PONDICHERRY UNIVERSITY
PUDUCHERRY - 605014

BATCHELOR OF TECHNOLOGY

B.TECH.,

INFORMATION TECHNOLOGY

REGULATIONS, CURRICULUM & SYLLABUS

[EFFECTIVE FROM THE ACADEMIC YEAR 2013-14]

PONDICHERRY UNIVERSITY

BACHELOR OF TECHNOLOGY PROGRAMMES

(EIGHT SEMESTERS)

REGULATIONS

1. Conditions for Admission:

(a) Candidates for admission to the first semester of the 8 semester B.Tech Degree programme should be required to have passed :

The Higher Secondary Examination of the (10+2) curriculum (Academic Stream) prescribed by the Government of Tamil Nadu or any other examination equivalent there to with minimum of 45% marks (40% marks for OBC and SC/ST candidates) in aggregate of subjects – Mathematics, Physics and any one of the following optional subjects: Chemistry / Biotechnology/ Computer Science / Biology (Botany & Zoology)or an Examination of any University or Authority recognized by the Executive Council of the Pondicherry University as equivalent thereto.

(b) For Lateral entry in to third semester of the eight semester B.Tech programme :

The minimum qualification for admission is a pass in three year diploma or four year sandwich diploma course in engineering / technology with a minimum of 45% marks (40% marks for OBC and SC/ST candidates) in aggregate in the subjects covered from 3rd to final semester or a pass in any B.Sc. course with mathematics as one of the subjects of study in XII standard with a minimum of 45% marks (40% marks for OBC and a mere pass for SC/ST candidates) in aggregate in main and ancillary subjects excluding language subjects. The list of diploma programs approved for admission for each of the degree programs is given in **Annexure A**.

2. Age Limit :

Age Limit :

The candidate should not have completed 21 years of age as on 1st July of the academic year under consideration. For Lateral Entry admission to second year of

degree programme , candidates should not have completed 24 years as on 1st July of the academic year under consideration. In the case of SC/ST candidates, the age limitis relaxable by 3 years for both the cases.

3. Duration of Programme :

The Bachelor of Technology degree programme shall extend over a period of 8 consecutive semesters spread over 4 academic years – two semesters constituting one academic year. The duration of each semester shall normally be 15 weeks excluding examinations.

4. Eligibility for the award of Degree:

No candidate shall be eligible for the award of the degree of Bachelor of Technology, unless he/she has undergone the course for a period of 8 semesters (4 academic years) / 6 semesters (3 academic years for Lateral Entry candidates) in the faculty of Engineering and has passed the prescribed examinations in all the semesters.

5. Branches of Study:

Brach I - Civil Engineering
Branch II - Mechanical Engineering
Branch III - Electronics & Communication Engineering
Branch IV - Computer Science & Engineering
Branch V - Electrical & Electronics Engineering
Branch VI - Chemical Engineering
Branch VII - Electronics & Instrumentation Engineering
Branch VIII - Information Technology
Branch IX - Instrumentation & Control Engineering
Branch X - Biomedical Engineering

or any other branches of study as and when offered. The branch allocation shall be ordinarily done at the time of admission of the candidate to the first semester.

6. Subjects of Study:

The subjects of study shall include theory and practical courses as given in the curriculum and shall be in accordance with the prescribed syllabus. The subjects of study for the first two semesters shall be common for all branches of study.

7. Examinations:

The theory and practical examinations shall comprise continuous

assessment throughout the semester in all subjects as well as university examinations conducted by Pondicherry University at the end of the semester (November / December or April / May).

(a) Theory courses for which there is a written paper of 75 marks in the university examination**.**

The Internal Assessment marks of 25 has to be distributed as 10 marks each for two class tests and 5 marks for class attendance in the particular subject. The distribution of marks for attendance is as follows.

5 marks for 95% and above

4 marks for 90% and above but below 95%

3 marks for 85% and above but below 90%

2 marks for 80% and above but below 85%

1 mark for 75% and above but below 80%

In total, three tests are to be conducted and the better two are to be considered for assessment.

(b) Practical courses for which there is a university practical examination of 50 marks**:**

The internal assessment marks of 50 has to be distributed as 20 marks for the periodic practical works and records submitted thereof, 15 marks for an internal practical examination, 5 marks for an internal viva voce, and 10 marks for class attendance in the particular subject. The distribution of marks is as given below.

10 marks for 95% and above

8 marks for 90% and above but below 95%

6 marks for 85% and above but below 90%

4 marks for 80% and above but below 85%

2 marks for 75% and above but below 80%

8. Requirement for appearing for University Examination:

A candidate shall be permitted to appear for university examinations at the end of any semester only if:

(i) He / She secures not less than 75% overall attendance arrived at by taking into account the total number of periods in all subjects put together offered by the

institution for the semester under consideration.

(Candidates who secure overall attendance greater than 60% and less than 75% have to pay a condonation fee as prescribed by University along with a medical certificate obtained from a medical officer not below the rank of Asst. Director)

(ii) He / She earns a progress certificate from the Head of the institution for having satisfactorily completed the course of study in all the subjects pertaining to that semester.

(iii) His / Her conduct is found to be satisfactory as certified by the Head of the institution.

A candidate who has satisfied the requirement (i) to (iii) shall be deemed to have satisfied the course requirements for the semester.

9. Procedure for completing the course:

A candidate can join the course of study of any semester only at the time of its normal commencement and only if he/she has satisfied the course requirements for the previous semester and further has registered for the university examinations of the previous semester in all the subjects as well as all arrear subjects if any.

However, the entire course should be completed within 14 consecutive semesters (12 consecutive semesters for students admitted under lateral entry).

10. Passing Minimum :

(i) A candidate shall be declared to have passed the examination in a subject of study only if he/she secures not less than 50% of the total marks (Internal Assessment plus University examination marks) and not less than 40% of the marks in University examination.

(ii) A candidate who has been declared "Failed" in a particular subject may reappear for that subject during the subsequent semesters and secure a pass.

However, there is a provision for revaluation of failed or passed subjects provided he/she fulfills the following norms for revaluation.

(a) Applications for revaluation should be filed within 4 weeks from the date of declaration of results or 15 days from the date of receipt of

marks card whichever is earlier.

(b) The candidate should have attended all the college examinations as well as university examinations.

(c) If a candidate has failed in more than four papers in the current university examination, his/her representation for revaluation will not be considered.

(d) The request for revaluation must be made in the format prescribed duly recommended by the Head of the Institution along with the revaluation fee prescribed by the University.

Further the University examination marks obtained in the latest attempt shall alone remain valid in total suppression of the University examination marks obtained by the candidate in earlier attempts.

11 Award of Letter Grades:

The assessment of a course will be done on absolute marks basis. However, for thepurpose of reporting the performance of a candidate, letter grades, each carrying certain points, will be awarded as per the range of total marks (out of 100) obtainedby the candidate, as detailed below:

Range of Total Marks	Letter Grade	Grade Points
90 to 100	S	10
80 to 89	A	9
70 to 79	B	8
60 to 69	C	7
55 to 59	D	6
50 to 54	E	5
0 to 49	F	0
Incomplete	FA	

'F' denotes failure in the course. 'FA' denotes absent / detained as per clause 8.

After results are declared, grade sheets will be issued to the students. The grade sheets will contain the following details:

(a) The college in which the candidate has studied.

(b) The list of courses enrolled during the semester and the grades scored.

(c) The Grade Point Average (GPA) for the semester and The Cumulative Grade

Point Average (CGPA) of all enrolled subjects from first semester onwards.

(d) GPA is the ratio of sum of the products of the number of credits (C) of courses registered and the corresponding grades points (GP) scored in those courses, taken for all the courses and sum of the number of credits of all the courses

$$GPA = \left(Sum\ of\ \ (C \times GP) / Sum\ of\ \ C \right)$$

CGPA will be calculated in a similar manner, considering all the courses enrolled from first semester. FA grades are to be excluded for calculating GPA and CGPA.

The conversion of CGPA into percentage marks is as given below

$$\%\ Marks = (CGPA - 0.5) \times 10$$

12 Award of Class and Rank:

(i) A candidate who satisfies the course requirements for all semesters and who passes all the examinations prescribed for all the eight semesters (six semesters for lateral entry candidates) within a maximum period of 7 years (6 years for lateral entry candidates) reckoned from the commencement of the first semester to which the candidate was admitted shall be declared to have qualified for the award of degree.

(ii) A candidate who qualifies for the award of the degree passing in all subjects pertaining to semesters 3 to 8 in his/her first appearance within 6 consecutive semesters (3 academic years) and in addition secures a CGPA of 8.50 and above for the semesters 3 to 8 shall be declared to have passed the examination in **FIRST CLASS** with **DISTINCTION**.

(iii) A candidate who qualifies for the award of the degree by passing in all subjects relating to semesters 3 to 8 within a maximum period of eight semesters after his/her commencement of study in the third semester and in addition secures CGPA not lessthan 6.5 shall declared to have passed the examination in **FIRST CLASS**.

(iv) All other candidates who qualify for the award of degree shall be declared to have passed the examination in **SECOND CLASS**.

(v) For the Award of University ranks and Gold Medal for each branch of study, the CGPA secured from 1st to 8th semester alone should be considered and it is mandatory that the candidate should have passed all the subjects from 1st to 8th semester in the first attempt. Rank certificates would be issued to the first ten candidates in each branch of study.

13. Provision for withdrawal :

A candidate may, for valid reasons, and on the recommendation of the Head of the Institution be granted permission by the University to withdraw from writing the entire semester examination as one Unit. The withdrawal application shall be valid only if it is made earlier than the commencement

of the last theory examination pertaining to that semester. Withdrawal shall be permitted only once during the entire course. Other conditions being satisfactory, candidates who withdraw are also eligible to be awarded DISTINCTION whereas they are not eligible to be awarded a rank.

14. Discontinuation of Course:

If a candidate wishes to temporarily discontinue the course for valid reasons, he/she shall apply through the Head of the Institution in advance and obtain a written order from the University permitting discontinuance. A candidate after temporary discontinuance may rejoin the course only at the commencement of the semesterat which he/she discontinued, provided he/she pays the prescribed fees to the University. The total period of completion of the course reckoned from the commencement of the first semester to which the candidate was admitted shall notin any case exceed 7 years, including of the period of discontinuance.

15. Revision of Regulations and Curriculum:

The University may from time to time revise, amend or change the regulations of curriculum

The candidate should not have completed 21years of age as on1stJuly of the academic year under consideration. For Lateral Entry admission to second year of degree programme, candidates should not have completed 24 years as on 1stJuly of the

academic year under consideration. In the case of SC/ST candidates, the age limit is relaxable by 3 years for both the cases.

ANNEXURE – A

B.Tech courses in which admission is sought	Diploma courses eligible for admission
Civil Engineering	Civil Engineering Civil and Rural Engineering Architectural Assistantship Architecture
Mechanical Engineering	Mechanical Engineering Automobile Engineering Agricultural Engineering Mechanical and Rural Engineering Refrigeration and Air-conditioning Agricultural Engineering & Farm Equipment
Electrical and Electronics Engineering Electronics & Communication Engineering Electronic and Instrumentation Engineering Instrumentation and Control Engineering	Electrical Engineering Electrical and Electronics Engineering Electronics and Instrumentation Engineering Instrumentation Engineering / Technology Electronics and Communication Engg. Electronics Engineering Medical Electronics Instrumentation and Control Engineering Applied Electronics
Bio Medical Engineering	Chemical Engineering Chemical Technology Petrochemical Technology Petroleum Engineering Ceramic Technology
Information Technology Computer Science & Engineering	Computer Science and Engineering Computer Technology Electrical and Electronics Engineering Electronics & Communication Engineering Electronics & Instrumentation Engineering

PONDICHERRY UNIVERSITY
B.Tech - CURRICULUM &SYLLABUS

First Semester

Sub. Code	Subjects	Periods			Credits	Marks		
		L	T	P		IA	UE	TM
	Theory							
T101	Mathematics – I	3	1	-	4	25	75	100
T102	Physics	4	-	-	4	25	75	100
T103	Chemistry	4	-	-	4	25	75	100
T104	Basic Electrical and Electronics Engineering	3	1	-	4	25	75	100
T105	Engineering Thermodynamics	3	1	-	4	25	75	100
T106	Computer Programming**	3	1	-	4	25	75	100
	Practical							
P101	Computer Programming Lab**	-	-	3	2	50	50	100
P102	Engineering Graphics	2	-	3	2	50	50	100
P103	Basic Electrical & Electronics Lab	-	-	3	2	50	50	100
	Total	**22**	**4**	**9**	**30**	**300**	**600**	**900**

** To be handled by departments of CSE / IT/ MCA

Second Semester

Sub. Code	Subjects	Periods			Credits	Marks		
		L	T	P		IA	UE	TM
	Theory							
T107	Mathematics – II	3	1	-	4	25	75	100
T108	Material Science	4	-	-	4	25	75	100
T109	Environmental Science	4	-	-	4	25	75	100
T110	Basic Civil and Mechanical Engineering	4	-	-	4	25	75	100
T111	Engineering Mechanics	3	1	-	4	25	75	100
T112	Communicative English	4	-	-	4	25	75	100
	Practical							
P104	Physicslab	-	-	3	2	50	50	100
P105	Chemistry lab	-	-	3	2	50	50	100
P106	Workshop Practice	-	-	3	2	50	50	100
P107	NSS / NCC *	-	-	-	-	-	-	-
	Total	**22**	**2**	**9**	**30**	**300**	**600**	**900**

* To be completed in I and II semesters, under Pass / Fail option only and not counted for CGPA calculation.

THIRD SEMESTER

CODE NO.	NAME OF THE SUBJECTS	PERIODS			CREDITS	MARKS		
		L	T	P		IA	UE	TM
MA-T31	MATHEMATICS-III	3	1	-	4	25	75	100
IT-T32	ELECTRONIC DEVICES AND CIRCUITS	3	1	-	4	25	75	100
IT-T33	DATA STRUCTURES	3	1	-	4	25	75	100
IT-T34	OBJECT ORIENTED PROGRAMMING	3	1	-	4	25	75	100
IT-T35	DIGITAL SYSTEM DESIGN	3	1	-	4	25	75	100
IT-T36	COMPUTER ORGANIZATION	3	1	-	4	25	75	100
IT-P31	DATA STRUCTURES LAB	-	-	3	2	50	50	100
IT-P32	ELECTRONIC DEVICES AND CIRCUITS LAB	-	-	3	2	50	50	100
IT-P33	DIGITAL LAB	-	-	3	2	50	50	100
	TOTAL	**18**	**6**	**9**	**30**	**300**	**600**	**900**

FOURTH SEMESTER

CODE NO.	NAME OF THE SUBJECTS	PERIODS			CREDITS	MARKS		
		L	T	P		IA	UE	TM
MA-T41	MATHEMATICS-IV	3	1	-	4	25	75	100
IT-T42	COMMUNICATION ENGINEERING-I	3	1	-	4	25	75	100
IT-T43	DESIGN AND ANALYSIS OF ALGORITHMS	3	1	-	4	25	75	100
IT-T44	MICROPROCESSORS AND MICROCONTROLLERS	3	1	-	4	25	75	100
IT-T45	JAVA PROGRAMMING	3	1	-	4	25	75	100
IT-T46	SYSTEM SOFTWARE	3	1	-	4	25	75	100
IT-P41	ALGORITHMS LAB	-	-	3	2	50	50	100
IT-P42	MICROPROCESSORS AND MICROCONTROLLERS LAB	-	-	3	2	50	50	100
IT-P43	JAVA LAB	-	-	3	2	50	50	100
PE-P44	PHYSICALEDUCATION #	-	-	0	0	-	-	-
	TOTAL	**18**	**6**	**9**	**30**	**300**	**600**	**900**

Under Pass/Fail option only and not accounted for CGPA calculation

FIFTH SEMESTER

CODE NO.	NAME OF THE SUBJECTS	PERIODS			CREDITS	MARKS		
		L	T	P		IA	UE	TM
IT-T51	COMMUNICATION ENGINEERING-II	3	1	-	4	25	75	100
IT-T52	SOFTWARE ENGINEERING	3	1	-	4	25	75	100
IT-T53	OPERATINGSYSTEMS	3	1	-	4	25	75	100
IT-T54	DATA BASE MANAGEMENT SYSTEMS	3	1	-	4	25	75	100
IT-T55	THEORY OF COMPUTATION	3	1	-	4	25	75	100
IT-E5X	ELECTIVE-I	3	1	-	4	25	75	100
IT-P51	COMMUNICATION ENGINEERINGLAB	-	-	3	2	50	50	100
IT-P52	OPERATINGSYSTEMS LAB	-	-	3	2	50	50	100
IT-P53	DATA BASE MANAGEMENT SYSTEMS LAB	-	-	3	2	50	50	100
HS-P54	GENERALPROFICIENCY-I	-	-	3	1	100	-	100
	TOTAL	**18**	**6**	**12**	**31**	**400**	**600**	**1000**

SIXTH SEMESTER

CODE NO.	NAME OF THE SUBJECTS	PERIODS			CREDITS	MARKS		
		L	T	P		IA	UE	TM
IT-T61	COMPUTER NETWORKS	3	1	-	4	25	75	100
IT-T62	WEB TECHNOLOGY	3	1	-	4	25	75	100
IT-T63	ARTIFICIAL INTELLIGENCE	3	1	-	4	25	75	100
IT-T64	INFORMATION CODING TECHNIQUES	3	1	-	4	25	75	100
IT-E6X	ELECTIVE-II	3	1	-	4	25	75	100
IT-E6X	ELECTIVE-III	3	1	-	4	25	75	100
IT-P61	COMPUTER NETWORKS LAB	-	-	3	2	50	50	100
IT-P62	WEB TECHNOLOGY LAB	-	-	3	2	50	50	100
IT-P63	MINI PROJECT	-	-	3	2	50	50	100
HS-P64	GENERALPROFICIENCY-II	-	-	3	1	100	-	100
	TOTAL	**18**	**6**	**12**	**31**	**400**	**600**	**1000**

SEVENTH SEMESTER

CODE NO.	NAME OF THE SUBJECTS	PERIODS			CREDITS	MARKS		
		L	T	P		IA	UE	TM
IT-T71	MOBILE COMPUTING	3	1	-	4	25	75	100
IT-T72	WEB SERVICES AND XML	3	1	-	4	25	75	100
IT-T73	CRYPTOGRAPHY AND NETWORK SECURITY	3	1	-	4	25	75	100
IT-E7X	ELECTIVE-IV	3	1	-	4	25	75	100
IT-E7X	ELECTIVE-V	3	1	-	4	25	75	100
IT-P71	MOBILE COMPUTING LAB	-	-	3	2	50	50	100
IT-P72	WEB SERVICES AND XML LAB	-	-	3	2	50	50	100
IT-P73	PROJECTWORK PHASE-I	-	-	3	4	100	-	100
IT-P74	SEMINAR	-	-	3	1	100	-	100
IT-P75	INDUSTRIAL TRAINING / INTERNSHIP	-	-	3	1	100	-	100
	TOTAL	**15**	**05**	**15**	**30**	**525**	**475**	**1000**

EIGHTH SEMESTER

CODE NO.	NAME OF THE SUBJECTS	PERIODS			CREDITS	MARKS		
		L	T	P		IA	UE	TM
IT-T81	PROFESSIONAL ETHICS	3	-	-	1	100	-	100
IT-T82	DISTRIBUTED COMPUTING	3	1	-	4	25	75	100
IT-E8X	ELECTIVE-VI	3	1	-	4	25	75	100
IT-P81	PROJECTWORK PHASE-II	-	-	3	8	50	50	100
IT-P82	COMPREHENSIVE VIVA VOCE	-	-	3	1	50	50	100
	TOTAL	**15**	**05**	**06**	**18**	**250**	**250**	**500**

LIST OF ELECTIVES

CODENO.	NAMEOFTHE SUBJECTS
IT-E51	COMPUTER HARDWAREAND TROUBLESHOOTING
IT-E52	OPERATION RESEARCH
IT-E53	PARALLEL PROCESSING
IT-E54	BUSINESSPROCESS
IT-E55	DIGITAL SIGNAL PROCESSING
IT-E61	PRINCIPLES OF PROGRAMMING LANGUAGES
IT-E62	SOFTWARE PROJECT MANAGEMENT
IT-E63	GRID COMPUTING
IT-E64	BUSINESS INTELLIGENCE
IT-E65	ENTERPRISE SOLUTIONS
IT-E66	OBJECT ORIENTED ANALYSIS AND DESIGN
IT-E67	GEOGRAPHICAL INFORMATION SYSTEM
IT-E68	USER INTERFACE DESIGN
IT-E69	SYSTEM MODELING AND SIMULATION
IT-E71	INFORMATION RETRIEVAL
IT-E72	SOFTWARE TESTING
IT-E73	MANAGEMENTCONCEPTS AND STRATEGIES
IT-E74	IMAGE PROCESSING
IT-E75	WIRELESS SENSOR NETWORKS
IT-E76	NETWORK MANAGEMENT AND PROTOCOLS
IT-E77	UNIX INTERNALS
IT-E78	CLOUD COMPUTING
IT-E79	BIG DATABASES
IT-E81	E-COMMERCE
IT-E82	EMBEDDED SYSTEMS
IT-E83	DATA MINING
IT-E84	OPEN SOURCE SOFTWARE
IT-E85	COMPONENT TECHNOLOGY
IT-E86	NATURAL LANGUAGE PROCESSING
IT-E87	HIGH SPEED NETWORKS
IT-E88	REAL TIME SYSTEMS
IT-E89	SOFT COMPUTING
IT-E810	CYBER CRIME AND ENFORCEMENT

T101 MATHEMATICS – I

UNIT I – CALCULUS

Curvature, radius of curvature, evolutes and involutes.Beta and Gamma functions and their properties.

