Testing, Alpha, Beta and Acceptance Tests

4	TEST MANAGEMENT		Total Hrs	9

Introductory Concepts, Testing and Debugging Goals and Policies, Test Planning, Test Plan Components, Test Plan Attachments, Locating Test Items, The role of three groups in Test Planning and Policy Development, Introducing the test specialist, Skills needed by a test specialist

5	CONTROLLING AND MONITORING		Total Hrs	9

Defining Terms, Measurements and Milestones for Controlling and Monitoring, Status Meetings, Reports and Control Issues, Criteria for Test Completion, SCM, Types of reviews, Developing a review program, Components of Review Plans.

Total hours to be taught	45

Text book :	
1	Ilene Burnstein, "Practical Software Testing", Springer International Edition, Chennai, 2003

Reference (s) :	
1	Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education, New Delhi, 1995
2	Elfriede Dustin, "Effective Software Testing", Pearson Education, New Delhi, 2003
3	Renu Rajani and Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw-Hill, New Delhi, 2003

K.S.Rangasamy College of Technology - Autonomous Regulation		R 2010
Department	Information Technology	Programme Code &Name	IT: B.Tech. Information Technology

Elective III							

Course Code	Course Name	L	T	P	C	CA	ES	Total
		Hours / Week			Credit	Maximum Marks		
10 IT E33	E-COMMERCE	3	0	0	3	50	50	100

Objective(s)	To enable learners to understand the Electronic commerce in Business and in payments, Security.

1	INTRODUCTION TO E-COMMERCE	Total Hrs	8

Electronic commerce and physical commerce - Economic forces – advantages – myths - business models.

2	TECHNOLOGY INFRASTRUCTURE	Total Hrs	10

Internet and World Wide Web, internet protocols - FTP, intranet and extranet - cryptography, information publishing technology- basics of web server hardware and software.

3	BUSINESS APPLICATIONS	Total Hrs	10

Consumer oriented ecommerce – E-tailing and models - Marketing on web – advertising, e-mail marketing, e-CRM; Business oriented ecommerce – E-Government, EDI on the internet, SCM; Web Auctions, Virtual communities and Web portals

4	ECOMMERCE PAYMENTS AND SECURITY	Total Hrs	9

E payments - Characteristics of payment of systems, protocols, E-cash, E- check and Micro payment systems.

5	LEGAL AND PRIVACY ISSUES IN E- COMMERCE	Total Hrs	8

Legal, Ethics and privacy issues – Protection needs and methodology – consumer protection, cyber laws, contracts and warranties. Taxation and encryption policies.

Total hours to be taught	45

Text book :

1	Hentry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, "E-Commerce – fundamentals and Applications", Wiley India Pvt Ltd, 2007.
2	Gary P. Schneider, "Electronic commerce, Thomson course technology", Fourth annual edition, 2007.

Reference (s) :

1	Bharat Bhasker, "Electronic Commerce – Frame work technologies and Applications", 3rd Edition. Tata McGrawHill Publications, 2008
2	Kamlesh K.Bajaj and Debjani Nag, "Ecommerce- the cutting edge of Business", Tata McGraw Hill Publications, 2008
3	Efraim Turban et al," Electronic Commerce –A managerial perspective", Pearson Education Asia, 2006

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Elective III							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E34	DISTRIBUTED COMPUTING	3	0	0	3	50	50	100

Objective(s)	To understand the concept of distributed computing. To know the issues of operating systems. To understand the concept of distributed processing.

1	INTRODUCTION	Total Hrs	9

Introducing- Goals – hardware concepts- bus based multiprocessor- switched multiprocessor – bus based multicomputer – switched multicomputer – software concepts – network operating system – True distributed system – Multiprocessor time sharing system – design issues – transparency – Flexibility – reliability – Performance and Scalability.

2	PROCESSES AND DISTRIBUTED OBJECTS	Total Hrs	9

Communication – Layered Protocols - ATM networks – Client server model – remote procedure call – group communication.

3	OPERATING SYSTEM ISSUES - I	Total Hrs	9

Synchronization – Clock Synchronization – Mutual Exclusion – Election Algorithms – Atomic transaction – Deadlock – Threads – System models – Processor Allocation – Scheduling – fault tolerance – Real time system.

4	OPERATING SYSTEM ISSUES - II	Total Hrs	9

Distributed file systems Distributed file system design – implementation – file models – fault tolerance - file replication –multimedia.

5	DISTRIBUTED PROCESSING	Total Hrs	9

Distributed shared memory - consistency models – page based distributed shared memory – shared variable distributed shared memory – Distributed programming languages – case studies.

Total hours to be taught	45

Text book :	
1	Andrew S.Tanenbaum,"Distributed Operating Systems", Pearson Education Asia, 2001.

Reference (s) :	
1	Mukesh singhal and niranjan G.Shivaratri, "Advanced concepts in Operating system, Tata McGraw Hill.
2	Pradeep.k and Sinha," Distributed operating systems,PHI, Newdelhi, 2001

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Elective III							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E35	CLIENT SERVER COMPUTING	3	0	0	3	50	50	100

Objective(s)	To learn advanced Java programming concepts like reflection, native code interface, threads, etc, develop network programs in Java, understand Concepts needed for distributed and multi-tier applications; understand issues in enterprise applications development.

1	INTRODUCTION		Total Hrs	9
Client Server Computing era, Real Client /Server, Fat Servers or fat clients, 2 tier versus 3 Tier, Intergalactic client server, client server for different models, building blocks.				
2	CLIENT / SERVER OPERATING SYSTEMS		Total Hrs	9
Anatomy of Server Programs, Server needs from OS ,Server scalability, Client anatomy, Client OS trends, MAC OS, Linux OS, Win OS Server OS trends, NetWare, Win 2000 Server, OS/2 warp server				
3	CLIENT SERVER MIDDLEWARE		Total Hrs	9
NOS Middleware global directory service, distributed time service, distributed security services, RPC messaging and peer to peer Sockets, NetWare, NetBIOS, remote procedure call, messaging and queuing, MOM Vs RPC, Evolution of the NOS, DEC, The enterprise NOS, the internet as NOS				
4	CLIENT SERVER TRANSACTION PROCESSING		Total Hrs	9
ACID Properties, Transaction Models, TP Monitor, TP Monitor and OS, TP Monitor and Transaction Management, TP Monitor Client / Server Interaction types - TP Lite or TP Heavy, TP Lite versus TP Heavy - TP monitor: meet the players.				
5	CLIENT SERVER AND INTERNET		Total Hrs	9
Web Client Server – Web Style, HTML Tutorial, HTTP,Web Client / Server -3-Tier Client Server, Web style, HTML Web Based forms, CGI - The Distributed object Era – Java Meets CORBA, document is a object.				
Total hours to be taught				45

Reference Books (s) :	
1	Robert Orfail, Dan Harkey Jeri Edwards, "Essential Client /Server Survival Guide", Third edition, John Wiley & Sons, Singapore, 2009.
2	James E.Goldman, Phillip T.Rawles, Julie R.Mariga," Client / Server Information Systems, A Business Oriented Approach",John Wiley& Sons, Singapore, 2000.
3	Eric J Johnson,"A complete guide to Client / Server Computing", First edition, Prentice Hall New Delhi, 2001.
4	Smith & Guengerich," Client / Server Computing ", Prentice Hall,New Delhi, 2002

K.S.Rangasamy College of Technology Autonomous Regulation							R 2010
Department	Information Technology	Programme Code &Name	IT : B.Tech. Information Technology				
Elective III							

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E36	XML AND WEB SERVICES	3	0	0	3	50	50	100

Objective(s)	The basic aim of this subject is to provide students with insight into XML Web Services, various key technologies for web services, protocol architecture of XML services and also explains how the web services can be developed using XML and also describes various security issues in the XML document.

1	INTRODUCTION	Total Hrs	9

Role Of XML – XML and the Web – XML Language Basics – SOAP – Web Services – Revolutions of Xml – Service Oriented Architecture (SOA).

2	XML TECHNOLOGY	Total Hrs	9

XML-Namespaces – Structuring With Schemas and DTD – Presentation Techniques – Transformation - XML Infrastructure.

3	SOAP	Total Hrs	9

Overview Of SOAP-HTTP – XML – RPC – SOAP: Protocol-Message Structure – Intermediaries – Actors – Design Patterns and Faults – SOAP with Attachments.

4	WEB SERVICES	Total Hrs	9

Overview – Architecture – Key Technologies – UDDI – WSDL – ebXML – SOAP and Web services in E-Com – Overview of .NET And J2EE.

5	XML SECURITY AND XML IN PRACTICE	Total Hrs	9

Security Overview – Canonicalization – XML Security Frame Work – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines for Signing XML Documents – XML in Practice.

Total hours to be taught	45

Text book (s) :

1	Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2nd edition,2002.

Reference(s):

1	Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, "Developing Java Web Services", Wiley Publishing Inc., 2004.
2	Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
3	McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name		IT: B.Tech. Information Technology			
Elective III							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks	
		L	T	P	C	CA	ES	Total
10 IT E37	JAVA TECHNOLOGIES	3	0	0	3	50	50	100
Objective(s)	To learn the basics of J2EE , to develop web applications using the J2EE concepts, to implement session tracking mechanism, to understand the JSP components and objects, to understand the basics of struts2, to perform XML based validations, to configure Hibernate, to write programs using HQL, to implement Spring IoC containers ,to implement the concept of Dependency injection.						

1	INTRODUCTION TO J2EE	Total Hrs	9

J2EE   Platform Overview – Java EE Platform – Distributed Multi tiered Applications – Java EE – Web and Business Components – Java EE Containers – services and types – Java EE application Assembly and deployment – Packaging Applications - Java EE modules – Getting started with Web Applications – Model View Controller (MVC2) Architecture and Packaging EJB Module

2	ADVANCED JAVA EE – WEB AND BUSINESS COMPONENTS DEVELOPMENT	Total Hrs	9

Servlet Overview – Features of Java Servlets – Servlet Lifecycle – Handling HTTP Request and Response – Understanding
Servlet Sessions – Sessions – Session Tracking Mechanism – Session Tracking and Java Servlet API - Servlet Context – Java Server Pages - Overview of JSP – JSP Architecture and lifecycle – Components of Java Server Pages – JSP Implicit objects and Tags – Enterprise JavaBeans (EJB 3.0)- Overview and Architecture – Features of EJB

3	STRUTS2 FRAMEWORK	Total Hrs	9

Struts2 Basics and Architecture – Struts Request Handling Life cycle- Struts2 Configuration, Struts2 Actions, Struts2 Interceptors – Struts2 Results – Struts2 Value Stack / OGNL –Struts2 Tag libraries – Struts2 XML Based Validations- Struts2 Database Access

4	HIBERNATE	Total Hrs	9

Introduction to Hibernate-, ORM Overview, Hibernate Environment – Hibernate Architecture and API, Hibernate Configuration – Hibernate Sessions - Persistent Class and Mapping Files – Building Hibernate Application, Hibernate Query Language (HQL) – Hibernate O/R   Mappings – Collection and Association Mappings- Many- to- Many, One- to- One, One –to- Many, Many –to –Many

5	SPRING	Total Hrs	9

Introduction to Spring Framework Architecture – Bean Definition, Bean Scopes and Bean Definition Inheritance – Spring IoC Containers, Understanding inversion of control (IoC) –Dependency Injection (DI) – Spring Setter Injection, Spring Constructor Injection –IoC in Action - Architecture of Spring MVC Framework

Total hours to be taught	45

Text book (s) :	
1	Kogent Solutions Inc, "Java Server Programming (J2EE 1.4)" , Black Book, Dreamtech Press, Platinum Edition.
2	Kogent Solutions Inc, "Struts2", Black Book , Second Edition.

Reference(s) :	
1	James Holmes, "Struts 2:The Complete Reference", McGraw Hill ,First Edition.
2	Christian Bauer, Gavin King, "Java Persistence with Hibernate", Manning Publications , First Edition.
3	Kogent Solutions Inc., "Java 6 and J2EE 1.5(Java EE 5)", Black Book , Dreamtech Press.

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2010
Department	Information Technology	Programme Code & Name		IT : B.Tech. Information Technology			
Elective IV							

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E41	WEB MINING	3	0	0	3	50	50	100

Objective(s)	This subject introduces basic concepts, tasks, methods, and techniques in web mining. This subject will develop an understanding of the web mining process and issues, learn various techniques for data mining, and apply the techniques in solving data mining problems using data mining tools and systems.		
1	INTRODUCTION	Total Hrs	9
What is Data Mining - Relational Databases - Data Warehouses - Transactional Databases - Advanced Database Systems - Data Mining Functionalities - Interestingness of a pattern Classification of Data Mining Systems - Major issues in Data Mining			
2	DATA MINING AND KNOWLEDGE DISCOVERY	Total Hrs	9
The KDD process and methodology - Data preparation for knowledge discovery - Overview of data mining techniques - Market basket analysis - Classification and prediction – Clustering - Memory-based reasoning - Evaluation and Interpretation.			
3	WEB USAGE MINING PROCESS AND TECHNIQUES	Total Hrs	9
Data collection and sources of data- Data preparation for usage mining - Mining navigational patterns - Integrating e-commerce data - Leveraging site content and structure - User tracking and profiling - E-Metrics: measuring success in e-commerce Privacy issues.			
4	CLASSIFICATION AND PREDICTION	Total Hrs	9
Concepts and Issues regarding Classification and Prediction – Classification by Decision Tree Induction – Bayesian Classification - Classification by Back-propagation - Classification Based on Concepts from Association Rule Mining.			
5	WEB MINING APPLICATIONS AND OTHER TOPICS	Total Hrs	9
Data integration for e-commerce - Web personalization and recommender systems - Web content and structure mining - Web data warehousing - Review of tools, applications, and systems.			
Total hours to be taught			45
Text book (s) :			
1	Michael J. Berry, Gordon S. Linof, John Wiley "Data Mining Techniques for Marketing, Sales, and Customer Relationship Management", 3rd Edition, 2011		
Reference(s):			
1	Ralph Kimball and Richard Merz, John Wiley, "The Data Web house Toolkit", 2000		
2	Gordon Linoff and Michael Berry, John Wiley & Sons,"Mining the Web: Transforming Customer Data into Customer Value", 2001.		