UNIT II– FUNCTIONS OF SEVERAL VARIABLES

Partial derivatives, Total derivative, Differentiation of implicit functions, Change of variables, Jacobians and their properties, Taylor's series for functions of two variables, Maxima and minima, Lagrange's method of undetermined multipliers.

UNIT III – MULTIPLE INTEGRALS AND APPLICATIONS

Multiple Integrals, change of order of integration and change of variables in double integrals (Cartesian to polar). Applications: Areas by double integration and volumes by triple integration (Cartesian and polar).

UNIT IV – DIFFERENTIAL EQUATIONS

Exact equations, First order linear equations, Bernoulli's equation, orthogonal trajectories, growth, decay and geometrical applications. Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT V – DIFFERENTIAL EQUATIONS (Higher order)

Linear differential equations of higher order - with constant coefficients, the operator D, Euler's linear equation of higher order with variable coefficients, simultaneous linear differential equations, solution by variation of parameters method.

Text Books

1. Venkataraman M.K, Engineering Mathematics-First year, National Publishing Company, Chennai.

2. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 41stEdition, 2011. (For Unit II only)

Reference Books

1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

2. Kandasamy P. et al, Engineering Mathematics, Vol.1 & 2, S. Chand & Co., New Delhi.

3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

4. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, New Delhi, 8th Edition.

5. Bali N. and Goyal M., Advanced Engineering Mathematics, Lakshmi Publications Pvt. Ltd., New Delhi, 7th Edition, 2010.

T102 PHYSICS

Unit I – Acoustics & NDT

*ultrasonics- U*ltrasonic Waves Productions (Piezoelectric &Magnetostriction method) – Detections (Acoustic Grating) *NDT applications – Ultrasonic* Pulse Echo Method - Liquid Penetrant Method

Acoustics - Factors affecting Acoustic of Buildings (Reverberation, Loudness, Focusing, Echo, Echelon Effect and Resonance) and their Remedies - Sabine's formula for Reverberation Time

Unit II – Optics

Interference- Air Wedge – Michelson's Interferometer - Wavelength Determination – Interference Filter – Antireflection Coatings

Diffraction - Diffraction Grating – Dispersive power of grating - Resolving Power of Grating & Prism

Polarisation Basic concepts of Double Refraction - Huygens Theory of Double Refraction- Quarter and Half Wave Plates – Specific Rotary Power – Laurent Half Shade Polarimeter

Unit III – Lasers & Fiber Optics

Lasers - Principles of Laser – Spontaneous and Stimulated Emissions - Einstein's Coefficients – Population Inversion and Laser Action – types of Optical resonators (qualitative ideas) – Types of Lasers - NdYAG, CO_2 laser, GaAs Laser-applications of lasers

Fiber Optics - Principle and Propagation of light in optical fiber – Numerical aperture and acceptance angle – Types of optical fibers (material, refractive index, mode)-applications to sensors and Fibre Optic Communication

Unit IV – Wave mechanics

Matter Waves – de Broglie Wavelength – Uncertainty Principle – Schrödinger Wave Equation – Time Dependent – Time Independent – Application to Particle in a One Dimensional potential Box – Quantum Mechanical Tunneling – Tunnel Diode.

Unit V – Nuclear energy source

General Properties of Nucleus (Size, Mass, Density, Charge) – Mass Defect – Binding Energy - Disintegration in fission –*Nuclear Reactor:* Materials Used in Nuclear Reactors. – PWR – BWR – FBTR. Nuclear fusion reactions for fusion reactors-D-D and D-T reactions, Basic principles of Nuclear Fusion reactors.

Text Books

1. V Rajendran, Engineering Physics, *2nd Edition*, TMH, New Delhi *2011*

2. Avadhanulu M N , Engineering Physics, S. Chand & Co, 2009.

3. Arthur Beiser, Concepts of Modern Physics, 6th Edition, TMH, New Delhi 2008.

Reference Books

1. AjoyGhatak, Optics, 5th Edition TMH, New Delhi, 2012.
2. K. Thyagarajan and AjoyGhatak, Lasers Fundamentals and Applications, 2nd Edition, Springer 2010.
3. Richtmyer, Kennard and cooper, Introduction to Modern Physics, TMH, New Delhi 2005.
4. 4 . R. Murugesan, Modern Physics, S. Chand & Co, New Delhi 2006.
5. 5 .K.R.Nambiar, Lasers, New Age International, New Delhi, 2008.
6. 6. Science of Engineering Materials, 2nd Edition, C.M. Srivastava and C. Srinivasan, New Age Int. (P) Ltd, New Delhi, 1997

T103 CHEMISTRY

Unit I - Water

Hardness of water - units and calcium carbonate equivalent.Determination of hardness of water-EDTA method. Disadvantages of hardwater – boiler scale and sludge, causticembrittlement, priming & foaming and boiler corrosion. Water softening methods – internal & external conditioning – Lime-Soda process, Zeolite process and Ion-exchange process. Desalination – reverse osmosis &electrodialysis.

Unit II – Polymers

Classification, types of polymerization reactions – mechanism of radical, ionic and Ziegler-Natta polymerizations. Polymer properties – chemical resistance, crystallinity and effect of temperature, Mn and Mw. Thermoplastics and thermosets.Preparation, properties and uses of PVC, TEFLON, Nylons, Bakelite, Polyurithane, Rubbers – vulcanization, synthetic rubber, BuNa-S, BuNa-N, silicone and butyl rubber.Conducting polymers – classification and applications.Polymer composites – FRP – laminar composites.Moulding constituents of plastic, moulding techniques – compression, injection, transfer and extrusion moulding.

Unit III - Electrochemical Cells

Galvanic cells, single electrode potential, standard electrode potential, electromotive series. EMF of a cell and its measurement.Nernst equation.Electrolyte concentration cell.Reference electrodes – hydrogen, calomel, Ag/AgCl& glass electrodes. Batteries – primary and secondary cells, Leclanche cell, Lead acid storage cell, Ni-Cd battery & alkaline battery. Fuel cells – H_2-O_2 fuel cell.

Unit IV - Corrosion and its Control

Chemical & electrochemical corrosion – Galvanic, pitting, stress and concentration cell corrosion.Factors influencing corrosion – corrosion control methods – cathodic protection and corrosion inhibitors.Protective coating – types of protective coatings – metallic coating – tinning and galvanizing, cladding, electroplating and anodizing.

Unit V -Phase Rule

Definition and derivation of phase rule. Application to one component system – water and sulfur systems. Thermal analysis, condensed phase rule.Two component systems – Pb-Ag, Cu-Ni, and Mg-Zn systems.

Text books

1. P.C. Jain and Monika Jain, Engineering Chemistry, Dhanpat Rai and Sons, New Delhi 2004.
2. P. Kannan and A. Ravi Krishnan “Engineering Chemistry” Hi-Tech Sri Krishna Publications, Chennai, 9th Ed, 2009
3. N. Krishnamurthy, P. Vallinayagam and D. Madhavan, Engineering Chemistry, 2ndEd. PHI Learning PVT., LTD, New Delhi, 2008.

Reference Books

1. S. S. Dara, A Textbook of Engineering Chemistry, 11th Ed, S.Chand& Co., Ltd. New Delhi, 2008.
2. B. K. Sharma, Engineering Chemistry, 3rdedition Krishna Prakashan Media (P) Ltd., Meerut, 2001.

T104 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

PART A- ELECTRICAL

UNIT – I - DC CIRCUITS

Definition of Voltage, Current, Power & Energy, circuit parameters, Ohm's law, Kirchoff's law & its applications – Simple Problems - Division of current in Series & parallel circuits - star/delta conversion - Node and mesh methods of analysis of DC circuits.

UNIT – II - AC CIRCUITS

Concepts of AC circuits – rms value, average value, form and peak factors – Simple RLC series circuits – Concept of real and reactive power – Power factor - Introduction to three phase system - Power measurement by two wattmeter method.

UNIT – III – ELECTRICAL MACHINES AND POWER PLANTS

Law of Electromagnetic induction, Fleming's Right & Left hand rule - Principle of DC rotating machine, Single phase transformer and single phase induction motor (Qualitative approach only) - Simple layout of thermal and hydro generation (block diagram approach only).

PART B – ELECTRONICS

UNIT – IV

V-I Characteristics of diode - Half-wave rectifier and Full-wave rectifier – with and without capacitor filter - Transistor - Construction & working - Input and output characteristics of CB and CE configuration - Transistor as an Amplifier - Principle and working of Hartley oscillator and RC phase shift oscillator - Construction and working of JFET & MOSFET.

UNIT – V

Boolean algebra – Reduction of Boolean expressions - De-Morgan's theorem - Logic gates - Implementation of Boolean expressions - Flip flops - RS, JK, T and D.

Combinational logic - Half adder, Full adder and Subtractors.

Sequential logic - Ripple counters and shift registers.

UNIT – VI

Model of communication system - Analog and digital - Wired and wireless channel.

Block diagram of various communication systems - Microwave, satellite, optical fiber and cellular mobile system.

Network model - PAN, LAN, MAN and WAN - Circuit and packet switching - Overview of ISDN.

Text Books

1. Kothari D P and Nagrath I J , Basic Electrical Engineering , Tata McGraw Hill,2009.

2. S.K. Sahdev, Fundamentals of Electrical Engineering and Electronics, Dhanpat Rai & Co, 2013.
3. Jacob Millman and Christos C. Halkias, "Electronic Devices and Circuits" Tata McGraw Hill
4. R.L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", PHI Learning Private Limited, Ninth Edition, 2008
5. Morris Mano, "Digital design", PHI Learning, Fourth Edition, 2008.
6. Rajendra Prasad , " Fundamentals of Electronic Engineering", Cengage learning , New Delhi, First Edition, 2011

Reference Books

1. R.Muthusubramaniam, S.Salivahanan and K.A. Mureleedharan, Basic Electrical Electronics and Computer Engineering, Tata McGraw Hill, 2004..
2. J.B.Gupta, A Course in Electrical Power, Katson Publishing House, New Delhi, 1993.

T105 THERMODYNAMICS

Unit I - Basic Concepts and Definitions

Energy conversion and efficiencies - System, property and state - Thermal equilibrium - Temperature - Zeroth law of Thermodynamics – Pure substance - P, V and T diagrams – Thermodynamic diagrams.

Unit II - First Law of Thermodynamics

The concept of work and adiabatic process - First law of thermodynamics - Conservation of Energy principle for closed and open systems - Calculation of work for different processes of expansion of gases

Unit III - Second Law of Thermodynamics

Equilibrium and the second law - Heat engines - Kelvin-Planck statement of second law of thermodynamics - Reversible and irreversible processes - Carnot principle - Clausius inequality- Entropy

Unit IV - Gas Power Cycles

Air standard cycles: The air standard Carnot cycle - Air standard Otto cycle, diesel cycle, dual cycle and Bryton cycles and their efficiencies

Unit V - Refrigeration Cycles and Systems

Reverse Carnot cycle - COP - Vapor compression refrigeration cycle and systems (only theory) - Gas refrigeration cycle - Absorption refrigeration system – Liquefaction – Solidification (only theory).

Text Books

1. Nag, P. K., "Engineering Thermodynamics", 4th edition, Tata Mc Graw Hill Publishing Co. Ltd., New Delhi, 1995

2. Wark, K., "Thermodynamics", 4th edition ,McGraw Hill, N.Y.,1985

Reference Books

1. Arora, C.P., "Thermodynamics" , Tata Mc Graw Hill Publishing Co. Ltd., New Delhi,1998.

2. Burghardt, M.D., "Engineering Thermodynamics with Applications", 4th edition, Harper & Row, N.Y.,1986.

3. Huang, F.F., "Engineering Thermodynamics" 2nd edition , Macmillan Publishing Co. Ltd., N.Y.,1989.

4. Cengel, Y.A. and Boles, M.A., "Thermodynamics - An Engineering Approach", 5th edition, Mc-Graw Hill, 2006

T106 COMPUTER PROGRAMMING

Unit – I

History of Computers – Block diagram of a Computer – Components of a Computer system –Classification of computers - Hardware – Software – Categories of Software – Operating System – Applications of Computers – Network structure – Internet and its services – Intranet – Study of word processor – Preparation of worksheets.

Unit – II

Problem solving techniques – Program – Program development cycle – Algorithm design – Flowchart - Pseudo code.

Introduction to C – History of C – Importance of C - C tokens – data types – Operators and expressions – I/O functions.

Unit – III

Decision making statements – branching and looping – arrays – multidimensional arrays – Functions – Recursion – Passing array to functions.

Storage classes – Strings – String library functions.

Unit – IV

Structures – Arrays and Structures – nested structures – passing structures to functions – user defined data types – Union.

Pointers – pointers and arrays – pointers and functions - pointers and strings - pointers and Structures.

Unit – V

Files – operations on a file – Random access to files – command line arguments.

Introduction to preprocessor – Macro substitution directives – File inclusion directives – conditional compilation directives – Miscellaneous directives.

Text Books

1. Balagurusamy. E, “Programming in ANSI C”, Tata McGraw Hill, Sixth edition, 2012.

Reference Book

1. VikasVerma, “A Workbook on C “,Cengage Learning, Second Edition,2012
2. Ashok N Kamthane, “Computer Programming”, Pearson education, Second Impression, 2008.

P101 COMPUTER PROGRAMMING LAB

List of Exercises
OS Commands, Word Processor and Spreadsheets

1. Study of OS commands-Compilation and execution of simple C programs
2. Use of mail merge in word processor
3. Greatest of three numbers using conditional operator and if statement
4. Solve quadratic equation for different sets of inputs.
5. Use of Switch….Case statements
6. Generation of prime and Fibonacci series
7. Summation of Odd and Even number separately
8. Evaluate the COSINE series using for, while and do while loops
9. Matrix operations
   a) Addition
   b) Transpose
   c) Multiplication
10. Evaluate the sin(x) series using functions and recursive functions
11. String manipulation
    a) Reverse of string
    b) Count number of vowels in the given string
    c) Length of string
    d) Count number of words and sentence
12. Create an array of structures for a list of items with the following details

Item - Code Item_ Name

102	Paste	Colgate
102	Paste	Pepsodent
102	Paste	Close-up
101	Soap	Cinthol
101	Soap	Lux
101	Soap	Hamam
101	Soap	Dove

Arrange the set of items in ascending order of its Item Code and descending order of its Item_ name as given below

Item-Code Item_ Name

101	Soap	Lux
101	Soap	Hamam
101	Soap	Dove
101	Soap	Cinthol
102	Paste	Pepsodent
102	Paste	Colgate
102	Paste	Close-up

13. Use of pointers and array of pointers
14. Functions with static data types

15. File handling
    a) Create file
    b) Read data
    c) Arrange the number in ascending order

P102 ENGINEERING GRAPHICS

Unit 0

Introduction to Standards for Engineering Drawing practice, Lettering, Line work and Dimensioning

Unit I

Conic sections, Involutes, Spirals, Helix. Projection of Points, Lines and Planes

Unit II

Projection of Solids and Sections of Solids.

Unit III

Development of surfaces - Intersection of surfaces (cylinder-cylinder, cylinder-cone)

Unit IV

Isometric projections and Orthographic projections

Unit V

Computer Aided Drafting: Introduction to Computer Aided Drafting hardware - Overview of application software - 2D drafting commands (Auto CAD) for simple shapes - Dimensioning.

Text Books

1. K.R. Gopalakrishna and SudhirGopalakrishna, Engineering Graphics, Inzinc Publishers, 2007.
2. K.V. Natarajan, A Text Book of Engineering Drawing, Dhanalakshmi Publishers, 2006.
3. BIS, Engineering Drawing practice for Schools & College, 1992.

Reference Books

1. N.D. Bhatt, Engineering Drawing, 49th edition, Chorotar Publishing House, 2006.
2. K. Venugopal, Engineering Drawing and Grahics + Auto CAD, 4th edition, New Age International Publication Ltd., 2004 .
3. David I cook and Robert N Mc Dougal, Engineering Graphics and Design with computer applications, Holt – Sounders Int. Edn. 1985.
4. James D Bethune and et. al., Modern Drafting, Prentice Hall Int., 1989.

P103 BASIC ELECTRICAL AND ELECTRONICS LAB

ELECTRICAL LAB

Objective of the course: The students get exposure on the basic electrical tools, applications and precautions. The students are trained for using different types of wiring for various purposes in domestic and industries. The students are taught to find faults in electrical lamp and ceiling fan.

List of Experiments

1. Electrical Safety, Precautions, study of tools and accessories.
2. Practices of different joints.
3. Wiring and testing of series and parallel lamp circuits.
4. Staircase wiring.
5. Doctor's room wiring.
6. Bed room wiring.
7. Go down wiring.
8. Wiring and testing a ceiling fan and fluorescent lamp circuit.
9. Study of different types of fuses and A.C and D.C meters.

ELECTRONICS LAB

1. Study of CRO

   (a) Measurement of AC and DC voltages

   (b) Frequency and phase measurements (using Lissajou's figures)

2. Verification of Kirchoff's Voltage and Current Laws

   Determine the voltage and current in given circuits using Kirchoff"s laws theoretically and verify the laws experimentally.

3. Characteristics and applications of PN junction diode.

   Forward and Reverse characteristics of PN junction diode.

Application of Diode as Half wave Rectifier – Measurement of ripple factor with and without capacitor filter

4. Frequency Response of RC Coupled Amplifiers

Determination of frequency response of given RC coupled amplifier - Calculation of bandwidth.

5. Study of Logic Gates

(a) Verification of Demorgan's theorems

(b) Verification of truth tables of OR, AND, NOT, NAND, NOR, EX-OR, EX-NOR gates and Flipflops - JK, RS, T and D

(c) Implementation of digital functions using logic gates and Universal gates.

T107 MATHEMATICS – II

UNIT I – MATRICES

Eigenvalues and Eigen vectors of a real matrix, Characteristic equation, Properties of Eigenvalues and Eigenvectors.Cayley-Hamilton Theorem, Diagonalization of matrices.Reduction of a quadratic form to canonical form by orthogonal transformation.Nature of quadratic forms.

UNIT II – VECTOR CALCULUS

Gradient, divergence and curl, their properties and relations.Gauss divergence theorem and Stoke's theorem (without proof).Simple application problems.

UNIT III – LAPLACE TRANSFORM

Definition, Transforms of elementary functions, properties. Transform of derivatives and integrals. Multiplication by tand division by t. Transform of unit step function, transform of periodic functions. Initial and final value theorems.

UNIT IV – APPLICATIONS OF LAPLACE TRANSFORM

Methods for determining inverse Laplace Transforms, convolution theorem, Application to differential equations and integral equations. Evaluation of integrals by Laplace transforms.

UNIT V – FOURIER TRANSFORM

Fourier Integral theorem (statement only), Fourier transform and its inverse, properties. Fourier sine and cosine transforms, their properties, convolution and Parseval's identity.

Text books

1. Venkataraman M.K., Engineering Mathematics, National Publishing Company, Chennai.

2. Kandasamy P. et al, Engineering Mathematics, Vol.2 & 3, S. Chand & Co., New Delhi.

Reference Books

1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

2. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 41st Edition, 2011.

3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

4. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, New Delhi.

5. Bali N. and Goyal M., Advanced Engineering Mathematics, Lakshmi Publications Pvt. Ltd., New Delhi, 7th Edition, 2010.

T108 MATERIAL SCIENCE

Unit I - Crystal structure and Lattice Defects

Crystal structure - BravaisLattices , Crystal Systems –– Coordination Number, Atomic Radius, Packing Factor for FCC & HCP structures – Miller Indices- Powder X Ray Diffraction Method

Lattice defects – Qualitative ideas of point, line, surface and volume defects

Unit II – Dielectric properties

Dielectric Polarization and Mechanism –Temperature dependence of polarization, Internal or local Field - Clausius-Mossotti relation. Basic ideas of Dielectric loss - frequency dependence of dielectric constant – Measurement of Dielectric constant and loss using Scherring bridge – Elementary ideas of Piezoelectrics, Ferroelectrics and Pyroelectric materials and Applications

Unit III – Magnetic Properties

Origin of atomic magnetic moment – Bohr magneton-Elementary Ideas of classification of magnetic materials (Dia, Para, Ferro, antiferro&Ferri). – Quantum theory of Para & Ferro Magnetism – Domain Theory of Hysteresis – Heisenberg Theory of Exchange Interaction (without derivation) – Qualitative ideas of Anti ferromagnetic Ordering – Structure and Properties of Ferrites – Properties of Soft & Hard Magnetic Materials – Applications. Magnetic data storage – Magnetic tapes, Hard disks, Magneto optical recording

Unit IV – Semiconductors and superconductors

Semiconductors -Derivation of Carrier concentration in intrinsic Semiconductors –Basic ideas of Electrical conductivity in intrinsic and extrinsic semiconductors (without derivations) -temperature dependence of carrier concentration and electrical conductivity in semiconductors (qualitative ideas), Hall effect in Semiconductors -- Application of Hall Effect, Basic Ideas of Compound Semiconductors (II-VI & III-V)

Superconductivity - Basic concepts – transition temperature – Meissener effect – Type I and II superconductors – high temperature superconductors – 123 superconductor – Applications of superconductors.

Unit V – Advanced Materials

Liquid Crystals – Types – Application as Display Devices

Metallic Glasses – preparation by melt spinning. Twin roller system, properties and applications

Shape Memory alloys (SMA), Shape memory effect, Properties and applications of SMA

Nanomaterials- Nano materials (one, Two& three Dimensional) –Methods of synthesis (PVD, CVD, Laser Ablation, Solgel, Ball-milling Techniques), Properties and applications of nanomaterials. carbon nanotubes– Properties and applications.

Text books

1. V Rajendran, Engineering Physics, *2nd Edition*, TMH, New Delhi *2011.*

2. V Raghavan , Materials Science and Engineering- A First Course, 5th Edition, Prentice Hall of India, 2008.

Reference Books

1. Ali Omar M, Elementary Solid State Physics, Addison Wesley Publishing Co., 2009.

2. William D Callister Jr., Material Science and Engineering, 6th Edition, John Wiley and sons, 2009.

3. Srivatsava J P, Elements of Solid State Physics, Prentice Hall of India, 2004.

4. Charles Kittel, Introduction to Solid State Physics, 7th Edition, John Wiley & sons, Singapore, 2007.

5. Pillai S.O, Solid State Physics, 6th Edition – New Age International, 2005.

6. B.S. Murty, P. Shankar, Baldev Raj, B.B. Rath, and James Murday, Text book of Nanoscience and Nanotechnology, Universities Press, Hyderabad 2012

7. Charles P Poole & Frank J Owens, Introduction to Nanotechnology, Wiley nterscience, 2003.

8. M Arumugam , Materials Science, Anuratha Printers, 2004.

9. M.N. Avadhanulu, Enginerring Physics- Volume-II, S.Chand&Co, New Delhi, 2009

T109 ENVIRONMENTAL SCIENCE

UNIT I – Environment and Energy Resources

Environmental segments – atmosphere, hydrosphere, lithosphere and biosphere. Atmospheric layers.Pollution definition and classification.Pollutants classification. Forest resources – use and over exploitation, deforestation, forest management. Water resources – use and conflicts over water, dams – benefits and problems.Mineral resources – mineral wealth of India, environmental effects of extracting and using mineral resources.Food resources – world food problems, environmental impact of modern Agriculture – fertilizer and pesticides.Energy resources – growing needs, renewable and non-renewable energy resources and use of alternate energy sources.From unsustainable to sustainable development.

UNIT II - Ecosystem and Biodiversity

Concept of an ecosystem - structure and function of an ecosystem.Producers, consumers, and decomposers.Energy flow in the ecosystem.Food chains, food webs and ecological pyramids.Introduction, types, characteristic features, structure and function of forest, grassland, desert and aquatic (fresh water, esturine and marine) ecosystems.Biodiversity – definition, genetic species and ecosystem diversity. Value of biodiversity - consumptive use, productive use, social, ethical, aesthetic and option values. Hot spots of biodiversity.Threats to biodiversity, habitat loss, poaching of wildlife, human wildlife conflicts.Endangered and endemic species.Conservation of biodiversity – in-situ and ex-situ conservation of biodiversity.

UNIT III - Air Pollution

Definition and classification.Chemical and photochemical reaction in different layers of atmosphere.Causes, sources, effects and control measures of air pollutants - oxides of Nitrogen, oxides of Carbon, oxides of Sulfur, hydrocarbons, chloro-fluoro carbons and particulates.Mechanism and effects of air pollution phenomenon – Global Warming, Ozone Depletion, AcidRain, Sulfurous Smog and Photochemical Smog.

UNIT IV- Water and Land Pollution

Water pollution – causes and effects of organic water pollutants – pesticides, insecticides, detergents and surfactants.Causes and effects of inorganic water pollutants – heavy metal pollutiondue to Hg, Pb, Cr & Cu. Water pollution control and monitoring – DO, COD, BOD & TOC. Land Pollution – Solid waste management – causes, effect and control measures of urban and industrial wastes. Thermal and radioactive pollution.

UNIT V -Pollution Control and Monitoring

Basic concepts and instrumentation of IR, UV-VIS, atomic absorption spectrometry, Gas Chromatography and Conductometry.Analysis of air pollutants – NO_x, CO_x, SO_x, H_2S, Hydrocarbons and particulates.

Text Books:

1. A. K. De, “Environmental chemistry” 7th Ed; New age international (P) Ltd, New Delhi, 2010.

2. K. RaghavanNambiar, “Text Book of Environmental Studies” 2ndEd, Scitech Publications (India) Pvt Ltd, India, 2010.

3. G. S. Sodhi, Fundamental concepts of environmental chemistry, I Ed, Alpha Science International Ltd, India, 2000.

Reference Books:

1. B.K. Sharma, “Environmental chemistry” 11th Ed, KRISHNA Prakashan Media (P) Ltd, Meerut, 2007.

2. S.S.Dara, and D.D. Mishra “A text book of environmental chemistry and pollution control, 5th Ed, S.Chandand Company Ltd, New Delhi, 2012.

3. Richard T. Wright, Environmental Science: Toward a Sustainable Future, 10thedition, Prentice Hall, 2008

T 110 BASIC CIVIL AND MECHANICAL ENGINEERING

Part-A Civil Engineering

Unit I - Buildings, Building Materials

Buildings-Definition-Classification according to NBC-plinth area, Floor area, carpet area, floor space index-construction materials-stone, brick, cement, cement-mortar, concrete, steel- their properties and uses.

Unit II - Buildings and their components

Buildings: Various Components and their functions. Soils and their classification. Foundation: function and types. Masonry- function and types. Floors: definition and types of floors. Roofs: definition f and types.

Unit III - Basic Infrastructure

Surveying: classification, general principles, types, Uses, instruments used. Roads-types: components, types and their advantage and disadvantages. Bridges: components and types of bridges. Dams: Purpose, types of dams. Water supply-sources and quality requirements, need and principles of rainwater harvesting.

PART - B Mechanical Engineering

Unit - IV

Internal and external combustion systems:

IC engines – Classification – Working principles - Diesel and petrol engines: two stroke and four stroke engines – Merits and demerits.

Steam generators (Boilers) – Classification – Constructional features (of only low pressure boilers) – Boiler mountings and accessories – Merits and demerits - Applications.

Unit - V

Power Generation Systems – Convectional and Non-Conventional:

Hydraulic – Thermal – Nuclear power plants – Schemes and layouts (Description Only)

Solar – wind –Geothermal - Wave – Tidal and Ocean Thermal Energy Conversion systems – Basic power plant schemes and layouts (Description only).

Unit - VI

Manufacturing Processes:

Machines – Lathe – Drilling – Bending – Grinding – Shearing (Description only)

Machining Processes – Turning – Planning – Facing – Blanking – Drilling – Punching – Shearing – Bending – Drawing – Filing – Sawing – Grinding.

Moulding and Metal Joining - Pattern making – Green and dry sand moulding – Arc and Gas welding – Brazing – Soldering (process description only).

Text Books

1. PurushothamaRaj.P., Basic civil engineering, 3rd Edn.,Dhanam Publications, Chennai, 2001.

2. Natarajan, K V, Basic Civil Engineering, 11th Edition, Dhanalakshmi Publications Chennai, 2001.

3. Lindberg, R.A.Process and Materials of Manufacture, PHI, 1999.

4. H.N.Gupta, R.C.Gupta and Arun Mittal, Manufacturing Processes, New Age Publications, 2001

5. Nagpal, Power Plant Engineering, Khanna Publishers, Delhi, 1998.

Reference Books

1. Rajput, R K, Engineering Materials, S Chand & Co. Ltd., New Delhi, 2002.

2. Punmia, B.C., et. al., Surveying ,Vol-I, Laxmi Publishers, New Delhi, 2002.

3. Punmia, B.C., et.al Building Construction, Laxmi Publishers, New Delhi ,2002.

4. El.Wakil, M.M., Power Plant Technology, Mc Graw Hill Book Co.,1985.

5. Hajra Choudhry, et. al., Workshop Technology Vol I and II, Media Promoters Publishers Pvt. Ltd., Bombay, 2004.

T 111 ENGINEERING MECHANICS

Unit I - Fundamental of Mechanics

Basic Concepts Force System and Equilibrium, Definition of Force, Moment and Couple, Principle of Transmissibility, Varignon's theorem, Resultant of force system – Concurrent and non concurrent coplanar forces, Condition of static equilibrium for coplanar force system, stability of equilibrium, , applications in solving the problems on static equilibrium of bodies.

Unit II – Practical application of force system

Structural member: definition, Degree of freedom, concept of free body diagrams, types of supports and reactions, types of loads, Analysis of Trusses-method of joints, method of sections.

Friction: Introduction, Static dry friction, simple contact friction problems, ladders, wedges.

Unit III - Properties of Surfaces

Properties of sections – area, centroids of lines, areas and volumes, moment of inertia first moment of inertia, second moment of inertia and product moment of inertia, polar moment of inertia, radius of gyration, mass moment of inertia.

Unit IV - Kinematics and Kinetics of Particles

Equations of motion - Rectilinear motion, curvelinear motion, Relative motion, D'Alembert's principle, work- Energy equation – Conservative forces and principle of conservation of energy, Impulse – momentum, Impact – Direct central impact and oblique central impact.

Unit V - Kinematics and Kinetics of Rigid bodies

Plane motion, Absolute motion, Relative motion, translating axes and rotating axes, work and energy, impulse and momentum

Text Books

1. Bhavikatti,S.S and K.G.Rajashekarappa, Engineering Mechanics, New Age International (P) Ltd, New Delhi,2008.

2. Rajesekaran, S and Sankara Subramanian., G., Engineering Mechanics, Vikas Publishing House Private Ltd., 2002.

Reference Books

1. Palanichamy, M.S. Nagan, S., Engineering Mechanics – Statics & Dynamics, Tata McGraw-Hill,2001.

2. Beer, F.P and Johnson Jr. E.R, Vector Mechanics for Engineers, Vol. 1 Statics and Vol.2 Dynamics, McGraw – Hill International Edition, 1997.

T112 COMMUNICATIVE ENGLISH

Unit I – Basic Communication Theory

Importance of Communication – stages of communication, modes of communication – barriers to communication – strategies for effective communication – Listening: Importance, types, barriers – Developing effective listening skills.

Unit II – Comprehension And Analysis

Comprehension of technical and non-technical material – Skimming, scanning, inferring-Note making and extension of vocabulary, predicting and responding to context- Intensive Reading and Reviewing

Unit III – Writing

Effective sentences, cohesive writing, clarity and conciseness in writing – Introduction to Technical Writing – Better paragraphs, Definitions, Practice in Summary Writing – Four modes of writing – Use of dictionaries, indices, library references – making bibliographical entries with regard to sources from books, journals, internet etc.

Unit IV – Business Writing / Correspondence

Report writing – Memoranda – Notice – Instruction – Letters – Resumes – Job applications

Unit V – Oral Communication

Basics of phonetics – Presentation skills – Group Discussions – Dialogue writing – Short Extempore – Debates-Role Plays-Conversation Practice

Reference Books

1. Ashraf M.Rizvi., Effective Technical Communication. Tata-McGraw, 2005.
2. Boove, Courtland R et al., Business Communication Today. Delhi. Pearson Education,2002.
3. Meenakshi Raman and Sangeeta Sharma., Technical Communication Principles And Practice,OUP, 2007.
4. Robert J.Dixson. ,Complete Course in English, Prentice-Hall of India Pvt. Ltd., New Delhi,2006.
5. Robert J.Dixson., Everyday Dialogues in English, Prentice-Hall of India Pvt. Ltd., New Delhi,2007.
6. Sethi,J and KamaleshSadanand., A Practical Course in English Pronunciation, Prentice-Hall of India Pvt. Ltd, New Delhi,2007.

P104 PHYSICS LABORATORY

List of experiments (Any 10 Experiments)

1. Thermal conductivity – Lee's DISC
2. Thermal conductivity - Radial flow
3. Spectrometer – Prism or Hollow prism
4. Spectrometer – Transmission grating
5. Spectrometer - Ordinary & Extraordinary rays
6. Newton's rings
7. Air – wedge
8. Half shade polarimeter – Determination of specific rotatory power
9. Jolly's experiment – determination of α
10. Magnetism: i – h curve
11. Field along the axis of coil carrying current
12. Vibration magnetometer – calculation of magnetic moment & pole strength
13. Laser experiment: wavelength determination using transmission grating, reflection grating (vernier calipers) & particle size determination
14. Determination of optical absorption coefficient of materials using laser
15. Determination of numerical aperture of an optical fiber

P105 CHEMISTRY LABORATORY

List of experiments (Any 10 Experiments)

1. Determination of dissolved oxygen in water.
2. Determination of total hardness of water by EDTA method.
3. Determination of carbonate and bicarbonate in water.
4. Estimation of chloride content in water.
5. Estimation of magnesium by EDTA.
6. Estimation of acetic acid in vinegar.
7. Estimation of ferrous by permanganometry.
8. Estimation of ferrous and ferric iron in a solution mixture by dichrometry.
9. Estimation of available chlorine in bleaching powder.
10. Estimation of copper in copper sulphate solution.
11. Estimation of calcium by permanganometry.
12. Estimation of iron by colorimetry.

Demonstration Experiments (Any two of the following)

1. Determination of COD of water sample.
2. Determination of lead by conductometry.
3. Percentage composition of sugar solution by viscometry.

Reference:

Laboratory Manual prepared by the Department of Chemistry

P106 WORKSHOP PRACTICE

Sl. No.	Trade	List of Exercises
1.	Fitting	Study of tools and Machineries. Exercises on symmetric joints and joints with acute angle.
2.	Welding	Study of arc and gas welding equipment and tools – Edge preparation – Exercises on lap joint and V Butt joints – Demonstration of gas welding
3	Sheet metal work	Study of tools and Machineries – exercises on simple products like Office tray and waste collection tray.
4.	Carpentry	Study of tools and Machineries – Exercises on Lap joints and Mortise joints

List of Exercises

I Fitting

1. Study of tools and Machineries
2. Symmetric fitting
3. Acute angle fitting

II Welding

1. Study of arc and gas welding equipment and tools
2. Simple lap welding (Arc)
3. Single V butt welding (Arc)

III Sheet metal work

1. Study of tools and machineries
2. Frustum
3. Waste collection tray

IV Carpentry

1. Study of tools and machineries

2. Half lap joint

3. Corner mortise joint.

Reference Books

1. Hajra Choudhry, et. al., Workshop Technology Vol. I and II, Media Promoters Publishers Pvt. Ltd., Bombay, 2004.
2. H.N.Gupta, R.C.Gupta and Arun Mittal, Manufacturing Processes, New Age Publications, 2001

P107 NCC / NSS

NCC/NSS training is compulsory for all the Undergraduate students

1. The above activities will include Practical/field activities/Extension lectures.
2. The above activities shall be carried out outside class hours.
3. In the above activities, the student participation shall be for a minimum period of 45 hours.
4. The above activities will be monitored by the respective faculty incharge and the First Year Coordinator.
5. Pass /Fail will be determined on the basis of participation, attendance, performance and behaviour. If a candidate Fails, he/she has to repeat the course in the subsequent years
6. Pass in this course is mandatory for the award of degree.

MA-T31 MATHEMATICS-III

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
MA-T31	Mathematics-III	3	1	0

Course Objectives:

1. To provide the concepts of functions of a complex variable, conformal mapping, complex integration, series expansion of complex functions, Harmonic analysis and Fourier series.
2. To make the students understand and work out problems of constructing analytic functions, conformal mapping, bilinear transformation, contour integration and expanding functions into Fourier series including Harmonic analysis.

Course Outcomes:

On successful completion of the module students will be able to:

1. Understand the concepts of function of a complex variable and complex integration and apply these ideas to solve problems occurring in the area of engineering and technology.
2. Expand functions into Fourier series which are very much essential for application in engineering and technology.