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code & Name	IT: B.Tech. Information Technology				
Elective IV							
Course Code	Course Name	Hours / Week			Credit	Maximum marks	
		L	T	P	C	CA	ES	Total
10 IT E42	MULTIMEDIA COMPRESSION TECHNOLOGY	3	0	0	3	50	50	100
Objective(s)	To have a complete understanding of error–control coding, to understand encoding and decoding of digital data streams, to introduce methods for the generation of these codes and their decoding techniques, to have a detailed knowledge of compression and decompression techniques, to introduce the concepts of multimedia communication.						

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 – Shannon-Fano coding – Dictionary techniques – LZW family algorithms.

3	AUDIO COMPRESSION	Total Hrs	9

Audio compression techniques - μ- Law and A- Law companding. Frequency domain and filtering – Basic sub-band coding – Application to speech coding – G.722 – Application to audio coding – MPEG audio, progressive encoding for audio – Silence compression, speech compression techniques – Formant and CELP Vocoders

4	IMAGE COMPRESSION	Total Hrs	9

Predictive techniques – DM, PCM, DPCM: Optimal Predictors and Optimal Quantization – Contour based compression – Transform Coding – JPEG Standard – Sub-band coding algorithms: Design of Filter banks – Wavelet based compression: Implementation using filters – EZW, SPIHT coders – JPEG 2000 standards - JBIG, JBIG2 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 – 4 and 7 – Motion estimation and compensation techniques – H.261 Standard – DVI technology – PLV performance – DVI real time compression – Packet Video.

Total hours to be taught	45

Reference (s) :	
1	Khalid Sayood : Introduction to Data Compression, Morgan Kauffman Harcourt India, 3rd Edition, 2005.
2	David Salomon : Data Compression – The Complete Reference, Springer Verlag New York Inc., 4th Edition, 2006.
3	Yun Q.Shi, Huifang Sun : Image and Video Compression for Multimedia Engineering - Fundamentals, Algorithms & Standards, CRC press, 2003.
4	Peter Symes : Digital Video Compression, McGraw Hill Pub., 2004.
5	Mark Nelson : Data compression, BPB Publishers, New Delhi,1998.
6	Mark S.Drew, Ze-Nian Li : Fundamentals of Multimedia, PHI, 1st Edition, 2003.
7	Watkinson,J : Compression in Video and Audio, Focal press,London.1995.
8	Jan Vozer : Video Compression for Multimedia, AP Profes, NewYork, 1995

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name		IT: B.Tech. Information Technology			
Elective IV							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT E43	NETWORK ADMINISTRATION AND MAINTENANCE	3	0	0	3	50	50	100
Objective(s)	To learn the systematic way of solving problems, understand the different methods of organizing large amounts of data, learn to program in C, efficiently implement the different data structures, efficiently implement solutions for specific problems.							
1	OVERVIEW AND NETWORK SERVICES				Total Hrs		9	
TCP/IP and the Internet, A data communication model, TCP/IP Protocol Architecture, Network access layer, Internet layer, Transport layer, Application Layer.Network Services -Name and Address, The Host Table, DNS, Mail Services, File and Print Servers, Configuration Servers, Planning Routing, Planning Naming Services.								
2	CONFIGURING ROUTING				Total Hrs		8	
Kernel Configuration, The Internet Daemon, The Extended Internet Daemon, Common Routing Configurations, The Minimal routing Table, Building a Static Routing Table, Interior Routing Protocols, Exterior Routing Protocols, Gateway Routing Daemon.								
3	CONFIGURING DNS AND LOCAL NETWORK SERVICES				Total Hrs		10	
BIND: Unix Name Service, Configuring the Resolver, Configuring named, Using nslookup. Local Network Services-The Network File System, Sharing Unix Printers, Using Samba to Share Resources with Windows, Network Information Service, DHCP, Managing Distributed Servers, Post Office Servers.								
4	SENDMAIL				Total Hrs		9	
sendmail's Function, Running Sendmail as Daemon, sendmail Aliases, the sendmail.cf File, sendmail.cf Configuration Language, Rewriting the Mail Address, Modifying a sendmail.cf File, Testing sendmail.cf.								
5	CONFIGURING APACHE AND NETWORK SECURITY				Total Hrs		9	
Installing Apache Software, Configuring the Apache Server, Understanding an httpd.conf file, Webserver security, Security Planning, User Authentication, Application Security, Security Monitoring, Access Control, Encryption, Firewalls, Words to the Wise.								
Total hours to be taught						45		
Text book (s) :								
1	Craig Hunt,"TCP/IP Network Administration",3rd Edition ,O'Reilly Media, Inc							
Reference (s) :								
1	Steve Wisniewski, "Network Administration", Pearson Education Asia, 2001.							
2	Craig Hunt , Robert Bruce,"Windows NT TCP/IP Network Administration", O'Reilly Media, Inc							

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Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT E44	USER INTERFACE DESIGN	3	0	0	3	50	50	100

Objective(s)	To study the concept of menus, windows, interfaces. To study about business functions, study the testing methods. To study the characteristics and components of windows. To study the various controls for the windows. To study about various problems in windows design with color, text, graphics.	
1	INTRODUCTION	Total Hrs	9

1	INTRODUCTION	Total Hrs	9

Introduction-Importance-Human-Computer interface-characteristics of graphics interface-Direct manipulation graphical system - web user interface-popularity-characteristic & principles

2	DESIGN PROCESS	Total Hrs	9

User interface design process- obstacles-usability-human characteristics in design - Human interaction speed-business functions-requirement analysis-Direct-Indirect methods-basic business functions-Design standards-system timings - Human consideration in screen design

3	SYSTEM MENUS AND NAVIGATION SCHEMES	Total Hrs	9

structures of menus - functions of menus-contents of menu-formatting -phrasing the menu - selecting menu choice-navigating menus-graphical menus

4	CONTROLS	Total Hrs	9

Windows: Characteristics-components-presentation styles-types-managements-organizations-operations-web systems-device-based controls: characteristics-Screen -based controls: operate control - text boxes-selection control-combination control-custom control-presentation control.

5	WINDOWS LAYOUT AND TEST	Total Hrs	9

Text for web pages - effective feedback-guidance & assistance-Internationalization-accesssibility-Icons-Image-Multimedia -coloring Windows layout-test :prototypes - kinds of tests - retest

Total hours to be taught	45

Text book :	
1	Wilbent. O. Galitz ,"The Essential Guide to User Interface Design", Second Edition, John Wiley& Sons, Reprint 2007

Reference (s) :	
1	Ben Sheiderman, "Design the User Interface", Pearson Education, 1998.
2	Alan Cooper, "The Essential of User Interface Design", Wiley – Dream Tech Ltd., 2002.