Unit I

Function of a complex variable: Continuity, derivative and analytic functions – Necessary conditions – Cauchy-Riemann equations (Cartesian and polar form) and sufficient conditions (excluding proof) – Harmonic and orthogonal properties of analytic function – Construction of analytic functions.

Unit II

Conformal mapping – Simple and standard transformations like $w = z+c$, cz, z^2, e^z, $\sin z$, $\cosh z$ and $z+1/z$ – Bilinear transformation and cross ratio property (excluding Schwarz-Christoffel transformation). Taylor's and Laurent's theorem (without proof) – Series expansion of complex valued functions – classification of singularities.

Unit III

Complex Integration: Cauchy's integral theorem and its application, Cauchy's integral formula and problems. Residues and evaluation of residues – Cauchy's residue theorem – Contour integration: Cauchy's and Jordan's Lemma (statement only) – Application of residue theorem to evaluate real integrals – unit circle and semicircular contour (excluding poles on boundaries).

Unit IV

Fourier Series: Dirichlet's conditions – General Fourier series – Expansion of periodic function into Fourier series – Fourier series for odd and even functions – Half-range Fourier cosine and sine series – Change of interval – Related problems.

Unit V

Root Mean Square Value – Parseval's theorem on Fourier Coefficients. Complex form of Fourier series – Harmonic Analysis.

(Total: 60 Periods)

Text Books:

1. Veerarajan T., Engineering Mathematics for first year, Tata-McGraw Hill, 2010.

2. Venkataraman M.K., Engineering Mathematics, Vol. II & III, National Publishing Company, Chennai, 2012.

Reference Books:

1. Kandasamy P. et al, Engineering Mathematics, Vol. II & III, S. Chand & Co., New Delhi, 2012.

2. Bali N. P and Manish Goyal, Text book of Engineering Mathematics, 3rd Edition, Laxmi Publications (p) Ltd., 2008.

3. Grewal B.S., Higher Engineering Mathematics, 40th Edition, Khanna Publishers, Delhi 2007.

4. Erwin Kreyszig, Advanced Engineering Mathematics, 7Th Edition, Wiley India, 2007.

IT-T32 ELECTRONIC DEVICES AND CIRCUITS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T32	Electronic Devices and Circuits	3	1	0

Course Objectives:

1. To introduce the applications of PN junction diode and Zener diode
2. To familiarize the students with an in-depth knowledge of special devices
3. To impart knowledge on biasing of BJT and FET.
4. To introduce the construction and operation of oscillators.
5. To introduce the op-amp fundamentals and to teach the applications of op-amp

Course Outcomes:

On successful completion of the module students will be able to:

1. Analyse the behaviour of PN junction diode, Zener diode and other special devices.
2. Understand the application areas of diodes.
3. Gain knowledge in biasing of BJT, FET.
4. Understand the working of Power amplifiers and oscillators.
5. Understand the practical applications of op-amps.

Unit I

Diode current equation – V-I characteristics of PN junction diode – Applications- Half wave and Full wave rectifiers with and without filters, Derivation of ripple factors ,rectification efficiency and transformer utilization factor, Zener diode and its application, Clippers, Clampers, voltage multipliers.

Unit II

Special devices: Silicon controlled rectifier, Uni-junction transistor, LED, LCD, Schottky Barrier diode, Varactor diode, Tunnel diode , photodiode, photo-transistor

Unit III

BJT – Transistor biasing and bias circuits – operating point — 'h' parameters — FET biasing – Power Amplifier – Types – Transformer coupled Class A Amplifier – Class B Amplifier – Amplifier distortion- Class C and Class D amplifiers.

Unit IV

Feedback concept, general characteristics of positive feedback, Oscillators: Barkhausen Criterion- Hartley, Colpitts, Wein bridge oscillators and crystal oscillator – frequency stability.

Unit V

Introduction to op-amp, Characteristics of op-amp, Op-amp parameters - Equivalent circuit - Applications : Inverting and non-inverting amplifier, summer, subtractor, voltage follower, differentiator, integrator, comparator, first order low pass and high pass active filters.

(Total: 60 Periods)

Content beyond Syllabus:

PSPICE Simulation on device characteristics (optional)

Text Books:

1. Robert L.Boylestad and Louis Neshelsky, Electronic devices and circuit theory, 11th Edition, Prentice Hall India, 2012.
2. Jacob Millman and Arvin Grabel, Micro-Electronics, McGraw Hill, Fifth edition, 2008.

Reference Books:

1. Jacob Millman and C. Halkias, Satya brataJit, Electronic Devices and circuits, Second edition, McGraw Hill Publications, 2007.
2. Theodore F.Bogart and etal, Electronic Devices and Circuits, pearson Education, 2004

Websites:

1. *www. ecee.colorado.edu*
2. *www-inst.eecs.berkeley.ed*u

IT-T33 DATA STRUCTURES

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T33	Data Structures	3	1	0

Course Objectives:

- To introduce the primary data structures and the associated operations
- To understand the applications of data structures with case studies
- To learn the implementation issues of the data structures introduced

Course Outcomes:

On successful completion of this course students will be able to:

- Use appropriate data structures in programming
- Learn various ways of implementing the data structures

Unit I **(12 Periods)**

Basics : Abstract Data Type(ADT) – introduction to data structures – representation - implementation

Stack and list: representing stack – implementation – application – balancing symbols –conversion of infix to postfix expression – evaluating a postfix expression – recursive function call – Linked list ADT – implementation using arrays – limitations - linked list using dynamic variables- linked implementation of stacks – circular list – doubly linked lists

Unit II **(12 Periods)**

Queues: Queue abstract data type - Array implementation – circular queue - linked list implementation of queues – priority queues – double ended queues – multiple stacks and queues - application.

Unit III **(12 Periods)**

Trees : General trees – binary tree – traversal methods – expression trees – game trees. Binary search trees – AVL trees – Splay trees – B Trees – B^+ Trees – Tries – application.

Unit IV **(12 Periods)**

Sorting: O notation – efficiency of sorting – bubble sort – quick sort – selection sort – heap sort – insertion sort – shell sort – merge sort – radix sort.

Unit V **(12 Periods)**

Hashing: Introduction **–** Hash function – methods - Hash table implementation - rehashing.

Graph: Directed and un directed graph – representation of graphs – graph traversals: Depth first search – Breadth first search – transitive closure – spanning trees – application - topological sorting.

(Total: 60 Periods)

Content beyond Syllabus:

1. Advanced data structures and their implementation.
2. Implementation of the data structures in different language platforms.

Text Books:

1. Mark Allen Weiss, Data structures and algorithm analysis in C++, Pearson Education, 6th edition, 2011
2. YedidyahLangsam, Moshe J Augenstein and Aaron M Tanenbaum, Data Structures using C and C++, 2nd edition, Prentice Hall of India, 2009.

Reference Books:

1. G.A.V.Pai, Data Structures and Algorithms – Concepts, Techniques and Applications, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
2. Ellis Horowitz and SartajSahni, Fundamentals of Data structures, Galgotia Publications, 2nd Edition, New Delhi, 2001.
3. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft. Data Structures and Algorithms. Addison Wesley, 1983

Websites:

- **http://www.cs.sunysb.edu/~skiena/214/lectures/**
- **http://opendatastructures.org/**
- **http://www.cplusplus.com/doc/tutorial/structures/**

IT-T34 OBJECT ORIENTED PROGRAMMING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T34	Object Oriented Programming	3	1	0

Pre-requisite: Structured Programming Language C

Course Objectives:

1. To understand the concepts of object-oriented programming and master OOP using C++.

Course Outcomes:

On successful completion of this course students will be able to:

1. Analyze and design a problem using an object-oriented approach.
2. Implement the problem using C++ programming Language.

Unit I

Object oriented programming - concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance – abstract classes – polymorphism. Introduction to C++ – classes – access specifiers – function and data members – default arguments – function overloading – friend functions – const and volatile functions - static members – Objects – pointers and objects – constant objects – nested classes – local classes

Unit II

Constructors – default constructor – Parameterized constructors – Constructor with dynamic allocation – copy constructor – destructors – operator overloading – overloading through friend functions – overloading the assignment operator – type conversion – explicit constructor

Unit III

Function and class templates - Exception handling – try-catch-throw paradigm – exception specification – terminate and Unexpected functions – Uncaught exception.

Unit IV

Inheritance – public, private, and protected derivations – multiple inheritance - virtual base class – abstract class – composite objects Runtime polymorphism – virtual functions – pure virtual functions – RTTI – typeid – dynamic casting – RTTI and templates – cross casting – down casting .

Unit V

Streams and formatted I/O – I/O manipulators - file handling – random access – object serialization – namespaces - std namespace – ANSI String Objects – standard template library.

(Total : 60 Periods)

Content beyond Syllabus:

1. Implementation of the design patterns to the solution of programming problems.

Text Books:

1. B.Trivedi, “Programming with ANSI C++”, Oxford University Press, 2007.

Reference Books:

1. Ira Pohl, “Object Oriented Programming using C++”, Pearson Education, Second Edition Reprint 2004..
2. S. B. Lippman, JoseeLajoie, Barbara E. Moo, “C++ Primer”, Fourth Edition, Pearson Education, 2005.
3. B. Stroustrup, “The C++ Programming language”, Third edition, Pearson Education,2004.
4. D. S. Malik, C++ Programming: From Problem Analysis to Program Design, 2012
5. E. Balaguruswamy,ObjectOriented Programming with C++,6th edition, TMH,2013.

Websites:

1. http://www.cplusplus.com

IT-T35 DIGITAL SYSTEM DESIGN

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T35	Digital System Design	3	1	-

Pre-requisite: Basic Electronics

Course Objectives:

- To apply knowledge of number systems, codes and Boolean algebra to the analysis and design of digital logic circuits.
- To identify, formulate, and solve engineering problems in the area of digital logic circuit design.
- To use the techniques, skills, and modern engineering tools such as logic works and VHDL, necessary for engineering practice.
- To design a digital system, components or process to meet desired needs within realistic constraints

Course Objectives:

- To apply knowledge of number systems, codes and Boolean algebra to the analysis and design of digital logic circuits.
- To identify, formulate, and solve engineering problems in the area of digital logic circuit design.
- To use the techniques, skills, and modern engineering tools such as logic works and VHDL, necessary for engineering practice.
- To design a digital system, components or process to meet desired needs within realistic constraints

UnitI–Number Systems and Boolean Algebra (12 Periods)

Revision of logic gates – Binary number systems and conversion-Binary arithmetic-Binary codes-Boolean algebra - Basic operations-Basic Theorems - Boolean functions – Canonical forms - Simplification of Boolean functions – Karnaugh maps-Tabulation method.

UnitII–Combinational Logic (12 Periods)

Adders – subtractors– code converters – binary parallel adder –decimal adder – magnitude comparator –encoders–decoders–multiplexers–demultiplexers-BinaryMultiplier–Parity generator and checker.

UnitIII–Sequential Logic I (12 Periods)

Sequentialcircuits:latches–flipflops–analysisofclockedsequentialcircuits–statereduction and assignments - RegistersandCounters:Registers–shiftregisters–ripplecounters–synchronouscounters–ringcounters–up/downcounters–moduluscounters.

UNITIV –Sequential Logic II (12 Periods)

Memory and Programmable Logic: Random Access Memory–memory decoding–error detection and correction–ReadOnlyMemory–ProgrammableLogicArrays–ProgrammableArrayLogic.AsynchronousSequentialLogic:Analysisprocedure–circuitswithLatches–Designprocedure–Reduction of state and Flow tables–Race-Free state assignment–Hazards.

UNITV-Introduction to Verilog Hardware Description Language (12 Periods)

Introduction–HDLforcombinationalcircuits–Sequentialcircuits–Registersandcounters–HDLdescriptionforbinarymultiplier.

(Total : 60 Periods)

Content beyond Syllabus:

Design of ALU and simple computer logic

TEXT BOOKS

1. M.MorrisMano,DigitalDesign,$_{4}^{th}$edition,Prentice-HallofIndiaPvt. Ltd.,2006.

Reference Books:

1. ThomasL.Floyd,R.P.Jain,DigitalFundamentals,10thedition,PearsonEducation, 2008.
2. LeachMalvino,DigitalPrinciplesandApplications,5thedition,TataMcGrawHill,2005.
3. CharlesH.Roth,Fundamentalsof LogicDesign,5thedition,ThomsonBrooks/cole.2003.
4. ThomasCBartee,ComputerArchitectureandLogicDesign,McGrawHill,Singapore,2002.
5. T.R.Padmanabhan,DesignthroughVerilogHDL,Wiley-IEEEPress,2003.

IT-T36 COMPUTER ORGANIZATION

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T36	Computer Organization	3	1	-

Pre-requisite: Fundamentals of Boolean logic, combinational and sequential circuits

Course Objectives:

1. To understand the basic operation of a computer
2. To understand the design and organization of a Von-Neumann computer system.
3. To comprehend the importance of the hardware-software interface.

Course Outcomes:

1. Can be familiar with the Von Neumann architecture, parallel, pipelined, superscalar, and RISC/CISC architectures.
2. Can analyze the cost -performance issues and design tradeoffs in designing and constructing a computer processor including memory.
3. Can be familiar with the basic knowledge the design of digital logic circuits and apply to computer organization.

Unit I BASIC STRUCTURE OF COMPUTERS **(12 Periods)**

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface –Instruction set architecture – Addressing modes – RISC – CISC. ALU design – Fixed point and floating point operations.

Unit II BASIC PROCESSING UNIT **(12 Periods)**

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Nano programming

.**Unit III** PIPELINING **(12 Periods)**

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations– Performance considerations-Exception handling.

Unit IV MEMORY SYSTEM **(12 Periods)**

Basic concepts–Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache performance – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices

Unit V I/O SYSTEMS (12 Periods)

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

(Total: 60 Periods)

Text Book:

1. Carl Hamacher, ZvonkoVranesic And SafwatZaky, Computer Organization, Fifth Edition, Tata McGraw Hill, 2002.

Reference Books:

1. Charles H. Roth, Jr., Fundamentals of Logic Design, Fifth Edition, Jaico Publishing House, 2003.

2. William Stallings, Computer Organization and Architecture – Designing for Performance, Sixth Edition, Pearson Education, 2003.

3. David A. Patterson And John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface‖, Third Edition, Elsevier, 2005.

4. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 1998.

IT-P31 DATA STRUCTURES LAB

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P31	DATA STRUCTURES LAB	0	0	3

Course Objectives:

1. To introduce the basics of C++ programming language.
2. To introduce the concepts of ADTs.
3. To introduce the concepts of Hashing and Sorting.
4. Solving various problems using techniques introduced in this course
5. Analyze the algorithm's / program's efficiency in terms of time and space complexity

Course Outcomes:

On successful completion of this practical's students will be able to:

1. Solve any given problem by identifying appropriate Data Structure
2. Evaluate program's efficiency in terms of time and space complexity

Exercises:

1. Programs using C++ concepts like
   - classes & objects
   - Constructors & Destructors
   - Function Overloading
   - Inheritance
   - Operator overloading
   - Polymorphism & virtual functions
   - I/O streams
   - File operations.
   - Templates
   - Exception handling (to be included in all problems)
   - String operations

2. Programs related to data structures using C++
   - Implementation of Sorting techniques
   - Implementation of Searching techniques
   - Implementation of stack and queue operations using linked list and array.
   - Expression evaluation
   - Polynomial addition
   - Sparse matrix addition
   - Binary tree representation and traversal techniques
   - Binary search trees
   - Graph representation and traversal techniques
   - Single source shortest path algorithm
   - Hashing and collision resolution techniques
   - AVL Trees

Content beyond Syllabus:

1. Analyze program's efficiency in terms of time and space complexity

Text Books:

3. Mark Allen Weiss, Data structures and algorithm analysis in C++, Pearson Education, 6th edition, 2011
4. YedidyahLangsam, Moshe J Augenstein and Aaron M Tanenbaum, Data Structures using C and C++, 2nd edition, Prentice Hall of India, 2009.

Reference Books:

1. G.A.V.Pai, Data Structures and Algorithms – Concepts, Techniques and Applications, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
2. Ellis Horowitz and SartajSahni, Fundamentals of Data structures, Galgotia Publications, 2nd Edition, New Delhi, 2001.
3. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft. Data Structures and Algorithms. Addison Wesley, 1983

Websites:

1. http://www.cs.sunysb.edu/~skiena/214/lectures/
2. http://cse.yeditepe.edu.tr/~odemir/spring2012/cse211/analysis.pdf

IT-P32 ELECTRONIC DEVICES AND CIRCUITS LAB

Subject Code	Subject Name	Lectures (Periods)	Tutorial (Periods)	Practical (Periods)
IT-P32	ELECTRONIC DEVICES AND CIRCUITS LAB	0	0	3

Course Objectives:

1. Introduce the basic concepts of various electronic circuits.
2. To study the performance of various types of feedback amplifiers.
3. To analyze and test the performance of small signal and large signal amplifiers.
4. To test and examine the applications of operational amplifiers.

Course Outcomes:

On successful completion of the lab classes students will be able to,

1. Conceptually and fully aware of the basic concepts, techniques and applications of electronic circuits.
2. To enhance their technical skills through analyzing the waveforms obtained at various stages of the circuit.
3. Carry out design of the various electronic circuits suitable for a specific application.

Experiment List:

- VI characteristics of semiconductor diodes.
- Diode clipping and clamping circuits.
- Characteristics of CB transistor configuration.
- Input and Output characteristics of CE transistor configuration.
- Characteristics of FET, Determination of drain resistance, mutual conductance and amplification factor.
- Feedback amplifier, To determine the frequency response with and without feedback.
- Hartley oscillator and Wein-bridge oscillator.
- Class B push-pull power amplifier.
- Applications of OP-Amps - Adder, Subtractor, Integrator and Differentiator.
- Active low pass and high pass filters using OP-AMP.

Text Books:

1. Jacob Millman and C. Halkias, Satya brataJit, Electronic Devices and circuits, Second edition, McGraw Hill Publications, 2007.
2. Jacob Millman and Arvin Grabel, Micro-Electronics, McGraw Hill, Fifth edition, 2008.

Reference Books:

1. Robert L.Boylestad and Louis Neshelsky, Electronic devices and circuit theory, Prentice-Hall India, 2008.

IT-P33 DIGITAL LAB

Subject Code	Subject Name	Lectures (Periods)	Tutorial (Periods)	Practical (Periods)
IT-P33	DIGITAL LAB	0	0	3

Course Objectives:

1. To perform fundamental operations on digital circuits.
2. To apply the concepts of basic combinational logic circuits, sequential circuit elements, and programmable logic in the laboratory setting.
3. To design the combinational and sequential circuits using Verilog Hardware Description Language (VHDL)

Course Objectives:

- To apply knowledge of number systems, codes and Boolean algebra to the analysis and design of digital logic circuits.
- To identify, formulate, and solve engineering problems in the area of digital logic circuit design.
- To use the techniques, skills, and modern engineering tools such as logic works and VHDL, necessary for engineering practice.
- To design a digital system, components or process to meet desired needs within realistic constraints

List of Experiments:

1. Implementation of logic circuits using gates
   - Full adder/full subtractor
   - Implementation of logic functions using universal gates only
   - Code converters
   - Parity generator and Checker
   - Design of priority encoder
   - Implementation of Boolean functions using MUX
   - Design of decoder, Demultiplexer.
2. Implementation of circuits using MSI
   - Synchronous counters
   - Asynchronous counters
   - Binary multiplier
   - Decimal Adder
   - Universal shift register
   - Design of Arithmetic unit
3. Interface experiments with MSI
   - Interface of ALU with memory
4. Design and Implementation of combinational circuits using Verilog Hardware Description Language (VHDL)
   - Combinational circuits – Adder/ Subtractor, Binary multiplier
   - Sequential circuits – Flip flops, counters.

Text Books:

1. Morris Mano, Digital Design, Third Edition, Pearson Education, 2002.
2. Carl Hamacher, ZvonkoVranesic And SafwatZaky, Computer Organization, Fifth Edition, Tata McGraw Hill, 2002**.**

Reference Books:

1. Charles H. Roth, Jr., Fundamentals of Logic Design, Fifth Edition, Jaico Publishing House, 2003.
2. William Stallings, Computer Organization and Architecture – Designing for Performance, Sixth Edition, Pearson Education, 2003.
3. David A. Patterson And John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface‖, Third Edition, Elsevier, 2005.
4. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 1998.

MA-T41 MATHEMATICS-IV

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
MA-T41	Mathematics-IV	3	1	0

Course Objectives:

1. Importance of problems in Partial Differential Equations
2. Problem solving techniques of PDE
3. To make the students knowledgeable in the areas of Boundary Value Problems like vibrating string (wave equation), heat equation in one and two dimensions.
4. To acquaint the students with the concepts of Theory of sampling.

Course Outcomes:

On successful completion of the module students will be able to:

1. Understand the different types of PDE and will be able to solve problems occurring in the area of engineering and technology.
2. Know sampling theory and apply to solve practical problems in engineering and technology.

UNIT I – PARTIAL DIFFERENTIAL EQUATIONS:

Formation by elimination of arbitrary constants and arbitrary functions – General, singular, particular and integrals – Lagrange's linear first order equation – Higher order differential equations with constant coefficients

UNIT II: Solution of partial differential equation by the method of separation of variables – Boundary value problems – Fourier series solution – Transverse vibration of an elastic string.

UNIT III: Fourier series solution for one dimensional heat flow equation – Fourier series solutions for two dimensional heat flow equations under steady state condition – (Cartesian and Polar forms).

UNIT IV – APPLIED STATISTICS

Curve fitting by the method of least squares – fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large samples test for single proportions, differences of proportions, single mean, difference of means and standard deviations.

UNIT V: Small samples – Test for single mean, difference of means and correlations of coefficients, test for ratio of variances – Chi-square test for goodness of fit and independence of attributes.

TOTAL PERIODS: 60

Text Books:

1. Venkataraman M. K, "Engineering Mathematics, Third year Part A& B", 12th Edition, The National Publishing Company, Madras 1996.
2. S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and sons, 1975.

Reference Books:

1. Kandasamy P. et al, Engineering Mathematics, Vol. II & III, S. Chand & Co., New Delhi, 2012.
2. Grewal B.S., Higher Engineering Mathematics, 40th Edition, Khanna Publishers, Delhi 2007.
3. Bali N.P., Manish Goyal, " Engineering Mathematics, 7th Edition, Laxmi Publications, 2007.
4. Erwin Kreyszig, Advanced Engineering Mathematics, 7th Edition, Wiley India, 2007.
5. Ray Wylie C. , Advanced Engineering Mathematics, 6th Edition, Tata McGraw Hill, 2003

IT-T42 COMMUNICATION ENGINEERING-I

Subject Code	Subject Name	Lectures (Periods)	Tutorial (Periods)	Practical (Periods)
IT-T42	**Communication Engineering-I**	**3**	**1**	**0**

Course Objectives:

1. To introduce the basics of electronic communication s
2. To introduce different analog modulation systems.
3. To introduce the operation of modulator and demodulator for different analog modulation systems.
4. To explore the use of pulse modulation system
5. To introduce the techniques of digital modulation .

Course Outcomes:

On successful completion of the course students:

1. Will be clear with the concepts of different analog modulation systems
2. Will understand the need for pulse modulation systems
3. Will have a clear idea on concept and applications of digital modulation systems

Unit I: Amplitude Modulation Systems (12 Periods)

External and internal noise - Noise figure - Need for modulation - Amplitude modulation –Frequency spectrum of AM wave – Representation of AM – Power relation – Generation of AM waves –Balanced modulators – Suppression of carrier – DSB and SSB –Demodulation of AM waves – Synchronous and envelope detectors.

Unit II: Angle Modulation System (10 Periods)

Frequency modulation and phase modulation – Mathematical representation of FM – Frequency spectrum of FM wave – Generation of FM wave – Direct and Indirect methods – Demodulation of FM waves – Slope detector – Balanced slope detector – Foster-Seeley discriminator – Ratio detector.

Unit III: Transmitters and Receivers (10 Periods)

Low level and high level AM transmitters – FM transmitter – Super heterodyne AM receiver – Receiver characteristics - Communication receiver – Diversity reception – FM receivers.

Unit IV: Pulse Modulation (9 Periods)

Principles of pulse modulation – sampling theorem, PAM – PWM – PPM— Generation of PAM, PPM and PWM waves – Demodulation of PAM, PWM and PPM. Principle of Pulse code modulation - elements of PCMsystem-Delta modulation and DPCM-transmitter and receiver

Unit V: Digital Communication (9 Periods)

Principle of ASK- Transmitter and receiver for coherent BPSK, BFSK and QPSK- Principle of QAM - transmitter and receiver for 8- QAM and 8-PSK. Basic principle of M-ary PSK and M-ary FSK.Bandwidth efficiency and error performance **c**omparisons of PSK, FSK and QAM (detailed derivations not required)

(Total:60 periods)

Content beyond the Syllabus:

Students will be motivated to visit the websites of AIR and Doordharshan and understand the practical frequency assignment, broadcast power level and coverage area of all the Indian radio and TV stations

Text Books:

1. George Kennedy and Bernard Davis, Electronic Communication Systems, Fourth edition, Tata Mc Graw Hill, 2008.
2. Simon Haykin, Communication Systems, Fourth edition, Wiley, 2013

Reference Books:

1. Wayne Tomasi, Electronic Communication Systems, Fifth edition, Pearson Education, 2008.
2. D. Roddy and Coolen , Electronic Communications, Fourth edition, Pearson Education, 2008.

Website:

1. http://drdo.gov.in/drdo/labs/LRDE/English

IT-T43 DESIGNANDANALYSISOFALGORITHMS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T43	Design and Analysis of Algorithms	3	1	0

Course Objectives:

1. To introduce the fundamental strategies of different algorithm design techniques.
2. Solving various problems using techniques introduced in this course.
3. Analyze the algorithm's / program's efficiency in terms of time and space complexity.

Course Outcomes:

On successful completion of this course students will be able to:

1. Analyze / compare the given algorithm.
2. Compute the time complexity/space complexity of any recursive/non recursive algorithms.
3. Solve any given problem using the fundamental design techniques.

Unit: I **(12 Periods)**

Introduction: what is an Algorithm – contradiction- mathematical induction -Efficiency of algorithms – average and worst-case – the order of - asymptotic notation.

Analysis Of Algorithms: Analyzing control structures – solving recurrences – homogeneous recurrences – inhomogeneous recurrences.

Unit: II **(12 Periods)**

Divide And Conquer Method: General method - Binary search – finding maximum and minimum - merge sort – quick sort – strassen's matrix multiplication.

Greedy Method: General method - Knapsack problem – job sequencing with deadlines - Prim's algorithm – Kruskal's algorithm – optimal storage on tapes – optimal merge patterns - Dijkstra's algorithm.

Unit: III **(12 Periods)**

Dynamic Programming: General method –Principle of optimality – multi stage graph - all pairs shortest paths - Warshall's and Floyd's algorithms – optimal binary search tree – 0 / 1 knapsack problem – traveling salesman problem

Unit: IV **(12 Periods)**

Tree traversals: Depth first search – articulation points – breadth first search

Backtracking: General method - n queen's problem – sum of subsets – graph coloring – Hamiltonian cycle – knapsack problem

Unit: V **(12 Periods)**

Branch And Bound: Least Cost search – 15 puzzle – control abstractions for LC search – bounding – FIFO Branch and bound – LC branch and Bound - Knapsack problem: LC branch and bound – FIFO branch and bound solutions – Traveling salesman problem – assignment problem

(Total : 60 Periods)

Content beyond Syllabus:

1. Algebraic problems
2. NP Hard and NP complete problems
3. Approximation Algorithms

Text Books:

1. Gilles Brassard and Paul Brately, Fundamentals of Algorithmics, Prentice Hall of India, 1997.
2. AnanyLevitin, Introduction to Design and Analysis of Algorithms, Pearson Education Inc., 2005.
3. Ellis Horowitz, SartajSahni and S. Rajasekaran, Fundamentals of Computer Algorithms , Galgotia Publications, 2nd Edition, New Delhi, 2003.

Reference Books:

1. Aho.A.V, Hopcroft.J.E and Ullman.J.D, Design and analysis of Algorithms, Pearson education, 3rd edition, 2000.
2. Thomas.H.Cormen, Charles E. Leiserson, Ronald L.Rivest, Introduction to Algorithms, Prentice Hall of India Pvt. Ltd, 1998.

Websites:

1. *www.algo-class.org/*
2. http://nptel.iitm.ac.in/video.php?subjectId=106101060
3. http://www.freetechbooks.com/design-and-analysis-of-algorithms-course-notes-t349.html
4. http://www.cse.iitd.ernet.in/~ssen/csl356/notes/root.pdf

IT-T44 MICROPROCESSORS AND MICROCONTROLLERS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T44	Microprocessors and Microcontrollers	3	1	0

Pre-requisite:
Digital Electronics and Computer Architecture

Course Objectives:

1. To understand the architectures and the instruction set of 8085 microprocessor
2. To understand the architectures and the instruction set of 8086 microprocessor
3. To understand the architectures and the instruction set of 8051 microcontroller
4. To learn the assembly language program using 8085, 8086 and 8051 instruction set
5. To learn interfacing of microprocessors and microcontrollers with various peripheral

Course Outcomes:

On successful completion of this course students will be able to:

1. Understanding the inner working components of the microprocessor and microcontrollers
2. Developing assembly language program using 8085 instruction set
3. Developing assembly language program using 8086 instruction set
4. Developing assembly language program using 8051 instruction set
5. Developing various I/O programs for 9085, 8086 and 8051

Unit: I

Intel 8085 Microprocessor: Introduction - Need for Microprocessors – Evolution – Intel 8085 Hardware - Architecture – Pin description - Internal Registers – Arithmetic and Logic Unit – Control Unit – Instruction word size - Addressing modes – Instruction Set – Assembly Language Programming - Stacks and Subroutines - Timing Diagrams. Evolution of Microprocessors – 16-bit and 32-bit microprocessors.

Unit II

Intel 8085 Interrupts and DMA: 8085 Interrupts – Software and Hardware Interrupts – 8259 Programmable Interrupt Controller - Data Transfer Techniques – Synchronous, Asynchronous and Direct Memory Access (DMA) and 8237 DMA Controller- 8253 Programmable Interval Timer.

Unit III

Memory & I/O Interfacing: Types of memory – Memory mapping and addressing – Concept of I/O map – types – I/O decode logic – Interfacing key switches and LEDs – 8279 Keyboard/Display Interface - 8255 Programmable Peripheral Interface – Concept of Serial Communication – 8251 USART – RS232C Interface.

Unit IV

Intel 8086 Microprocessor: Introduction-Intel 8086 Hardware – Pin description – External memory Addressing – Bus cycles – Interrupt Processing. Addressing modes - Instruction set – Assembler Directives.

Unit V

Microcontroller: Intel 8051 Microcontroller: Introduction – Architecture – Memory Organization – Special Function Registers – Pins and Signals – Timing and control – Port Operation – Memory and I/O interfacing – Interrupts – Instruction Set and Programming.

(Total : 60 Periods)

Content beyond Syllabus:

Study of Multi-core Architecture and Programming
Study of Intel i5 processor

Text Books:

1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming and Applications with 8085", Penram International Publications, Fifth Edition,2002.
2. Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2008.
3. N. Senthil Kumar, M Saravanan and S. Jeevananthan, "Microprocessors and Microcontrollers", Oxford University Press, 2010.

Reference Books:

1. A. P. Godse and D.A Godse, "Microprocessors and Microcontrollers", Technical Publications, Fourth Edition, 2008.
2. Barry B. Brey, "The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386 and 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III Pentium 4 – Architecture, Programming and Interfacing, 7th Edn., PHI, 2008.
3. Ajay V Deshmukh, "Microcontrollers – Theory and Applications", Tata McGraw-Hill, Seventh Edition, 2007.

Websites:

1. http://infocenter.arm.com/help/index.jsp?topic=/com.arm.doc.dai0211a/index.html
2. http://www.arm.com/products/processors/classic/arm7/index.php
3. http://infocenter.arm.com/help/index.jsp?topic=/com.arm.doc.dai0211a/index.html
4. **http:// www.embeddedindia.com/**

IT-T45 JAVA PROGRAMMING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T45	Java Programming	3	1	---

Pre-requisite: Object Oriented Programming

Course Objectives:

1. To understand the basics of Java
2. To learn the features of Java
3. To learn the advanced concepts in Java.

Course Outcomes: Students will understand the benefits and capabilities of Java.

Unit: I

Creation of Java, importance of Java to internet, byte code, Java buzzwords, data types, declaring variables, dynamic initialization, scope and life time of variables, arrays, operators, control statements, type conversion and casting, compiling and running of simple Java program. Concepts of classes and objects, class fundamentals Declaring objects, assigning object reference variables, introducing methods, constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing - call by value, recursion, nested classes and inner classes, exploring the String class.

Unit: II

Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

Unit: III

Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes, Concepts of Multithreading, differences between process and thread, thread life cycle ,creating multiple threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks, thread groups.

Unit: IV

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

AWT : Concepts of components, container, panel, window, frame, canvas, Font class, Color class and Graphics.

Applets - Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Unit: V

RMI- JDBC- Developing Java Program for RMI and JDBC.

(Total : 60 Periods)

Content beyond Syllabus:

Java's support in graphics, networking, web technology etc.

Text Books:

1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi.
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons.

Reference Books:

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.

Websites:

1. http://www.ibm.com/developerworks/java/
2. http://docs.oracle.com/javase/tutorial/rmi/.
3. IBM's tutorials on Swings, AWT controls and JDBC.

IT-T46 SYSTEM SOFTWARE

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T46	**System Software**	3	1	0

Pre-requisite:
Knowledge in C Programming, Assembly languages, Discrete mathematics and data structures.

Course Objectives:
1. Understand the design and implementation of Assemblers, loaders, linkers and compilers.
2. Understand how source language programs are implemented at the machine level.
3. Understand compilation as an instance of language translation.

Course Outcomes:
On successful completion of this course students will be able to:
1. To use of formal attributed grammars for specifying the syntax and semantics of programming languages.
2. Have in depth Working knowledge of the major phases of Loading linking and compiling.
3. To design and implement a significant portion of a compiler for a language chosen by the instructor.

Unit: I

Introduction to System Software and Machine architecture – Simplified Instructional Computer (SIC)- Traditional machines-VAX Architecture-Pentium Pro Architecture- RISC machines.

Unit: II

Assemblers: Basic assembler functions- machine – dependent and machine independent assembler features - Assembler design – Two-pass assembler with overlay structure- one – pass assembler and multi - pass assembler.
Interpreters: Virtual Machine concept- Java Byte Codes- Microsoft Intermediate Language

Unit: III
Loaders and Linkers: Basic loader functions, machine – dependent and machine – independent loader features. Loader design – Linkage editors, dynamic linking and bootstrap loaders.

Unit: IV

Macro Processors: Functions – Machine independent macro processor features – macro processor design option- Implementation examples.

Unit: V

Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria**.** - Introduction to Compilers -Analysis of the source program - The phases-of Compiler.

(Total: 60 Periods)

Content beyond Syllabus:
1. Implementation examples on Assemblers – MASM, SPARC and AIX.
2. Implementation examples on Linkers- MSDOS, SunOS and CRAY MPP.
3. Implementation examples on Compilers- SunOS, GNU NYA Ada Translator, Java compiler and YACC Compiler-compiler.

Text Books:
1. Leland L Beck and D. Manjula, "System Software",III Edition, Pearson Education , First Impression, 2007.
2. John J Donovan, Systems Programming, Tata McGraw Hill Company, New Delhi, 2004.
3. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques, & Tools, 2nd edition Addison-Wesley, 2006.

Reference Books:
1. Dhamdhere D M, Systems Programming and Operating Systems, Tata McGraw Hill Company, New Delhi, 2002.
2. David Galles, Modern Compiler Design, Addison Wesley, 2004.

Websites:
1. http://www.edunotes.in/system-software-notes
2. http://www.uotechnology.edu.iq/sweit/Lectures/Dr-Shaima-Sys-Prog/lec1-2-3-4.pdf

IT-P41 ALGORITHMS LAB

Subject Code	Subject Name	Lectures Periods)	Tutorials (Periods)	Practical (Periods)
IT-P41	Algorithms Lab	0	0	3

Course Objectives:

- To introduce the implementation of various design techniques using C and C++.

Course Outcomes:

On successful completion of this course, the students will be able to:

- Learn to implement the complex tasks using various design techniques.

Programs to implement the following :

1. Quick sort using divide and conquer
2. Merge sort using divide and conquer
3. Prim's algorithm
4. Kruskal's algorithm
5. Dijikstra's algorithm
6. Optimal binary search tree
7. TSP using dynamic programming.
8. N-queens problem using backtracking.
9. Sum of subsets using backtracking.
10. Graph coloring using backtracking.
11. Hamilton Cycle using backtracking.
12. Knapsack using branch and bound.

Content beyond Syllabus:

1. Advanced data structures and their implementation
2. Implementation of the data structures in different language platforms

Text Books:

1. Robert Sedgewick, Algorithms in C , 3rd Edition, PHI, 2007.

Reference Books:

1. Brian W Kernighan and Dennis M. Ritche, C Programming Language, PHI, 2005.

Websites:

1. http://www.cse.iitd.ernet.in/~ssen/csl356/root.pdf

IT-P42 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P42	Microprocessors and Microcontrollers Laboratory	0	0	3

Pre-requisite:
Digital Electronics and Computer Architecture

Course Objectives:

1. To understand the architectures and the instruction set of 8085 microprocessor
2. To understand the architectures and the instruction set of 8086 microprocessor
3. To understand the architectures and the instruction set of 8051 microcontroller
4. To learn the assembly language program using 8085, 8086 and 8051 instruction set
5. To learn interfacing of microprocessors and microcontrollers with various peripheral

Course Outcomes:
On successful completion of this course students will be able to:

1. Understanding the inner working components of the microprocessor and microcontrollers
2. Developing assembly language program using 8085 instruction set
3. Developing assembly language program using 8086 instruction set
4. Developing assembly language program using 8051 instruction set
5. Developing various I/O programs for 9085, 8086 and 8051

LIST OF EXPERIMENTS
Experiment Using 8085 Microprocessor

1. Study of 8085 Microprocessor Trainer Kit
2. 8-bit Arithmetic Operations
3. (Addition, Subtraction, Multiplication and Division)
4. Block Operations
5. (Move, Exchange, Compare, Insert and Delete)
6. Code Conversions
7. Digital Clock simulation
8. Moving Display
9. Serial Communication
10. Interrupt Programming
11. Elevator Simulation
12. Traffic Light Control

Experiments Using 8086 Microprocessor with MASM

1. Arithmetic Operations
2. Sorting and Searching

Experiments Using 8051 Microcontroller

1. Arithmetic operations
2. ADC & DAC Interfacing
3. Stepper Motor and DC Motor Interface

Content beyond Syllabus:
Multi-core Programming

Websites:

1. http://infocenter.arm.com/help/index.jsp?topic=/com.arm.doc.dai0211a/index.html
2. http://www.arm.com/products/processors/classic/arm7/index.php
3. http://infocenter.arm.com/help/index.jsp?topic=/com.arm.doc.dai0211a/index.html
4. **http:// www.embeddedindia.com/**

IT-P43 JAVA LAB

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P43	Java Lab	-	-	9

Pre-requisite: Object oriented programming

Course Objectives:

1. To understand the basics of java
2. To write programs in Java covering the object oriented concepts.
3. To write programs covering advanced concepts in java like thread handling, applets, RMI and JDBC

Course Outcomes: Students will learn how to write programs and develop projects in Java.