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Elective IV							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E45	SEMANTIC WEB	3	0	0	3	50	50	100

Objective(s)	To study about Ontology, to study languages for semantic web, to learn taxonomy for Ontology, to study Ontology tools and applications

1	INTRODUCTION	Total Hrs	9

History – Semantic Web Layers –Semantic Web technologies – Semantics in Semantic Web – XML: Structuring – Namespaces – Addressing – Querying – Processing

2	WEB RESOURCES	Total Hrs	9

RDF and Semantic Web – Basic Ideas - RDF Specification – RDF Syntax: XML and Non- XML - RDF elements – RDF relationship: Reification, Container, and collaboration – RDF Schema – Editing, Parsing, and Browsing RDF/XML-RQL-RDQL

3	WEB ONTOLOGY LANGUAGE	Total Hrs	9

Why Ontology – Ontology movement – OWL – OWL Specification - OWL Elements – OWL constructs: Simple and Complex – Ontology Engineering : Introduction – Constructing ontologies – Reusing ontologies – On-To-Knowledge Semantic Web architecture

4	LOGIC AND INFERENCE	Total Hrs	9

Logic – Description Logics - Rules – Monotonic Rules: Syntax, Semantics and examples – Non-Monotonic Rules – Motivation, Syntax, and Examples – Rule Markup in XML: Monotonic Rules, and Non-Monotonic Rules

5	APPLICATIONS	Total Hrs	9

RDF Uses: Commercial and Non-Commercial use – Sample Ontology – e-Learning – Web Services – Web mining – Horizontal information – Data Integration – Future of Semantic Web

Total hours to be taught	45

Text book :	
1	Grigorous Antoniou and Van Hermelen - "A Semantic Web Primer"-The MITPress, 2nd edition,2008

Reference(s) :	
1	"Spinning the Semantic Web: Bringing the world wide web to its full potential" – The MIT Press – 2004
2	Shelley Powers – "Practical RDF" – O'reilly publishers – First Indian Reprint : 2003

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Department	Information Technology	Programme Code &Name		IT : B.Tech. Information Technology			
Elective IV							

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E46	3G WIRELESS NETWORKS	3	0	0	3	50	50	100

Objective(s)	To learn the basics of 3G Wireless data communications technologies. To understand various Spreading codes used in 3G Wireless Communication. To build working knowledge on various telephone networks. To study the working principles of 3G Wireless Network data transmission procedures. To study 3G Wireless Network services,3G upgrades and 4G vision..

1	3G WIRELESS COMMUNICATION FUNDAMENTALS	Total Hrs	9

Overview of 3G – Proposals for 3G Standard – 3GPP2 - 3GPP2 - 3G Evolution Paths – CDMA Principles – Radio-Channel Access Schemes – Spread Spectrum – RAKE Receiver – Power Control – Handovers – Multiuser Detection – TDD – Modulation Techniques and Spread Spectrum – Spreading Techniques – Data Modulation.

2	CHANNEL CODING	Total Hrs	9

Spreading Codes – Orthogonal Codes – Pseudo- Noise Codes – Synchronization Codes – autocorrelation and Cross-Correlation – Intercell Interference – Channel Coding – Coding Processes. Coding Theory – Block Codes – Convolutional Codes. Turbo Codes – Channel Coding in UTRAN.

3	TELECOMMUNICATION NETWORKS	Total Hrs	9

Network – General Discussion. Evolution from GSM. UMTS Network Structure. Core Network. UMTS Radio Access Network. GSM Radio Access Network. Interfaces. Network Protocols. UMTS Network Evolution – Network Planning – Network Planning Terminology. Network Planning Process – Admission Control. Congestion Control – Network Management – Telecommunication Management Architecture.

4	3G PROCEDURES	Total Hrs	9

Procedures – RRC Connection Procedures. Radio Bearer Procedures. Data Transmission, Handovers. Random Access Procedure – New Concepts in the UMTS Network – Locations Services. High-Speed Downlink Packet Access. Multimedia Broadcast/Multicast Service, Multimedia Messaging Service - Super-Charger – Prepaging - Gateway Location Register. Optimal Routing. Adaptive Multirate Codec, Support of Localized Service Area. Smart Antennas

5	3G SERVICES	Total Hrs	9

3G Services – Service Categories. Teleservices. Bearer Services Supplementary Services. Services Capabilities. Quality of Service – 3G Applications - Application Technologies. Multimedia. Traffic Characteristics of 3G Applications. M-Commerce. Examples of 3G Applications. Terminals – The Future – New Spectrum. Satellites. 3G Upgrades. Downlink Bottleneck. 4G Vision

Total hours to be taught	45

Text book :	
1	Juha Korhonen, "Introduction to 3G Mobile Communications", Second Edition, Artech House, 2003

Reference (s) :	
1	Daniel Collins, Clint Smith, "3G Wireless Networks", McGraw – Hill , 2001
2	Roman Kitka, Richard Levine, Lawrence J.HJarte, "3G Wireless Demystified" McGraw – Hill 2001.

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010	
Department	Information Technology	Programme Code &Name	IT: B.Tech. Information Technology				
Elective IV							
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		

Course Code	Course Name	L	T	P	C	CA	ES	Total
10 IT E47	CYBER SECURITY(Infosys)	3	0	0	3	50	50	100
Objective(s)	To understand the basics of Cyber Security, to know the legal, ethical and professional issues in Cyber Security, to know the aspects of risk management, to become aware of various standards in this area.							
1	CYBER SECURITY FUNDAMENTALS			Total Hrs		8		
Network and security concepts, basic cryptography, Symmetric encryption, Public key Encryption, DNS, Firewalls, Virtualization, Radio Frequency Identification.								
2	ATTACKER TECHNIQUES AND EXPLOITATION			Total Hrs		10		
Antiforensics – Tunneling techniques – Fraud Techniques - Threat Infrastructure. Techniques to gain a foot hold –Misdirection, Reconnaissance, and disruption methods.								
3	TRAFFIC ANALYSIS			Total Hrs		9		
Cracking code/passwords /logs, Content filtering tools for Indian and other languages, Intelligence gathering tools, intelligent traffic analysis..								
4	MALICIOUS CODE			Total Hrs		9		
Self-Replication Malicious code – Evading Detection and Elevating privileges – Stealing Information and Exploitation..								
5	DEFENSE AND ANALYSIS TECHNIQUES			Total Hrs		9		
Memory Forensics – Honeypots – Malicious code naming – Automated malicious code analysis systems – Intrusion detection systems – Defense file investigation tools								
Total hours to be taught						45		
Text book :								
1	James Graham, Richard Howard and Ryan Olson, "Cyber Security Essentials", CRC Press, Taylor & Francis Group,2011.							
Reference (s) :								
1	Dan Shoemaker, Ph.D., William Arthur Conklin, Wm Arthur Conklin, "Cyber Security: The Essential Body of Knowledge", Cengage Learning, 2012.							
2	Ali Jahangiri, "Live Hacking: The Ultimate Guide to hacking Techniques & Counter measures for Ethical Hackers &IT Security Experts", 2009.							

Electives - Course Outcomes (COs)

Modules	10ITE11-Advanced Computer Networks Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the OSI model and the TCP/IP protocol suite
2.	Acquire knowledge of IP addressing and Internet Protocol
3.	Obtain knowledge on forwarding and routing of IP Packets
4.	Understand Internet Control Message Protocol – Internet Group Management Protocol.
5.	Understand the Transmission Control
6.	Know about User Datagram Protocol
7.	Acquire the concepts in Socket programming
8.	Study about echo server for TCP and UDP
9.	Acquire the knowledge of unicast routing protocol
10.	Know about Open Shortest Path First Protocol
11.	Understand the host configuration
12.	Know the functions of BOOTP
13.	Study the optical networks
14.	Know about Synchronous Optical Network
15.	Understand the circuit switched networks
16.	Know operation of DSL,ISDN
17.	Learn Optical Networks
18.	Obtain a knowledge of voice transmission over internet protocol
19.	Understand about Local Area Network
20.	Understand the multimedia networks