Develop Java programs to cover the following topics:

1. Simple Java program with one or more classes
2. Exception Handling
3. Inheritance
4. Packages
5. Interfaces
6. Event Handling
7. File Handling
8. Thread Handling
9. AWT controls/Java Swings/Struts framework
10. Applets
11. RMI
12. JDBC

Content beyond Syllabus:

Java's support in graphics, networking, web technology etc.

Text Books:

1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi.

2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons.

Reference Books:

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.

Websites:

1. http://www.ibm.com/developerworks/java/
2. http://docs.oracle.com/javase/tutorial/rmi/.
3. IBM's tutorials on Swings, AWT controls and JDBC.

PE-P44 PHYSICALEDUCATION

Physical Education is compulsory for all the Undergraduate students

1. The above activities will include games and sports/extension lectures.
2. In the above activities, the studentparticipationshallbeforaminimumperiodof45Periods.
3. The above activities will be monitored by the Director of Physical Education.

4.Pass/Failwillbedeterminedonthebasisofparticipation,attendance,performanceandbehavior.If a candidate fails, he/she has to repeat the course in the subsequent years

5. Pass in this course is mandatory for the award of degree.

IT-T51 COMMUNICATION ENGINEERING-II

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T51	Communication Engineering- II	3	1	0

Course Objectives:

1. To learn the various orbits used for satellite communication systems.
2. To understand the working principle of various satellite systems and their applications.
3. To understand the concept of spread spectrum technologies, Rake receivers and CDMA
4. To introduce the concept and operation of cellular mobile communication and to introduce various cellular standards
5. To learn the need for fiber optics communication and the operation of fiber optic communication system.

Course Outcomes:

On successful completion of this course students will be able to:

1. Understand the operation of various types of communication systems
2. Understand the application of various types of communication systems

UNIT I **(12 Periods)**

Satellite Communication systems: Satellite Orbits, launch vehicles, look angles, satellite parameters, satellite link model and link budget calculations, satellites used for mobile networks and personal communication systems-GPS services.

UNIT II **(12Periods)**

Spread Spectrum Communication: Introduction-PN sequences-Direct sequence spread spectrum systems-Frequency hopping spread spectrum systems- slow and fast frequency hopping- RAKE receivers-principle of code division multiple access-applications.

UNIT III (12 Periods)

Cellular Mobile Communication concepts: Basic cellular concept-frequency reuse-interference-uniqueness of mobile radio environment - Performance metrics in cellular system-Elements of cellular mobile radio-Handoff-Frequency management and channel assignment-concepts of cell splitting and cell sectoring

UNIT IV **(12 Periods)**

Mobile Communication systems and standards : Second Generation systems- Global System for Mobile Communication (GSM) – architecture-channels-radio resource, mobility, communication and network management – IS-95 standard- CDMA frequency and channel allocations- CDMA traffic channels- radiated power - GPRS – architecture and services- principle of EDGE- Third Generation systems- UMTS network architecture- UTRAN architecture- basic principles of cdma2000

UNIT V **(12 Periods)**

Optical fiber communication Systems: Need for fiber optics, introduction to optical fiber, principle of light transmission through a fiber, fiber characteristics and classification, various fiber losses– Light sources and photo detectors -Block diagram of fiber optic system- Power budget analysis for an optical link-Recent applications of fiber optics.

(**Total: 60 Periods**)

Content beyond Syllabus:

To implement a wireless link and study its performance using computer programs

Text Books:

1. Wayne Tomasi, Electronics Communication systems, Pearson Education, Fifth edition, 2008.

2. William C.Y. Lee, Wireless and Cellular Telecommunications, McGraw Hill, Third edition,2006.

Reference Books:

1. D.Roddy, Satellite Communications,Tata Mc Graw Hill , Fourth Edition, 2009.
2. T.S. Rappaport, Wireless Communication, Pearson education, second edition, 2010
3. Simon Haykin, Communication Systems, Fourth edition, Wiley, 2013
4. GerdKeiser, Optical fiber Communications, McGraw Hill , Fifthedition, 2013.
4. T.Prattand ,C.W.Bostain, Satellite Communication, John Wiley and Sons, Second edition, 2006

Websites:

1. www.globecommsytems.com/wireless
2. www.opticsexpress.org
3. www.lightreading.com

IT-T52 SOFTWARE ENGINEERING

Subject Code	Subject Name	Lectures (Periods)	Tutorial (Periods)	Practical (Periods)
IT-T52	**Software Engineering**	3	1	0

Course Objectives:

1. To learn, practice and apply the software engineering industry practices.
2. To acquire knowledge on the various techniques, tools and models for each of the phases of software development.

Course Outcomes:

1. Ability to apply basic knowledge and understanding of the analysis, synthesis and design of complex systems
2. Develop, maintain and evaluate large-scale software systems
3. Produce efficient, reliable, robust and cost-effective software solutions

Syllabus:

UNIT I

Introduction to Software Engineering: The Software Engineering Discipline – Evolution and Impact – Software Development projects – Emergence of Software Engineering – Computer System Engineering **Software Life Cycle Models:** classic Waterfall model – Iterative Lifecycle model – prototyping model – Evolutionary model – spiral model – Comparison of Life cycle models.

UNIT II

Software Project Management: Responsibilities of a Software Project Manager – Project Planning – Metrics for Project Size Estimation – Empirical Estimation Techniques – COCOMO – Halstead's Software Science – Staffing Level Estimation – Scheduling – Organization and Team structures – Staffing – Risk Management – Software Configuration Management
Requirements Analysis and Specification: Requirements Gathering and Analysis – Software Requirements specification – Formal System Specification – Axiomatic Specification - Algebraic Specification – 4GL.

UNIT III

Software Design: Outcome of a Design Process – Characteristiscs of a Good Software Design – Coupling and Cohesion – Approaches to Software Design – Object Oriented Vs Function Oriented Software Design approaches
Function Oriented Software Design: Structured Analysis – Data Flow Diagrams – Applying DFD to Real time systems – Structured and Detailed Design.

UNIT IV

Coding and Testing: Coding – Software Documentation – Testing – Unit Testing – Black Box testing – White Box testing – Debugging – Program Analysis tools – Integration testing – Testing Object Oriented programs – System Testing – Issues.

UNIT V

Software Reliability and Quality : - Software Reliability – Software Quality – ISO 9000 – SEI CMM – Six Sigma.
CASE and Software Maintenance: - CASE environment – CASE support in Software Life cycle – Characteristics of CASE tools – characteristics of software maintenance – software reverse engineering – software maintenance process models.

(**Total: 60 Periods**)

Content beyond the Syllabus:

The students can be encouraged to apply concepts learnt in this course for the development / documentation of their mini project and final year project

Text Books:

1. Rajib Mall, " Fundamentals of Software Engineering", PHI Learning, Third Edition, 2013.

Reference Books:

1. Roger S. Pressman, “Software Engineering: A Practitioner's Approach”, McGraw-Hill International Edition, Seventh edition, 2009.
2. S. L. Pfleeger and J.M. Atlee, “Software Engineering Theory and Practice”, Pearson Education, Third edition, 2008.
3. PankajJalote, “An Integrated Approach to Software Engineering”, Narosa, Third edition, 2008.
4. Ian Sommerville, “Software Engineering”, Pearson Education, Eighth edition, 2008.

Websites:

1. http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IITKharagpur/SoftEngg/
2. http://www.computer.org/portal/web/swebok

IT-T53OPERATINGSYSTEMS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T53	Operating Systems	3	1	0

Course Objectives:

1. To grasp a fundamental understanding of operating systems
2. To learn the concepts and creation computer processes and threads
3. To understand memory management and virtual memory concepts in modern OS
4. To understand process concurrency and synchronization
5. Understand the concepts of data input/output, storage and file management
6. To learn the scheduling policies, memory management and file management of some commercial operating systems

Course Outcomes:

On successful completion of this course students will be able to:

1. Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.,
2. Understand how the operating system abstractions can be used in the development of application programs, or to build higher level abstractions,
3. Understand how the operating system abstractions can be implemented,
4. Understand the principles of concurrency and synchronization, and apply them to write correct concurrent programs/software,
5. Understand basic resource management techniques (scheduling or time management, space management) and principles and how they can be implemented. These also include issues of performance and fairness objectives, avoiding deadlocks, as well as security and protection.

UnitI **(12 Periods)**

Introduction:MainframeSystems-–DesktopSystems–MultiprocessorSystems–Distributed Systems–ClusteredSystems-RealTimeSystems—HardwareProtection–SystemComponents –HandheldSystems-OperatingSystemServices–SystemCalls–SystemPrograms-Process Concept–ProcessScheduling–OperationsonProcesses–CooperatingProcesses–Inter-processCommunication.

UnitII **(12 Periods)**

Threads–Overview–Threadingissues-CPUScheduling–BasicConcepts–SchedulingCriteria –SchedulingAlgorithms–Multiple-ProcessorScheduling–RealTimeScheduling-TheCritical- Section Problem –Synchronization Hardware - Semaphores– Classic problems of Synchronization –Critical regions–Monitors.

UnitIII **(12 Periods)**

System Model – Deadlock Characterization – Methods for handling Deadlocks –Deadlock Prevention – Deadlockavoidance–Deadlockdetection–RecoveryfromDeadlocks-StorageManagement –Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging -Virtual Memory – Demand Paging – Process creation – Page Replacement–Allocation of frames–Thrashing.

UnitIV **(12 Periods)**

FileConcept–AccessMethods–DirectoryStructure–FileSystemMounting–FileSharing–Protection -FileSystemStructure–FileSystemImplementation–DirectoryImplementation–AllocationMethods-Free-spaceManagement-KernelI/OSubsystems-DiskStructure–Disk Scheduling–Disk Management–Swap-Space Management.

UnitV **(12 Periods)**

Linux overview– Kernel Architecture–Process, memory, file and I/O management –Inter- process communication and synchronization–Security - Windows XP - System Architecture – System management mechanisms – Process, thread ,memory and file management– I/O subsystem–Interprocess communication–Security

(Total : 60 Periods)

Content beyond Syllabus:

1. Introduction to Multiprocessor, Network and Distributed Operating Systems.

Text Books:

1. AbrahamSilberschatz,PeterBaerGalvinandGregGagne,OperatingSystemConcepts,Seventh

Edition,JohnWiley&Sons(ASIA)Pvt.Ltd,2005.
2. Harvey M. Deitel, PaulJ. Deitel, andDavid R. Choffnes, Operating Systems,
Third Edition,Prentice Hall,2003.

Reference Books:

1. William Stallings, Operating System,PrenticeHall ofIndia,6th Edition,2009.
2. HarveyM.Deitel, Operating Systems ,SecondEdition,PearsonEducationPvt.Ltd, 2002.
3. GaryJ.Nutt,OperatingSystems: AModern Perspective, SecondEdition,Addison Wesley, 2001.
4. A.Tannenbaum.ModernOperatingSystems.2ndEdition,Prentice Hall,2001.
5. CharlesCrowley,Operating System, A Design-Oriented Approach, TataMcGraw-Hill, 1999.

Websites:

1. http://www.tcyonline.com/tests/operating-system-concepts
2. http://www.galvin.info/history-of-operating-system-concepts-textbook
3. http://www.ittestpapers.com/operating-system-concepts

IT-T54 DATABASE MANAGEMENT SYSTEMS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T54	Data Base Management Systems	3	1	0

Pre-requisite:

1. Knowledge about Memory Management
2. Programming Skills

Course Objectives:

To introduce the fundamental concepts of Database Management System to the students and to make them understand the usage of Database Management System in the current industry scenario.

Course Outcomes:

The students can be able to understand the concepts of Database Management System and to choose and design the database for the specific requirement of the project.

Unit I

Introduction: Introduction to Database Systems: Overview – Data Models – Database System Architecture – History of Database Systems. Entity-Relationship Model: Basic Concepts – Constraints – Keys – Design Issues – Entity Relationship Diagram – Weak Entity Sets – Extended E-R Features – Design of an E-R Database Schema.

Unit II

Relational Model: Structure of Relational Databases – Relational Algebra – Extended - Relational Algebra Operations – Modification of Database – Views – Tuple Relational - Calculus – Domain Relational Calculus. SQL: Background – Basic Structure – Set - Operations – Aggregate Functions – Null Values – Nested Sub-queries – Views – Complex Queries – Modification of the database –Joined Relations – Data-Definition Language.

Unit III

Integrity and Security: Domain Constraints – Referential Integrity – Assertions –Triggers – Security and Authorization – Authorization in SQL .Relational-Database Design: Normalization -First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form.

Unit IV

Storage and File Structures: Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary Storage – Storage Access – File Organization. Indexing and Hashing: Basic Concepts –Static Hashing – Dynamic Hashing.

Unit V

Transactions: Transaction concept – Transaction State – Implementation of Atomicity and Durability – Concurrent Executions – Serializability – Testing for Serializability. Concurrency Control: Lock-Based Protocols – Timestamp-Based Protocols. Recovery System: Failure Classification – Storage Structure – Recovery and Atomicity – Log-Based Recovery – Shadow Paging.

(Total : 60 Periods)

Content beyond Syllabus: The recent developments of the Database Management System and the current standards of the IT organizations have to be introduced to the students.

Text Books:

1. Silberschatz, Korth, Sudarshan, *Database System Concepts*, 6th Edition – McGraw-Hill Higher Education, International Edition, 2011.

Reference Books:

1. Fred R McFadden, Jeffery A Hoffer, Mary B. Prescott, Modern Database Management, Seventh Edition, Addison Wesley, 2004.
2. Elmasri, Navathe, Fundamentals of database Systems, Sixth Edition, Addison Wesley, 2010.
3. JefreyD.Ulman, Jenifer Widom, A First Course in Database Systems, Pearson Education Asia, 2001.
4. Bipin C Desai, An Introduction to Database Systems, Galgotia Publications Pvt Limited, 2003.

Websites:

1. http://www.database.com/
2.www.infoworld.com/t/dbms

IT-T55 THEORY OF COMPUTATION

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T55	Theory of Computation	3	1	-

Pre-requisite:
Knowledge in mathematics, including a course in Discrete mathematics, and in programming.

Course Objectives:
Learning about automata, grammar, language, and their relationships. Further, gives an understanding of the power of Turing machine, and the decidable nature of a problem. Also, gives the idea on some new trends and applications.

Course Outcomes:
Upon completion of the course, you should be able to:

1. Explain the basic concepts of deterministic and non-deterministic finite automata, regular language, context-free language, Turing machines, computability and complexity.
2. Describe the formal relationships among machines, languages and grammars.
3. Solve the problems using formal language.
4. Develop a view on the importance of computational theory.

Unit I
Finite Automata and Regular Expressions: Deterministic and Non-Deterministic Finite Automata,
Finite Automata with ε-moves, regular expressions – equivalence of NFA and DFA, two-way finite automata, Moore and Mealy machines, minimization of finite automata- applications of finite automata.

Unit II
Regular Expressions and Context Free Grammars: Regular expression formalism- equivalence with finite automata-regular sets and closure properties- pumping lemma for regular languages- decision algorithms for regular sets- applications.
Context-Free Grammars – derivation trees, Chomsky Normal Forms and Greibach Normal Forms, ambiguous and unambiguous grammars- equivalence of regular grammar and finite automata- pumping lemma for Context free languages – applications.

Unit III
Turing machines: Elements of Turing machines(TM) – tuning machine construction – complexity of TM-Universal, multi-tape, multi-track, multi-stack Turing machines –recursive and recursive enumerable languages- functions –Church's Turing hypothesis.

Unit IV
Pushdown Automata(PDA) and Parsing Algorithms: Pushdown Automata and context-free languages; Deterministic PDA-Nondeterministic PDA- Equivalence of PDA and CFG-closure properties of CFL.

Unit V
Parsing Techniques: Top down parsing- bottom up parsing- Automatic construction of bottom up parsers – LR(0) grammar – SLR parser – LR(1) grammar – Canonical-LR parser- LALR parser.

(Total :60 Periods)

Content beyond Syllabus:

1. Models of Linear bounded automata
2. Partial recursive functions and Turing machines.

Text Books:

1. Vivek Kulkarni, "Theory of Computation", Oxford University press, 2013.
2. K.L.P. Mishra and NM.Chandrasekaran, "Theory of Computer Science-Automata Languages and Computation", third edition, PHI Learning Private Ltd, 2009.
3. John E. Hopcroft and Jeffrey D. Ullman, Introduction to Automata Theory, Languages and Computation, Narosa Publishers, 2002.

Reference Books:

1. Michael Sipser, Introduction to the Theory of Computations, Brooks/Cole Thomson Learning, 1997.
2. John c. Martin, Introduction to Languages and the Theory of Computation, Tata McGraw-Hill,2003.

Websites:

1. www.infolab.stanford.edu/~ullman/ialc.html
2. www.nptel.iitm.ac.in/courses/106106049/

IT-P51 COMMUNICATION ENGINEERING LAB

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P51	Communication Engineering Lab	0	0	3

Course Objectives:

1. To understand the working of main concepts of analogue and digital communication systems.
2. To enhance technical skills through analyzing the waveforms obtained at various stages of the experiment.
3. To verify the experimentally obtained and simulated outputs and knowing the reason for the deviation.

Course Outcomes:

On successful completion of this course students will be able to:

1. Follow rapid developments in the field of communication systems.
2. Apply problem-solving skills, Recognize and utilize latest analogue and digital communication technologies.
3. Interpret and integrate diverse information sources to form a coherent understanding of the subject.

Syllabus:

1. Amplitude modulation and demodulation
2. Frequency modulation and demodulation
3. PCM encoder and decoder
4. Generation of PAM, PWM and PPM
5. Generation of ASK, FSK and PSK
6. Simulation analysis of hand off performance in cellular mobile systems
7. Simulation of satellite link budget analysis
8. Simulation of fiber optic link budget analysis
9. Simulation of various propagation models (Outdoor and Indoor)
10. Simulation of antenna radiation pattern(Horn, Parabolic reflector)

Content beyond Syllabus:

1. Students will be motivated to visit the websites of AIR and Doordharshan and understand the practical frequency assignment, broadcast power level and coverage area of all the Indian radio and TV stations.

Websites:

1. http://drdo.gov.in/drdo/labs/LRDE/English

IT-P52 OPERATING SYSTEMS LAB

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P52	Operating Systems Lab	0	0	3

Course Objectives:

1. To simulate the scheduling algorithms
2. To implement dining philophers, reader-writer's using synchronization mechanisms.
3. To learn the concept of memory management and file systems.

Course Outcomes:

On successful completion of this course students will be able to:

1. Learn the concepts of job scheduling in systems.
2. Learn event synchronization mechanisms.
3. Study the concept of memory management.

Syllabus:

1. Study of basic Unix/Linux commands.
2. Shell Programming.
3. Programs using the following systemcalls of Unix/Linux operating system:

   fork, exec, getpid, exit, wait, close, stat,opendir, readdir
4. ProgramsusingtheI/OsystemcallsofUNIXoperatingsystem(open,read,write,etc).
5. Simulations of Unix/Linux commands like ls, grep, etc.
6. Simulation of scheduling algorithms (CPUandDisk).
7. Implementation of synchronization problems using Semaphore.
8. Simulation of basic memory management schemes.
9. Simulation of virtual memory management schemes.
10. Simulation of filesystems.

Content beyond Syllabus:

1. Simulation environment for deadlock situation can be created.
2. Paging and segmentation may be included.

Websites:

1. **http://www.inf.ed.ac.uk/teaching/courses/os/prac/**
2. **http://www.scribd.com/doc/7137624/OS-Practical-File/**
3. **http://www.cl.cam.ac.uk/freshers/raspberrypi/tutorials/os/introduction.html/**

IT-P53 DATABASE MANAGEMENT SYSTEMS LABORATORY

Subject Code	Subject Name	Lectures (Periods)	Tutorial (Periods)	Practical (Periods)
IT-P53	**Database Management Systems Laboratory**	0	0	3

Course Objectives:

To familiarize students with the database systems concepts

1. To design databases for real-time applications
2. To provide students with hands-on experience to understand and to be familiar in Oracle database, SQL, Oracle Reports and Oracle Forms.
3. To understand how to administer a database system
4. To acquire knowledge of JDBC and ODBC connectivity

Course Outcomes:

1. An ability to analyze database needs and functions
2. An ability to create data models
3. An ability to create Entity-Relationship (E-R) diagrams
4. An ability to design and implement databases using database technology
5. An ability to use normalization rules and principles to create normalized databases
6. An ability to manage databases as a DBA

Experiments are to be carried out in DB2 / ORACLE and VB/ Open source DBMS package with the required front end software

1. **Study of Database Concepts**: Relational model – table – operations on tables – index – table space – view – schema – data dictionary – privilege – role – transactions.
2. **Study of SQL**: Primitive Data Types – User Defined data Types – Built-in Functions –To create, alter, drop, select, insert, delete, update, commit, rollback, save point, grant, revoke.
3. **Study of Query Types:** Queries involving Union, Intersection, Difference, Cartesian Product, Divide Operations – Sub-Queries – Join Queries – Nested Queries – Correlated Queries – Recursive Queries. .
4. **Application:** Design and develop any three of the following:
   - Library Information System
   - Logistics Management System
   - Students' Information System
   - Ticket Reservation System
   - Hotel Management System
   - Hospital Management System
   - Inventory Control
   - Retail Shop Management
   - Employee Information System
   - Payroll System
   - Any other Similar System.

Content beyond the Syllabus:

1. Conceptual designing using ERDRAW

Text Books:

1. Oracle developer handbook
2. SQL/PL/SQL for Oracle by P.S. Deshpande IIT Madras,Dream tech Press

Reference Books:

1. Elmasri, Navathe, Fundamentals of database Systems, Sixth Edition, Addison Wesley, 2010.
2. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, "Database System Concepts",McGraw-Hill International Inc., 2011.

Websites:

1. www.oracle-developer.net
2. www.oracle.com/DBA

HS-P54 GENERAL PROFICIENCY-I

Subject Code	Subject Name	Lectures (Periods)	Tutorial (Periods)	Practical (Periods)
HS-P54	General Proficiency-I	-	-	3

Course Objectives:

1. To enhance the employability prospects of students
2. To hone the communication and language skills and make the students industry-ready
3. To groom the students holistically
4. To ensure a hassle-free transition for students from college set-up to corporate set-up

Course Outcomes:

On successful completion of the module students will be able to:

1. Become good communicators
2. Imbibe the requisite soft skills
3. Sharpen their writing skills
4. Analyse contemporary issues from various perspectives

Syllabus:

UNIT

Art of Communication: Verbal and Non-verbal Communication – Barriers to Communication – Importance of Body Language – Effective Listening – Feedback.

UNIT II

Introduction to Soft Skills: Attitude – Self-Confidence – Leadership Qualities – Emotional Quotient – Effective Time Management Skills – Surviving Stress – Overcoming Failure – Professional Ethics – Interpersonal Skills.

UNIT III

Writing: Importance of Writing – Written Vs Spoken Language – Formal and Informal Styles of writing – Resources for improving writing – Grammar and Usage – Vocabulary Building – SWOT analysis.

UNIT IV

Speaking Practice: Dialogue – Telephone Etiquette – Public Speaking – Debate – Informal Discussions – Presentations.

UNIT V

Aptitude: Verbal and Numerical Aptitude.

(Total:45 Periods)

Content beyond the Syllabus:

- Mock Group Discussions
- Analysis of contemporary issues
- Expanding terminology
- Debates

Reference Books:

1. Nicholls and Anne, “Mastering Public Speaking”, Jaico Publishing House, 2003.
2. Aggarwal, R.S, “Quantitative Aptitude”, S. Chand & Co., 2004.
3. Leigh Andrew and Michael Maynard, “The Perfect Leader”, Random House Business Books, 1999.
4. Whetton A. David and Kim S. Cameron, “Developing Management Skills”, Pearson Education, 2007.
5. K.R. Lakshminarayan, “Developing Soft Skills”, SciTech, 2009.
6. Sherfield M Robert, “Developing Soft Skills”, Pearson Education, 2005.
7. Hair O’ Dan, Friedrich W. Gustav and Lynda Dee Dixon, “Strategic Communication in Business and the Professions”, Pearson Education, 2008.
8. Chaney Lilian and Jeanette Martin, “Intercultural Business Communication”, Pearson Education, Fourth edition, 2008.

Websites:

1. www.softskillsindia.com/why develop soft skills/importance of soft skills
2. www.softskill. Blogspot.Com
3. www.careervarsity.com/careertools
4. www.searchio.target.com/definition/softskills

IT-T61 COMPUTER NETWORKS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T61	**Computer Networks**	3	1	-

Pre-requisite: IT–T35 Digital System and Computer Architecture

Course Objectives: Gets the idea of choosing the required functionality at each layer for a given application and trace the flow of information from one node to another node in the network. Then gives the understanding of division of network functionalities into layers, the component required to build different types of networks and identifying the solution for the functionalities in each layer**.**

Course Outcomes:

1. Understand the Layered Architecture of Computer Networks.
2. Understand the operation of the main components of computer networks.
3. Learn various network protocols and algorithms.
4. Acquire the required skill to design simple computer networks.

Syllabus:

Unit I

Introduction to Computer Networks: Need for Networking - Service Description –connectionless and Connection-Oriented Services – Circuit and Packet Switching – Access Networks and Physical Media – Wireless Links and Characteristics – Queuing Delay and Packet Loss – Internet Protocol stack – OSI Reference Model - Service Models – History of Computer Networking and the Internet.

Unit II

Application Layer: Principles of Network Applications – The Web and HTTP – FTP – Electronic Mail – SMTP – Mail Message Formats and MIME – DNS – Socket Programming with TCP and UDP. Multimedia Networking: Internet Telephony – RTP – RTCP – RTSP.

Unit III

Transport Layer: Transport Layer Services – Multiplexing and Demultiplexing – UDP – Reliable Data Transfer – Go- Back-N and Selective Repeat. Connection-Oriented Transport: TCP – Segment Structure – RTT estimation – Flow Control – Connection Management – Congestion Control – TCP Delay Modeling – SSL and TLS. Integrated and Differentiated Services: Intserv – Diffserv.

Unit IV

Network Layer: Circuit Switching - Packet Switching Virtual Circuit Switching – IP – ARP – DHCP – ICMP – Routing – RIP – OSPF – Sub netting – CIDR – Inter domain Routing – BGP – IPV6 Basic Features – Inter Domain Multicast – Congestion Avoidance in Network Layer.

Unit V

Data Link Layer– Layer Services– Framing - Error correction anddetection – Link Level Flow Control – Medium Access – Ethernet – Token Ring –FDDI – Wireless LAN – Bridges and Switches.

(Total: 60 Periods)

Text Books:

1. James F. Kurose, Keith W. Ross, “Computer Networking, A Top-Down Approach Featuring the Internet”, Third Edition, Pearson Education, 2006.
2. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.
3. William Stallings, “Data and Computer Communications”, Eighth Edition, Pearson Education, 2011.

Reference Books:

1. Nader F. Mir, “Computer and Communication Networks”, First Edition, PearsonEducation, 2007.
2. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An OpenSource Approach “, McGraw Hill Publisher, 2011.
3. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill,2004.

IT-T62 WEB TECHNOLOGY

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T62	Web Technology	3	1	0

Course Objectives:

1. To introduce the basics of Network Model.
2. To introduce the Web Development Process and Various Web Technologies.
3. To learn Networking and Security issues of Internet.

Course Outcomes:

On successful completion of this course students will be able to:

1. Use appropriate web development tools for various web application
2. Learn various Networking and Security issues of Internet to have a protected internet use.

UNIT I

Internet principles – Basic Web concepts – Client –Server model – Retrieving data from Internet -Protocols and applications. Web Design process: Web process Model-Goals and problems-design phase-Testing. Site Types and Architecture-Web site types-Dynamic Sites-site structures

UNIT II

Search and Design: Worldwide search-web searching overview-working of search engines-search engine promotion-optimization-Search interface.
Web protocols-HTTPDNS,- Web Servers-components-software, web hosting. Browsers-HTML and scripting languages- cookies-Multimedia in web design.

UNIT III

Web Technologies: Anatomy of xml document - XML markup-working with elements and attributes - creating valid documents-xml objects.
ActiveX controls: Introduction- Building a basic control - OLE and ActiveX- HTML and ActiveX-ActiveX Documents.

UNIT IV

Streaming – Networking Principles – Sockets for Clients - Sockets for Servers – Protocols handlers – Content handlers – Multicast sockets – Remote method invocation.

UNIT V

Internet Security: The Internet-Understanding Firewalls-Hackers-TCP/IP from a security view point –sockets and services-Encryption. Firewall Technology-packet filtering- Network Address Translation-application level proxies-VPN- ideal firewall.

(**Total: 60 Periods**)

Content beyond Syllabus:

1. Advanced data structures and their implementation.
2. Implementation of the data structures in different language platforms.

Text Books:

1. Thomas A.Powell, The Complete Reference Web design, Tata McGraw-Hill, 2000.
2. Mathew strebe, charlesperkins, Firewalls, BPB, 2000.

Reference Books:

1. Eillotte Rusty Harold, Java Network Programming, O'Reilly Publications, 1997.
2. John paulMueller,Active X from the Ground up, TataMcGraw-Hill,1997.
3. Michael Girdley, Kathryn A. Jones, et al., Web programming with JavaTM, Sams.net publishing, 1996.

Websites:

1. **http://www.w3schools.com**

IT-T63 ARTIFICIAL INTELLIGENCE

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T63	Artificial Intelligence	3	1	0

Pre-requisite:
Knowledge in Programming, Discrete mathematics and in probability.

Course Objectives:

1. To search and discover intelligent characteristics of existing AI projects, Intelligent agents map a new problem – as search.
2. To understand different search strategies for a problem.
3. To understand different Knowledge Representation schemes for typical AI problems.
4. To design and implement a typical AI problem to be solved Using Machine Learning Techniques.
5. Implement a futuristic AI application.

Course Outcomes:

On successful completion of this course students will be able to:

1. Capability to develop intelligent systems
2. Apply heuristic concepts to design efficient algorithms that help to attain the goals in satisfactory manner
3. Design applications related to Natural Language Processing and Web applications.

Unit I

Introduction: History of AI - - problem spaces and search- Heuristic Search techniques –Best-first search- Problem reduction- Constraint satisfaction-Means Ends Analysis.
Intelligent agents: Agents and environment – structure of agents and its functions

Unit II

Knowledge Representation: Approaches and issues in knowledge representation- Propositional Logic –Predicate logic-Forward and backward reasoning - Unification- Resolution- Weak slot-filler structure – Strong slot-filler structure- Knowledge- Based Agent

Unit III

Reasoning under uncertainty: Logics of non-monotonic reasoning-Implementation- Basic probability notation - Bayes rule – Certainty factors and rule based systems-Bayesian networks – Dempster - Shafer Theory - Fuzzy Logic.

Unit IV

Planning and Learning: Planning with state space search-partial order planning-planning graphs-conditional planning- continuous planning-Multi-Agent planning. Forms of learning-inductive learning-learning decision trees-ensemble learning- Neural Net learning and Genetic learning

Unit V

Advanced Topics: Game Playing: Minimax search procedure-Adding alpha-beta cutoffs Expert System: Representation-Expert System shells-Knowledge Acquisition. Robotics: Hardware-Robotic Perception-Planning-Application domains

(Total : 60 Periods)

Content beyond Syllabus:

1. Natural language understanding and generation.
2. Speech processing system.

Text Books:

1. Elaine Rich and Kevin Knight and ShivashankarB.Nair, Artificial Intelligence, 3rd edition, Tata Mc Graw Hill, 2009.
2. Ben Coppin, "Artificial Intelligence Illuminated", Jones and Bartlett Publishers, 1st edition, 2004.
3. Stuart J.Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson Education Asia, II edition, 2003.
4. N.P.Padhy, Artificial Intelligence and Intelligent Systems, Oxford University Press, 2nd edition, 2005.

Reference Books:

1. RajendraAkerkar ,Introduction to Artificial Intelligence, Prentice hall of India, 2005.
2. Patrick Henry Winston, Artificial Intelligence, 3rd edition Pearson Education, Inc., 2001.

Websites:

1. http://aima.cs.berkeley.edu/ai.html
2. www.stanford.edu/**class**/cs221/

IT-T64 INFORMATION CODING TECHNIQUES

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T64	Information Coding And Techniques	3	1	0

Course Objectives:

1. To understand the coding principles and different security algorithms.
2. To analyze the compression techniques.

Course Outcomes:

On successful completion of this course students will be able to:

1. Learn the coding techniques.
2. Learn the cryptographic algorithms.
3. Study the code generation process.

UNIT I

Information entropy fundamentals: Information–entropy-properties of information and entropy-relation between information and probability-mutual and self information-coding theory-code efficiency and redundancy-Shannon's theorem- construction of basic codes-Shannon and Fanon coding, Huffman coding–arithmetic coding.

UNIT II

Data and Voice Coding: Lossless predictive-Run-length-Ziv-Lempel coding-voice coding-modulation –linear predictive coding-silence coding and sub-band coding.

UNIT III

Image and video compression: Quantization-JPEG standards-motion compensation-MPEG-1- MPEG-2-MPEG-4, H.26x standards.

UNIT IV

Error Control Coding: Linear Block Codes for Error Correction-Cyclic Codes-Bose-ChoudhuriHocquenghem codes-Convolution Codes-Trellis Coded Modulation.

UNIT V

Cryptography: Overview of encryption techniques- symmetric cryptography-Data Encryption Standard (DES)-International Data Encryption Algorithm (IDEA)-RC Ciphers-Public-key algorithm-RSA algorithm-Pretty Good Privacy-One-way Hashing.

(Total: 60 Periods)

Content beyond Syllabus:

1. Security techniques can be studied.
2. Moving objects can be studied.

Text Books:

1. Ze-NianLiand Mark S.Drew, Fundamentals of Multimedia, Pearson Education, 2004.
2. J.S.Chitode, Information Coding Techniques, Technical Publications, 2008.
3. RanjanBose, Information theory, coding and cryptography,TataMcGrawHill, 2002.
4. Viterbi, Information theory and coding, McGraw Hill, 1982.

Reference Books:

1. John G. Proakis, Digital Communications, 2ndEdition, McGrawHill, 1989.
2. K.Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers, 2000.

Websites:

1. http://www.itswtech.org/Lec/Manal%28system%20programming%29/ch2_introduction_to_coding_tecniques.pdf
2. http://www.webopedia.com/coding.html
3. http://www.cmlab.csle.ntu.edu.twu/~itct.html

IT-P61 COMPUTER NETWORKS LAB

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P61	Computer Networks Lab	0	0	3

Course Objectives:

1. To learn socket programming
2. To use simulation tools.
3. To analyze the performance of protocols in different layers in computer networks using simulation tools.

1. Applications using TCP Sockets like
   (i) Echo client and echo server
   ii) File transfer
   iii) date and time server & client
   iv) Chat
2. Applications using UDP Sockets like
   ii. DNS
   iii. SNMP
3. Applications using Raw Sockets like
   i) Ping
   ii) Traceroute
4. Programs using RPC
5. Experiments using simulators like OPNET:
   i. Performance comparison of MAC protocols
   ii. Performance comparison of Routing protocols like
   iii. Shortest path routing
   iv. Flooding
   v. Link State
   vi. Hierarchical
   vii. Study of TCP/UDP performance.

(**Total: 45 Periods**)

Text Books:

1. James F. Kurose, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Third Edition, Pearson Education, 2006.
2. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.
3. William Stallings, "Data and Computer Communications", Eighth Edition, Pearson Education, 2011.

Reference Books:

1. Nader F. Mir, "Computer and Communication Networks", First Edition, PearsonEducation, 2007.
2. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An OpenSource Approach ", McGraw Hill Publisher, 2011.
3. Behrouz A. Forouzan, "Data communication and Networking", Tata McGraw-Hill,2004.

IT-P62 WEB TECHNOLOGY LAB

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P62	Web Technology Lab	0	0	3

Course Objectives:

1) To introduce the basics of Network Model.
2) To introduce the Web Development Process and Various Web Technologies.
3) To learn Networking and Security issues of Internet.

Course Outcomes:

On successful completion of this course students will be able to:

1) Use appropriate web development tools for various web application
2) Learn various Networking and Security issues of Internet to have a protected internet use.

Implement the following problems :

1. Creation of HTML Files
2. Working with Client Side Scripting
   - VBScript
   - JavaScript
3. Configuration of web servers
   - Apache
   - Internet Information Server(IIS)
4. Working with ActiveX Controls in web documents.
5. Experiments in JAVA
   - Applets
   - Threads
   - Sockets
6. Working with Server Side Scripting
   - Active Server Pages
   - Java Servelets
7. Sample web application development in the open source environment

Content beyond Syllabus:

1. Advanced data structures and their implementation
2. Implementation of the data structures in different language platforms

Text Books:

1. Thomas A.Powell , The Complete Reference Web design, TataMcGraw-Hill ,2000.
2. Mathew strebe, charlesperkins, Firewalls, BPB, 2000.

Reference Books:

1. Eillotte Rusty Harold, Java Network Programming, O'Reilly Publications, 1997.
2. John paulMueller,Active X from the Ground up, TataMcGraw-Hill,1997.
3. Michael Girdley, Kathryn A. Jones, et al., Web programming with JavaTM, Sams.net publishing, 1996.

Websites:

1. http://www.w3schools.com

IT-P63 MINIPROJECT

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P63	MINI PROJECT	0	0	3

Course Objectives:

Scope of this lab is to understand the application of case tools, which focuses on the

following software engineering activities:

- Software requirements analysis and specification
- Software design
- Software implementation
- Software testing and maintenance
- Communication skills and teamwork

Course Outcomes:

On successful completion of this practical's students will be able to:

- Solve any given problem by identifying appropriate Domain/Area
- Prepare SRS for projects
- Prepare SDS for projects
- Document for projects

Exercises:

Students in convenient groups of not more than three members in a group are to take up sample project development activities with the guidelines given below using some of the Computer Aided Software Engineering Tools (CASE):

• Preparing a project – brief proposal including
o Problem Identification
o Developing a model for solving the problem
o A statement of system / process specifications proposed to be developed (Data Flow Diagram)
o List of possible solutions including alternatives and constraints
o Cost benefit analysis
o Time line activities
• A report highlighting the design finalization [based on functional requirements & standards (if any)]
• A presentation including the following
o Implementation phase (Hardware / Software / both)
o Testing & Validation of the developed system
o Learning in the project
• Consolidated report preparation

Content beyond Syllabus:

- Real-Time projects.