Modules	10ITE12-Wireless Mobile Networking Course Outcomes
	At the end of the course, the student will be able to
1.	Analyze the basic issues of wireless and mobile systems
2.	Use analytic or simulation techniques to evaluate a wireless or mobile network
3.	Design and implement Wireless devices service technologies SMS, USSD, WAP, VXML
4.	Compare Wireless Operating Systems Blackberry, Palm, EPOC
5.	Fundamental issues in designing MAC Protocol and goals
6.	Understand and apply the concept of classification of MAC protocol
7.	Compare the features of Sensor networks, Mesh networks and Hybrid Networks
8.	Design and implement Mesh networks and Hybrid Networks
9.	Analyze the basic Issues of routing protocols
10.	Design and implement the Classification of routing protocols(DSDV, WRP, CSGR, DSR, AODV,
11.	Understand the basic issues in designing multicast routing protocols -
12.	Implement the Operation of Multicast routing protocols
13.	Essential issues in designing a transport layer protocol for ad hoc networks
14.	Gain knowledge about Goals and Classification of transport layer protocol
15.	Analyze the basic concept of TCP over ad hoc networks and Security issues in ad hoc network
16.	Implement and compare the concept of Attacks and Key management
17.	Analyze the fundamental issues and challenges in providing the QoS in wireless networks
18.	Design and implement Classification of QoS solutions(MAC layer solutions and Network layer
19.	Recognize the concept of QoS frame work for wireless networks
20.	Evaluate the concept of Energy management schemes (Battery management, Transmission power

Modules	10ITE13-Software Quality Management Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the basics of concepts of Software Quality and measurement
2.	Know about the basic concept of Gilb's approach .
3.	Learn how to develop quality based GQM Model
4.	Study about designing of Metrics measurement and analysis
5.	Understand the basics knowledge about Quality tasks based measurement
6.	Gain knowledge of concept of quality Implementation and operation
7.	Learn how to validate the concept of quality Implementation
8.	Validate and practices aspect of Documentation Transformation Techniques
9.	Understand the basic concept knowledge Tools for Quality Structure programmers.
10.	Learn how to Reliability growth models for quality assessment system
11.	Create knowledge on Complexity metrics and Models
12.	Construct the Customer satisfaction analysis
13.	Understand the on Elements of QMS and Rayleigh model
14.	Learn about framework of quality assessment techniques
15.	Have knowledge about the Complexity system
16.	Learn how to knowledge about the various standards of ISO 9000 Series.
17.	Understand the various performance of ISO 9000-3 for software development
18.	Create and performance of ISO 9000 for software resource
19.	Understand the basics of concept of CMM
20.	Access the CMMI model for QMS

Modules	10ITE14-Advanced Microprocessors Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the instruction formats and addressing modes of a microprocessor.
2.	Learn the hierarchy of data storage in the memory of microprocessor architecture.
3.	Gain knowledge about the need of pipelining and its possible hazards.
4.	Analyze the solutions to overcome the pipeline hazards.
5.	Understand the architecture of Motorola MC 68000 family.
6.	Learn the addressing modes and data format for a Motorola MC 68000 family.
7.	Comprehend the memory management techniques in MC 68000.
8.	Analyze the methods to solve the exception in a processor.
9.	Compare the properties of RISC and CISC processors.
10.	Aware of the Advanced RISC microprocessors.
11.	Gain idea about the architecture of DEC Alpha and Power PC family processors.
12.	Gain knowledge about the architecture of Sun SPARC and MIPS Rx000 family processors.
13.	Understand the architecture of high performance RISC - ARM
14.	Realize the development tools for ARM processor.
15.	Learn the assembly language program for ARM processor.
16.	Understand the data flow and processing instructions for ARM processor.
17.	Understand the organization and implementation of ARM processor family.
18.	Gain knowledge about the instruction set of ARM processor.
19.	Understand the thumb instruction set of ARM processor.
20.	Learn the CPU cores of ARM processor.

Modules	10ITE15-Knowledge based Decision Support Course Outcomes
	At the end of the course, the student will be able to
1.	Understand what is the need for knowledge based decision and phases in Decision making
2.	Study the different phase for decision making for system development.
3.	Evaluate the decision, making alternate decision and implement the decision.
4.	Understand the decision and implement the decision for case applications.
5.	Study of life cycle, methodologies and tools used in decision making.
6.	Understand and Comparing Integrating EIS and DSS, EIS data access, Data Warehouse, OLAP,
7.	Understand the knowledge of decision support system, their prototype, life cycle, platform and
8.	Examining the problems of supply and chain , ERP,SCM and MRP.
9.	Development methods, Technologies, and Tools for success of Knowledge management and
10.	Develop documentation for knowledge based analysis.
11.	Understand the Electronic document management, Knowledge acquisition and validation.
12.	Study the machine learning technique, methods and codings for validating the document.
13.	Develop inference techniques with their rules and explanation.
14.	Study the inference rules with reasoning , certainity and uncertainity.
15.	Implement the development of intelligent system and study their progress.
16.	Classify the software and use prototype and some logic to implement a project.
17.	Implementing and integrating management support systems and study about Generic models
18.	Examine the integrated system and study their major issues in integration.
19.	Study the Impacts of Management Support Systems and needs of reengineering .
20.	Analyze Personnel management issues and Impact on individuals, Productivity, quality, and

Modules	10ITE16-Advanced Computer Architecture Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the principles of computer design.
2.	Know the principles of instruction set.
3.	Learn about ISA, pipelining.
4.	Study about hazards and multicycle operations.
5.	Acquire knowledge about dynamic scheduling.
6.	Learn about dynamic hardware prediction .
7.	Study about hardware based speculation.
8.	Know the limitations of ILP
9.	Study the compiler techniques for exposing ILP
10.	Learn about static branch prediction and VLIW
11.	Get knowledge about advanced compiler and hardware support for exposing parallelism.
12.	Know about hardware versus software speculation mechanism
13.	Gain knowledge about cache memory, main memory and its performance
14.	Study about buses and RAID
15.	Learn about the performance measures of I/O
16.	Understand the design of I/O system
17.	Study the architecture of symmetric memory
18.	Know about the architecture of shared memory
19.	Learn about synchronization, models of memory consistency
20.	Gain knowledge about multithreading

Modules	10ITE17-Advanced Databases Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the role of SQL in the development of applications over relational databases.
2.	Identify the basic concepts of database management system and its queries
3.	Familiar with programming language extensions to SQL, and the integration of SQL with programming languages.
4.	Gain knowledge with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.
5.	Familiar with the relational database theory, and be able to write relational algebra expressions for queries.
6.	Gain knowledge about embedded & dynamic SQL as well as JDBC – ODBC concepts and implementation
7.	Understand how information is organized in object databases, and how this impacts on the programming of object database systems.
8.	Design and implement an object databases, conceptual data model along with the XML Schema implementation.
9.	Understand semi-structured data management, and be familiar with techniques for storing and querying XML data.
10.	Knowledge about how to analyze the characteristics of distributed database, Identify the services needed to implement the OnLine Analytical Processing and its types
11.	Understand the basics of query evaluation techniques and query optimization.
12.	Identify and use the appropriate method for optimization techniques for cost and size estimation
13.	Aware of the principal challenges that have to be addressed in the development of distributed database systems.
14.	Distinguish Transaction Processing in a Centralized and Distributed System, Architecture and Transaction Processing Monitor.
15.	Gain critically how to compare, analyze and evaluate methods/technologies in developing concurrency control, Locking, Abort and Media Failure Recovery
16.	Understand the mechanism of analyzes and evaluate different technologies in Distributed Deadlock, Global Serialization, Replicated Databases and Distributed Transactions in Real World.
17.	Familiar with the concept of database design issues like database security, encryption, digital signature and RPC
18.	Understand emerging database technologies like Consistency, Database Tuning, Optimization and Research Issues.
19.	Understand the background and knowledge of some contemporary topics in database research; typical topics are data mining, uncertainty data management, XML data.
20.	Familiar with the background processes involved in queries and transactions, and explain how these impact on database operation and design

Modules	10ITE21-Grid Computing Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the need of grid computing
2.	Understand the evolution of grid computing activities and the importance of Virtual Organization
3.	Design the high-level business area requirements for grid computing systems
4.	Understand the purpose of GGF and how it helps the grid developers and researchers to discuss
5.	Develop the various toolkits involved in developing a grid
6.	Design layered grid architecture in combination with internet protocol architecture
7.	Develop grid technologies such as BOD, SOA, semantic grid and autonomic computing
8.	Build up the interaction pattern between the service consumer and service provider via UDDI
9.	Write XML coding which helps to achieve interoperability in grid computing environment
10.	Realize how SOAP helps to transfer XML messages
11.	Understand about the different versions of WSDL and its associated properties
12.	Understand how message integrity and confidentiality is achieved in grid systems
13.	Realize the membership rules, service entries in a service group
14.	Be aware of the actors, scenarios and functional requirements from OGSA working group use
15.	Understand the significance of transforming GWSDL to WSDL
16.	Realize the membership rules, service entries in a service group
17.	Understand about the set of rules to administer , manage and control access to a grid service
18.	Measure resource consumption in distributed systems
19.	Implement and work with GLOBUS toolkit.
20.	Design the algorithms for discovery, monitoring, allocation and management of resources in grid

Modules	10ITE22-Sofwtare Project Management Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the principles of Software Project Management
2.	Gain knowledge of Contract Management
3.	Learn about Project Planning
4.	Identify the Stepwise Project Planning.
5.	Discover Strategic Programme Management
6.	Learn about Technical Assessment
7.	Acquire knowledge about Cost Benefit Evaluation Techniques
8.	Estimate the Risk Evaluation
9.	Study the Project Schedule , Sequencing and Scheduling Activities
10.	Understand the Network Planning Models
11.	Study the Activity on Arrow Networks
12.	Get knowledge about Risk Identification, Risk Assessment,
13.	Gain a knowledge about identifying and scheduling resources, publishing resource and cost
14.	Discover Visualizing Progress
15.	Understand the Contracts
16.	Discover the Stages In Contract Placement and Acceptance
17.	Learn about Organizational Behavior
18.	Understand the Hackman Job Characteristics Model
19.	Gain a knowledge about Decision Making, Leadership and Organizational Structures
20.	Learn about Health And Safety

Modules	10ITE23-Design of Embedded System Course Outcomes
	At the end of the course, the student will be able to
1.	Outline the various definitions and aspects of embedded systems
2.	Understand the functional building blocks of embedded systems
3.	Learn the functionality of register and other memory devices
4.	Design circuit diagrams for interrupt controllers
5.	Study of Structural units in a processor
6.	Learn about the selection of processor & memory devices
7.	Gain knowledge about shared memory concepts
8.	Learn various memory management techniques
9.	Know about I/O device timer & counting devices
10.	Establish serial communication using I2C, CAN
11.	Learn about the buses involved in parallel communication
12.	Study about the interfacing of devices in a system
13.	Gain basic knowledge about interrupts and how it occurs in a system
14.	Learn various types of interrupts
15.	Develop interrupt service routine in C & assembly languages
16.	Understand the importance of Mulitthreaded programming
17.	Learn and analyze the performance of various scheduling algorithms
18.	Know the basic concepts of RTOS
19.	Analyze design issues in system development process
20.	Utilize the software tools for various applications

Modules	10ITE24-Cloud Computing Course Outcomes
	At the end of the course, the student will be able to
1.	Understand what the current challenges are in cloud computing.
2.	Examine how to measure the cloud value
3.	Understand how to formulate the cloud computation stack
4.	Study of cloud types and their architecture.
5.	Implement and run distributed and cloud applications.
6.	Understand the concept of virtualization and about techniques available in virtualization.
7.	Study of defining platforms ,infrastructure ,software ,identity as a cloud services for implementing
8.	Implement various levels of virtualization techniques.
9.	Design a model of Cloud Platforms.
10.	Understanding Amazon Database Services and use Amazon cloud to experience the existing
11.	Study the cloud platform as a service for application framework.
12.	Understanding the working of Elastic Compute Cloud and Amazon Storage systems .
13.	Study the basic understandings of cloud security.
14.	Implement Microsoft cloud Services windows Azure Platform and experience Microsoft cloud and
15.	Study of how to provide Security to the cloud ,Data and Establishing the Identity and Presence.
16.	Explain major security and privacy problems in the
17.	Understanding the basic knowledge of Service Oriented Communication.
18.	How Service Oriented Architecture is used to communicate between cloud services.
19.	Explain the Service Oriented Architecture management and monitoring.

20.	Implement cloud and study about Cloud storage in detail.

Modules	10ITE25-Pervasive Computing Course Outcomes
	At the end of the course, the student will be able to
1.	Study the basic Pervasive computing concepts
2.	Acquire knowledge about devices involved in establishing pervasive environment
3.	Know the issues in connecting devices
4.	Find protocols involved in connecting devices
5.	Correlate web based applications with pervasive environment
6.	Find web based applications like XML for Pervasive computing
7.	Understand the WAP architecture and security
8.	Designing application in WML
9.	Gain knowledge of voice enabled environment
10.	Find voice standards supporting the environment
11.	Find security issues in Pervasive environment
12.	Estimate applications of speech technology
13.	Study how PDA are involved in making personal area network
14.	Acquire knowledge about components involved in PDA
15.	Obtain knowledge of device characteristics
16.	Know architecture of PDA involved
17.	Find issues for user interface
18.	Obtain knowledge of user interface architecture
19.	Know smart based authentication
20.	Find applications of wearable computing

Modules	10ITE26- C# and .Net Course Outcomes
	At the end of the course, the student will be able to
1	Study software testing as an engineering activity
2	Expect to learn the role of process in software quality
3	Understand software testing principles and the tester's role in a software development organization
4	Identify the origins of defects, defect classes, the defect repository and test design with
5	Get introduction about testing design strategies
6	Study the test case design using black box approaches: random testing, equivalence
7	Study the test case design using white box approaches: coverage and control flow
8	Evaluate test adequacy criteria
9	Understand the need for levels of testing
10	Expect to learn the unit test planning, designing the unit tests, the class as a testable unit,
11	Expect to learn the planning and designing of integration testing
12	Expect to know the different types of system testing with regression testing, alpha, beta and
13	Get the introduction about the concepts of test management
14	Study the test planning, test plan components, test plan attachments
15	Gain knowledge about the process and the engineering disciplines
16	Able to show the skills needed by a test specialist and building a testing group
17	Expect to learn the terms, measurements and milestones for controlling and monitoring
18	Understand the status meeting reports and control issues
19	Able to give criteria for test completion
20	Study the types of reviews, developing a review program and components of review plans

Modules	10ITE31-Information Retrieval Techniques Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the fundamentals of Retrieval Process and Modeling.
2.	Know about the components for Algebraic and Probabilistic Models.
3.	Characterize the various Key Word based Querying and Pattern
4.	Applying transformation technique such as Local and Global Analysis
5.	Analyze the Clustering and Text Compression
6.	Know about the User Interface and Visualization
7.	Designing an Data Models and Query Languages
8.	Understand the Two Dimensional Color Images and Feature Extraction .
9.	Analyze various services provided by Challenges and Characterizing
10.	Designing an Architectural Issues by Document Models, Representations
	understanding the text compression, indexing
12.	Establish the queries and sequential search methods.
13.	Knowing the pattern matching, user interface and visualization.
14.	Understanding data models and query languages
15.	Establish generic multimedia indexing approach
16.	Knowing digital libraries and architectural methods
17.	Establish challenges and characterizing the web
18.	Knowing about browse engines and meta searches.
19.	Establish the online IR systems and libraries
20.	Knowing document models,and web access

Modules	10ITE32-Software Testing Course Outcomes
	At the end of the course, the student will be able to
1	Study software testing as an engineering activity
2	Expect to learn the role of process in software quality
3	Understand software testing principles and the tester's role in a software development
4	Identify the origins of defects, defect classes, the defect repository and test design
5	Get introduction about testing design strategies
6	Study the test case design using black box approaches: random testing, equivalence
7	Study the test case design using white box approaches: coverage and control flow
8	Evaluate test adequacy criteria
9	Understand the need for levels of testing
10	Expect to learn the unit test planning, designing the unit tests, the class as a testable
11	Expect to learn the planning and designing of integration testing
12	Expect to know the different types of system testing with regression testing, alpha, beta and
13	Get the introduction about the concepts of test management
14	Study the test planning, test plan components, test plan attachments
15	Gain knowledge about the process and the engineering disciplines
16	Able to show the skills needed by a test specialist and building a testing group
17	Expect to learn the terms, measurements and milestones for controlling and
18	Understand the status meeting reports and control issues
19	Able to give criteria for test completion
20	Study the types of reviews, developing a review program and components of review

Modules	10iTE33- E-Commerce Course Outcomes
	At the end of the course, the student will be able to
1.	Study the basic concepts of E-Commerce, physical commerce and its advantages
2.	Understand the economic forces in E-Commerce
3.	Understand the myths in E-Commerce
4.	Obtain the knowledge of different business models in E-Commerce
5.	Acquire the knowledge of World wide web, Internet and its protocols
6.	Study the basic concepts of FTP, intranet and extranet
7.	Obtain the knowledge of cryptography and information publishing technology
8.	Study the basics of web server hardware and software
9.	Acquire the knowledge of consumer oriented E-Commerce by learning etailing and its models
10.	Learn marketing on web, advertising, email marketing, e-CRM
11.	Understand the business oriented E-Commerce, E- Government, EDI on Internet & SCM
12.	Acquire the knowledge of Web Auctions, Virtual Communities and Web Portals
13.	Gain the knowledge of E-Payments in E-Commerce
14.	Understand the characteristics of payment systems and its protocols
15.	Understand the basic concepts of E-Cash
16.	Acquire the knowledge of E-Check and micro payment system
17.	Understand the legal, ethical and privacy issues
18.	Understand the importance of protection needs and methodology
19.	Understand the cyber laws, contracts and warranties
20.	Acquire the knowledge of taxation and encryption policies

Modules	10ITE34- Distributed Computing Course Outcomes
	At the end of the course, the student will be able to
1.	Recognize the concept of bus based multiprocessor.
2.	Analyze the concept of network operating system
3.	Understand the concept of true distributed system.
4.	Familiar with Multiprocessor time sharing system
5.	Identify the concept of Layered Protocols with its operations.
6.	Knowledge about how to implement ATM networks.
7.	Gain the knowledge of Client server model.
8.	Aware about remote procedure call.
9.	Specify the purpose of Clock Synchronization.
10.	Review and implement Election Algorithms.
11.	Understand how Deadlock occurs.
12.	Aware various scheduling techniques and Real Time Systems.
13.	Observe the concept of Distributed file system design.
14.	Aware about fault tolerance.
15.	Demonstrate various file replication techniques.
16.	Understand multimedia streaming techniques.
17.	Analyze Distributed shared memory and consistency models
18.	Observe the concept of page based distributed shared memory.
19.	Knowledge about shared variable distributed shared memory.
20.	Analyze various Distributed programming languages.

Module	**10ITE35- Client Server Computing** **Course Outcomes**
	At the end of the course, the student will be able to
1.	Study the role of Real Client /Server and Fat Servers or fat clients
2.	Understand the concept of client server for different models, building blocks.
3.	Acquire the knowledge of Server scalability and Client anatomy
4.	Obtain a knowledge of NetWare Win 2000 Server and OS/2 warp server
5.	Acquire the knowledge of distributed security services, RPC messaging and peer to peer Sockets
6.	Obtain knowledge of the enterprise NOS and the internet as NOS
7.	Gain a knowledge of TP Monitor, TP Monitor and OS, TP Monitor and Transaction Management
8.	Obtain a knowledge of TP Monitor Client / Server Interaction types
9.	Study the challenges of Client / Server -3-Tier Client Server
10.	Analyze the existing solutions for Distributed object
11.	Study the role of Intergalactic Server
12.	Understand the concept of 2 tier and 3 tier Architecture
13.	Study the challenges of client os trends
14.	Gain a knowledge of anatomy of server program
15.	Analyze the existing solutions for the NOS middleware global directory service
16.	Study the challenges of the NetBIOS and remote procedure call
17.	Analyze the existing solutions for ACID properties and Transaction models
18.	Gain the knowledge of TP Lite and TP Mointor
19.	Study the challenges of web client server and web style
20.	Analyze the existing solutions for HTML web based forms

Modules	**10ITE36 – XML and Web Services** **Course Outcomes**
	At the end of the course, the student will be able to
1.	Study the basic XML language concepts and web
2.	Understand the basic concept of Service Oriented Architecture and Web services
3.	Learn about revolutions of XML
4.	Gain knowledge on Service Oriented Architecture
5.	Acquire the knowledge about XML Namespaces
6.	Know about structuring with schemes and DTD
7.	Have knowledge on various types of presentation techniques
8.	Study about transformation techniques and XML infrastructure
9.	Understand the general idea about SOAP
10.	Obtain knowledge on HTTP, XML and RPC
11.	Gain knowledge on Protocol-Message Structure and Intermediaries of SOAP.
12.	Learn about SOAP actors, design patterns, faults and attachments
13.	Study the architecture of web services
14.	Gain knowledge on UDDI – WSDL and ebXML
15.	Understand the role of SOAP and Web services in E-Com.
16.	Have basic knowledge of .NET and J2EE.
17.	Learn about the security mechanism canonicalization
18.	Understand the security mechanisms XML Encryption and XML Digital Signature.
19.	Obtain knowledge on XKMS structure
20.	Learn the guidelines for signing XML documents

Modules	10ITE41- Web Mining Course Outcomes
	At the end of the course, the student will be able to
1.	Obtain knowledge of Data Mining
2.	Learn the basic concept of Relational Databases and Data Warehouses.
3.	Understand the Data Mining Functionalities concepts.
4.	Study the Advanced Database Systems
5.	Gain a knowledge about the KDD process
6.	Understand the concept of methodology and Overview of data mining techniques
7.	Study the basic of Market basket analysis.
8.	Learn about Clustering and Memory-based reasoning
9.	Learn how to prepare the data for usage mining
10.	Know the Mining navigational patterns
11.	Analyze the Integrating e-commerce data and measuring success in e-commerce Privacy in E-
12.	Understand the issues regarding Classification and Prediction.
13.	Expected to know about the concepts Classification by Decision Tree Induction
14.	Understand the concepts of Bayesian Classification.
15.	Learn the basic concept of Classification by Back-propagation.
16.	Study about the Web personalization and recommender systems.
17.	Understand the concepts of Web data warehousing and Review of tools about that applications
18.	Understand about designing Classification Based on Concepts from Association Rule Mining.
19.	Understand the concept of Web content and structure mining.
20.	Study about the web mining applications tools, applications, and systems.

Modules	10ITE42- Multimedia Compression Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the importance of compression techniques
2.	Understand the usage of compression techniques in storage space minimization of multimedia
3.	Gain knowledge about the taxonomy of compression techniques
4.	Learn the evaluation techniques available in multimedia applications
5.	Understand the different compaction techniques involved in text compression
6.	Know the areas where these compaction techniques can be applied
7.	Learn the basics of dictionary technique
8.	Understand the different dictionary techniques involved in text compression
9.	Study about the different coding techniques used in audio compression
10.	Get awareness about silence compression technique
11.	Gain knowledge about speech compression techniques
12.	Understand the functionality of Formant and CELP Vocoders
13.	Understand contour based compression technique
14.	Learn the predictive techniques involved in image compression
15.	Get awareness about the JPEG standards for image compression techniques
16.	Learn implementation of Wavelet based compression using various filters
17.	Analyze various techniques used in video compression
18.	Know the motion estimation and compression techniques in video compression
19.	Gain knowledge about DVI technologies
20.	Analyze PLV performance measures

Modules	10ITE43- Network Administration and maintenance Course Outcomes
	At the end of the course, the student will be able to
1.	Study the role of A data communication model and TCP/IP Protocol Architecture
2.	Understand the concept of Configuration Servers and Planning Routing
3.	Acquire the knowledge of kernel Configuration and Common Routing Configurations
4.	Obtain a knowledge of Building a static routing table
5.	Acquire the knowledge of Managing Distributed Servers, Post Office Servers
6.	Obtain knowledge of Configuring the Resolver and Configuring named by Using nslookup
7.	Gain a knowledge of Configuration Language
8.	Obtain a knowledge of Modifying Testing send mail Configuration
9.	Study the challenges of Installing Apache Software and Configuring the Apache Server
10.	Analyze the existing solutions for Application security,User authentication
11.	Study the role of Host table and Transport layer
12.	Analyze the existing solutions for Network layer
13.	Gain a knowledge of the Extended Internet Daemon
14.	Study the challenges of Exterior Routing protocols
15.	Analyze the existing solutions for the Local network services
16.	Study the challenges of the DHCP and network file system
17.	Analyze the existing solutions for Running Sendmail as Daemon
18.	Understand the concept of Rewriting mailing address
19.	Study the challenges of Web server security and firewall
20.	Understand the concept of Access control and Security Mointoring

Modules	10ITE44- User Interface Design Course Outcomes
	At the end of the course, the student will be able to
1.	Understand the importance of user interface.
2.	Familiar with the importance of good design in user interface.
3.	Understand about human interaction with computers.
4.	Recognize the GUI vs. web user.
5.	Understand about user interface design process.
6.	Identify the human characteristics in user interface design.
7.	Understand the business functions of user interface design
8.	Make out the principles of good screen design.
9.	Understand how menus are used, and selecting the proper kinds for specific tasks.
10.	Develop the system menus and navigation schemes.
11.	Select the keyboard accelerator for phrasing the menu.
12.	Identify the graphical menus.
13.	Understand types of windows at user interface design.
14.	Select the proper kinds of windows and characteristics.
15.	Familiar with the Device based control and screen based control.
16.	Make out the presentation controls and custom controls.
17.	Understand about effective feedback, guidance and assistance.
18.	Design multimedia systems like graphics, icons, images, colors.
19.	Identify effective internationalization and accessibility.
20.	Familiar with the test and retest in user interface design.

Modules	10ITE45- Semantic Web Course Outcomes
	At the end of the course, the student will be able to
1.	Out line the History of Semantic Web Layers
2.	Constructing Semantic Web technologies
3.	Understanding Semantics in semantic Web-XML
4.	Elaborate Structuring Namespace, Addressing, Querying and Processing
5.	Know the concept of XML Structuring, Query Processing
6.	Identify the web resources, RDF and Semantic Web Basic Ideas
7.	Understand the basic ideas of RDF elements
8.	Describe the relationship, Schema Browsing RDF/XML, DQL
9.	Summarize the concept of ontology and its movements
10.	Elaborate web ontology language, OWL Specification, OWL construction
11.	Constructing ontologies, Reusing ontologies and to Knowledge
12.	Design the Semantic Web architecture and study its functions
13.	Analyze Logic, Description Logics with suitable examples
14.	Classify the Rules, Monotonic Rules, Syntax, Semantics of Logic and interference
15.	Understand the examples of Non-monotonic Rules, Motivation, Syntax and examples
16.	Compare and contrast with Monotonic and Non Monotonic Rule Markup in XML
17.	Enumerate the Uses of RDF Commercial and Noncommercial
18.	Elaborate the Sample Ontology and Identify various applications
19.	Establish the applications like e-Learning, Web Services, Web mining
20.	Distinguish the Future of Semantic Web

Modules	10ITE46 – 3G Wireless Networks Course Outcomes
	At the end of the course, the student will be able to
1.	Study the Overview of 3G, Proposals for 3G Standard
2.	Know about 3GPP2 , 3GPP2, 3G Evolution Paths and CDMA Principles
3.	Understand the Radio-Channel Access Schemes, Spread Spectrum, RAKE Receiver, Power
4.	Study about the Spread Spectrum, Spreading Techniques, Data Modulation.
5.	Gain a knowledge about Orthogonal Codes, Pseudo- Noise Codes, Synchronization Codes,
6.	Gain Knowledge about Intercell Interference , Channel Coding and Coding Processes
7.	Obtain a knowledge of Coding Theory, Block Codes and Convolutional Codes
8.	Know about Turbo Codes, Channel Coding in UTRAN
9.	Acquire the knowledge of Evolution from GSM, UMTS Network Structure, Core Network
10.	Developing the knowledge about Core Network, UMTS Radio Access Network, GSM Radio Access Network and Interfaces
11.	Obtain knowledge of Network Planning Process, Admission Control and Congestion Control,
12.	Know about the Network Management, Telecommunication Management Architecture
13.	Study the Architecture RRC Connection Procedures, Radio Bearer Procedures
14.	Learn about Data Transmission and Handovers
15.	Obtain a knowledge of Multimedia Broadcast/Multicast Service, Multimedia Messaging Service,
16.	Learn New Concepts in the UMTS Network, Locations Services
17.	Study about the Security Overview, Canonicalization , XM3G Services, Service Categories and
18.	Know about Bearer Services Supplementary Services, Services Capabilities, Quality of Service
19.	Obtain knowledge of Traffic Characteristics of 3G Applications, M-Commerce
20.	Study the examples of 3G Applications, Terminals, The Future, New Spectrum, Satellites, 3G sUpgrades, Downlink Bottleneck, 4G Vision