Text Books:

Theory prescribed books

Reference Books:

1.Theory prescribed Reference

Websites:

1. http://projects.spogel.com/forum_posts.asp?TID=52
2. http://codeincodeblock.blogspot.in/2012/04/list-of-top-ten-college-mini-projects.html

HS-P64 GENERAL PROFICIENCY–II

Subject Code	Subject Name	Lectures (Periods)	Tutorial (Periods)	Practical (Periods)
HS-P64	General Proficiency-II	-	-	03

Course Objectives:

1. To hone both the oral and written communication skills of the students
2. To equip the students with the skills required to gain placement

Course Outcomes:

On successful completion of the module students will be able to:

1. Communicate better
2. Confidently face the placement process

Syllabus:

Unit I

Composition Analysis: Technical and Non-Technical Passages (GRE Based) – Differences in American and British English – Analyzing Contemporary issues – Expanding Terminology.

Unit II

Writing: Job Application Letter Writing – Resume Writing.

Unit III

Oral Skills: Group Discussion – Introduction and Practice – Team Work – Negotiation Skills – Organizing and Attending Meetings – Facing Interviews.

Unit IV

Adapting To Corporate Life: Corporate Etiquette – Grooming and Dressing.

Unit V

Aptitude: Verbal and numerical aptitude.

(Total: 45 Periods)

Content beyond the Syllabus:

- Students are encouraged to participate in various activities like extempore, vocabulary building, group discussions and mock interviews to develop their confidence and communication skills

Rerences:

1. Pushplata and Sanjay Kumar, "Communicate or Collapse: A Handbook of Effective Public Speaking", Group Discussions and Interviews. Prentice-Hall, Delhi, 2007.
2. Thorpe, Edgar, "Course in Mental Ability and Quantitative Aptitude", Tata McGraw-Hill, 2003.
3. Thorpe, Edgar, "Test of Reasoning", Tata McGraw-Hill, 2003.
4. Prasad, H.M, "How to prepare for Group Discussion and Interview", Tata McGraw-Hill, 2001.
5. "Career Press Editors. 101 Great Resumes", Jaico Publishing House, 2003.
6. Aggarwal, R.S, "A Modern Approach to Verbal and Non-Verbal Reasoning", S. Chand & Co., 2004.
7. Mishra Sunita and Muralikrishna, "Communication Skills for Engineers", PearsonEducation, First edition, 2004

Websites:

1. http://esl.about.com/od/toeflieltscambridge/a/dif_ambrit.htm
2. http://www.majortests.com/gre/reading_comprehension.php
3. http://www.bestsamplequestions.com/gre-questions/reading-comprehension/reading-comprehension.html
4. http://www.smallbusinessnotes.com/managing-your-business/how-to-organize-meetings.html
5. http://www.skillsyouneed.co.uk/IPS/Negotiation1.html
6. http://www.greguide.com/gre-reading-comprehension.html
7. http://jobsearch.about.com/od/resumes/Resumes.htm
8. http://www.dailywritingtips.com/resume-writing-tips/
9. http://www.youth.gc.ca/eng/topics/jobs/resume.shtml
10. www.freshersworld.com
11. http://www.indiabix.com/group-discussion/topics-with-answers/
12. http://www.managementstudyguide.com/corporate-etiquettes.htm
13. http://www.wisegeek.org/what-is-corporate-etiquette.htm
14. http://www.indiabix.com/

IT-T71 MOBILE COMPUTING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T71	Mobile Computing	3	1	0

Course Objectives:

1. To teach the basics of mobile computing ideas and best practices.
2. To teach the emerging wireless network standards.
3. To introduce the various models and data management concepts of mobile computing.
4. To learn the routing and secure protocols of mobile networking.

Course Outcomes:

On successful completion of the module students will be able to:

1. Gain basic knowledge in mobile computing.
2. Should have a broader knowledge on 3G.
3. Gain the knowledge on emerging wireless network standards.

Syllabus:

Unit I

INTRODUCTION: Wireless and Mobile Computing Architecture – Limitations of wireless and mobile communication – Wireless Telecommunication Networks: Digital cellular Systems, TDMA - CDMA – Wireless Networking Techniques – Mobility Bandwidth Tradeoffs – Portable Information Appliances.

Unit II

EMERGING WIRELESS NETWORK STANDARDS: 3 G Wireless Networks – State of Industry – Mobility support Software – End User Client Application – Mobility Middleware –Middleware for Application Development - Adaptation and Agents - Service Discovery Middleware – Finding Needed Services - Interoperability and Standardization.

Unit III

MOBILE NETWORKING: Virtual IP Protocols - Loose Source Routing Protocols - Mobile IP – CDPD – GPRS – UMTS Security and Authentication – Quality of Service – Mobile Access to the World Wide Web.

Unit IV

MOBILE DATA MANAGEMENT: Mobile Transactions - Reporting and Co Transactions –Kangaroo Transaction Model – Clustering Model –Isolation only transaction – 2 Tier Transaction Model – Semantic based nomadic transaction processing.

Unit V

MOBILE COMPUTING MODELS: Client Server model – Client/Proxy/Server Model – Disconnected Operation Model – Mobile Agent Model – Thin Client Model – Tools: Java, Brew, Windows CE, WAP, Sybian, and EPOC.

(Total: 60 Periods)

Content beyond the Syllabus:

1. Data dissemination and broadcasting systems.
2. Data synchronization in mobile computing systems.

Text Books:

1. Reza B Fat and Roy.T. Fielding, “Mobile Computing Principles”, Cambridge University Press, 2005.
2. Abdelsalam A Helal, Richard Brice, Bert Haskel, MarekRusinkiewicz, Jeffery L Caster and DarellWoelk, “Anytime, Anywhere Computing, Mobile Computing Concepts and Technology”, Springer International Series in Engineering and Computer Science, 2000.

Reference Books:

1. Golden Richard, Frank Adelstein, Sandeep KS Gupta, Golden Richard and Loren Schwiebert, “Fundamentals of Mobile and Pervasive Computing”, McGraw-Hill Professional Publishing”, 2005.
2. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.

Websites:

1. http://www.faadooengineers.com/threads/394-MOBILE-COMPUTING-E-book presentation-and-lecture-notes-covering-full-semester-syllabus
   http://www.dsc.ufcg.edu.br/~sampaio/cursos/2005.1/BancoDeDados/Artigos/BDMoveis/MobileTransactions/an-overview-of-transaction.pdf

IT-T72 WEB SERVICES AND XML

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T72	Web Services and XML	3	1	---

Pre-requisite: HTML,Component Technology and Databases

Course Objectives:

1. To understand the advantages of using XML technology family.
2. To analyze the problems associated with tightly coupled distributed software architecture.
3. To learn the Web services building block.
4. To implement e-business solutions using XML based web services.

Course Outcomes:

1. Students will understand the benefits of XML, web services and SOA.
2. They will learn how to develop e-business applications using these technologies.

Unit I

XML – benefits – Advantages of XML over HTML, EDI, Databases – XML based standards – Structuring with schemas - DTD – XML Schemas – XML processing – DOM –SAX – presentation technologies – XSL – XFORMS – XHTML – Transformation – XSLT – XLINK – XPATH – XQuery.

Unit II

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

Unit III

Business motivations for web services – B2B – B2C – Technical motivations – limitations of Component Technologies – Architecting web services – Implementation view – web services technology stack – logical view – composition of web services – deployment view – from application server to peer to peer – process view – life in the runtime.

Unit IV

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

Unit V

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

(Total : 60 Periods)

Content beyond Syllabus: Semantic web- Xlang- XDBMS

Text Books:

1. AtulKahate," XML and Related technologies", Pearson Education,2008.
2. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.
3. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
4. Ron Schmelzer et al. " XML and Web Services", Pearson Education, 2002.

Reference Books:

1. Keith Ballinger, ". NET Web Services Architecture and Implementation", Pearson Education, 2003.
2. David Chappell, "Understanding .NET A Tutorial and Analysis", Addison Wesley, 2002.
3. KennardScibner and Mark C.Stiver, "Understanding SOAP", SAMS publishing.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson's Edn, 2005.

Websites:

1. http://docs.oracle.com/cd/E17802_01/webservices/webservices/docs/1.6/tutorial/doc/JavaWSTutorial.pdf
2. http://www.w3schools.com/xml/
3. WWW.SOA.COM

IT-T73 CRYPTOGRAPHY AND NETWORK SECURITY

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T73	Information Security	3	1	0

Course Objectives:

To learn about wired and wireless network security with various cryptographic techniques, which include private and public keys algorithms along with attacks types.

Course Outcomes:

On successful completion of this course students will be able to:

1. Use appropriate methods in security
2. Learn various methods of implementing security

UNIT – I CLASSICAL CRYPTOSYSTEM

Security trends – Security Attacks and services – Classical Encryption Techniques — Symmetric cipher model– Basic Number theory –Pseudorandom Number Generation - Stream Ciphers - RC4.

UNIT – II BLOCK CIPHER

Simple DES – DES – Modes of operation – Triple DES – AES – RSA – Attacks – Primality test – factoring.

UNIT – III MESSAGE AUTHENTICATION

Discrete Logarithms – Computing discrete logs – Diffie-Hellman key exchange – ElGamal Public key cryptosystems – Hash functions – Secure Hash - MD5 – Digital signatures – RSA – ElGamal Digital signature scheme.

UNIT – IV NETWORK SECURITY

Key Management and Distribution: X.509, PKI – Electronic Mail security – PGP – IP security – Web Security – SSL, TLS.

UNIT – V WIRELESS NETWORK SECURITY

Wireless Network Security- IEEE 802.11 Wireless LANs - Protocol Overview and Security - Wireless Application Protocol (WAP) - Protocol Overview – Wireless Transport Layer Security (WTLS), WAP end-to-end Security

TOTAL: 60

Content beyond Syllabus:

1. Advanced techniques of security and their implementation
2. Implementation of the latest security for latest security threats

TEXT BOOKS:

1. William Stallings, “Crpyptography and Network security Principles and Practices”, Pearson/PHI, 5th ed, 2006. [Unit I, Unit II, Unit IV, Unit V]
2. Wade Trappe, Lawrence C Washington, “Introduction to Cryptography with coding theory”, 2nd ed, Pearson, 2007. [Unit III]

REFERENCES:

1. W. Mao, “Modern Cryptography – Theory and Practice”, Pearson Education, Second Edition, 2007.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger, “Security in computing”, Third Edition – Prentice Hall of India, 2006.
3. Douglas R. Stinson. “Cryptography, theory and practice” , Second edition, CRS Press.

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Websites:

1. http://thor.info.uaic.ro/~fltiplea/IS/ICSCourseNotes.html
2. https://www.securityforum.org/
3. eeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4149673

IT-P71 MOBILE COMPUTING LAB

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P71	Mobile Computing Lab	**0**	**0**	**3**

Course Objectives:

1. To introduce the basics of Mobile computing.
2. To introduce the WML and J2ME Technologies.
3. To learn Bluetooth and distributed mobile computing.

Course Outcomes:

On successful completion of this course students will be able to:

1. Use appropriate mobile communication tools for various mobile application
2. Learn various issues of Mobile Computing

List of Exercises

1. Study of WML and J2ME simulators
2. Design of simple Calculator having +,,,* and / using WML
3. Design of Calendar for any given month and year using WML
4. Design of simple game using WML
5. Animate an image using WML
6. SimulationofapplicationusingJ2MEsimulator
   a. Midlet and other basic UI items.
   b. Bluetooth API
   c. Implementation of Wireless Messaging
   d. MMAPI
7. Simulation of Authentication and encryption technique used in GSM
8. Simulation of applications to access web sites using Microsoft Windows Mobile .net environment.
9. Simulation of Infotainment(news, weather forecasts etc)using WAP
10. Simulation of applications using symbian OS

Course Outcomes:

On successful completion of this course students will be able to:

1. Use appropriate mobile communication tools for various mobile application
2. Learn various issues of Mobile Computing
1. Study of GSM architecture and signalling techniques.
2. Study of Cellular system and related concepts.
3. Study of GPRS services.
4. Study of WAP architecture.
5. Design a web page using WML.
6. Study of Bluetooth architecture.
7. Study of IEEE 802.11 network topology.
8. Study of Distributed mobile computing

Content beyond Syllabus:

1) Advanced cellular systems

Text Books:

1. Reza B Fat and Roy.T. Fielding, “Mobile Computing Principles”, Cambridge University Press, 2005.
2. Abdelsalam A Helal, Richard Brice, Bert Haskel, MarekRusinkiewicz, Jeffery L Caster and DarellWoelk, “Anytime, Anywhere Computing, Mobile Computing Concepts and Technology”, Springer International Series in Engineering and Computer Science, 2000.

Reference Books:

1. Golden Richard, Frank Adelstein, Sandeep KS Gupta, Golden Richard and Loren Schwiebert, “Fundamentals of Mobile and Pervasive Computing”, McGraw-Hill Professional Publishing”, 2005.
2. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.

Websites:

1. http://www.faadooengineers.com/threads/394-MOBILE-COMPUTING-E-bookpresentation-and-lecture-notescovering-full-semester-syllabus
2. http://www.dsc.ufcg.edu.br/~sampaio/cursos/2005.1/BancoDeDados/Artigos/BDMoveis/MobileTransactions/anoverview-of-transaction.pdf

IT-P72 WEB SERVICES AND XML LAB

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P72	Web Services and XML Lab	0	0	3

Course Objectives:

1) The students learn how to design and develop business applications using the popular middleware technologies practiced in the industry.

Course Outcomes:

On successful completion of this course students will be able to:

1) Develop distributed applications in popular platform independent technologies for any business domain.

The students have to develop distributed applications for a given domain using the following technologies:

1. EJB
2. Web Services in Java Platform
3. Web Services with SOA client using C#.net
4. XML with presentation technologies like XSLT, CSS and storage technologies like SAX, DOM with SOAP protocol using C#.net
5. XML with presentation technologies like XSLT, CSS and storage technologies like SAX, DOM with SOAP protocol using Java
6. Aninteroperableapplicationinvolvingeitherlanguage/networkprotocol heterogeneity or involving any two of the above technologies.

Content beyond Syllabus: Semantic web- Xlang- XDBMS

Text Books:

1. AtulKahate," XML and Related technologies", Pearson Education,2008.
2. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.
3. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
4. Ron Schmelzer et al. " XML and Web Services", Pearson Education, 2002.

Reference Books:

1. Keith Ballinger, ". NET Web Services Architecture and Implementation", Pearson Education, 2003.
2. David Chappell, "Understanding .NET A Tutorial and Analysis", Addison Wesley, 2002.
3. KennardScibner and Mark C.Stiver, "Understanding SOAP", SAMS publishing.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson's Edn, 2005.

Websites:

1. http://docs.oracle.com/cd/E17802_01/webservices/webservices/docs/1.6/tutorial/doc/JavaWSTutorial.pdf
2. http://www.w3schools.com/xml/
3. WWW.SOA.COM

IT-P73 PROJECT WORK PHASE-I

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P73	Project Work Phase-I	0	0	3

Pre-requisite: Fundamentals of Software Engineering, Problem-solving skills and Application Development Knowledge.

Course Objectives: The objective of the project is to enable the students to work in convenient groups of three to four members in a group on a project of latest topic / research area / industrial applications. Each project group shall have a guide who is a faculty member. This first phase of project work focuses on the following activities:

- Literature Survey on project topic
- Problem Definition
- Project Design

Course Outcomes: On successful completion of the First Project Phase, the students will be able to:

- State Problem definition clearly
- Prepare SRS for projects
- Prepare SDS for projects
- Develop the Presentation skills
- Develop the ability to work in a Group

Exercises:

The project group is required to do the following

- literature survey,
- Problem formulation
- Forming a methodology of arriving at the solution of the problem.
- Documentation of each step

Content beyond Syllabus:
Real-Time projects.

Text Books:

1. Books related to the Project Title
2. Papers published in Reputed Journals and Conferences related to the Project

IT-P74 SEMINAR

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P74	Seminar	-	-	3

Course Objectives:

The objective of the seminar is to encourage the students to work independently and to get exposure in latest technologies. The topic shall be chosen in consultation with a faculty member who would be the guide. Each student is expected to make a critical review of literature and prepare a report. The student is expected to present a seminar. The departmental committee will evaluate the performance of the students in the seminar and the report for 100 marks.

Course Outcomes:

Upon completion of the course, the students will have an exposure to

- Latest technologies emerged in the field of IT
- Current need of IT industries.

IT-P75INDUSTRIAL TRAINING / INTERNSHIP

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P75	**Industrial Training / Internship**	-	-	3

Course Objectives:

In the course of study ,during 5th and6th semesters holidays, each student is expected to undertake a minimum of 4 industrial visits (leading hardware manufacturing /software development companies) and 2 week training or undertake a minimum of one month of industry internship (in a reputed concern) . Based on the industrial internships/training/visits, the student has to submit a report at the end of sixth semester highlighting the exposure he/she gained. The report will be evaluated by the departmentalcommitteefor100marks. More weightage will be given for Internship. The proofs for having undergone visits/training are to been closed along with report as enclosures.

IT-T81 PROFESSIONAL ETHICS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-T81	Professional Ethics	3	0	0

Course Objectives:

1. To introduce the basics of Moral Ethics, Engineering Ethics.
2. To introduce the professional Ethics and Case Studies

Course Outcomes:

On successful completion of this course students will be able to:

1. Understand the Values of Moral, Engineering and Professional Ethics

The course should cover the following topics by way of Seminars, Expert Lectures and Assignments:

1. Engineering Ethics – Moral issues, Ethical theories and their uses

2. Engineering as Experimentation – Code of Ethics

3. Engineer's responsibility for safety

4. Responsibilities and rights

5. Global issues of engineering ethics

Content beyond Syllabus:

Case studies on Moral, Engineering and Professional Ethics

Text Books:

1. Charles D.Fleddermann, Engineering Ethics, Prentice Hall, New Mexico, 1999.

Reference Books:

1. Mike W. Martin, Roland Schinzinger, Ethics in Engineering, Tata McGraw Hill, New Delhi, 2005.

IT-T82 DISTRIBUTED COMPUTING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT T82	Distributed Computing	3	1	0

Pre-requisite:
Computer Networks, Operating System

Course Objectives:

1. To understand the importance of communication in distributed environment.
2. To study the actual implementation of various communication mechanisms.
3. To learn the distributed resource management mechanisms.

Course Outcomes:

1. Learn the distributed computing concepts.
2. Learn the resource management techniques.
3. Learn the file management in distributed environment.

Unit I

Introduction: Characteristics, Examples, Applications, Challenges –System models:- Architectural models and Fundamental models – Network principles and Internet protocols – Inter-process communication: API, Marshalling ,Multicast communication, Client-server communication, Group communication.

Unit II

Remote Invocation – Indirect Communication - Operating System Support:- Introduction, OSLayer, Protection, Processes and Threads, Communication and invocation, Operating system architecture – Distributed objects and components.

Unit III

Distributed File System: Fileservice architecture, Sunnetwork and Andrew Filesystem ,Recent advances–NameServices:-DomainNameSystem,Directoryanddiscoveryservices,CasestudyforGlobalnameserviceandDirectoryservice–Time and GlobalStates:- Clocks, events and processes, Clock synchronization, Logical clocks, Global states, Distributed debugging – Coordination and Agreement.

Unit IV

Transaction and Concurrency Control: Transactions and nested transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of concurrency control – Distributed Transactions – Replication - Distributed Shared Memory: Design and implementation issues, Consistency models.

Unit V

Distributed Multimedia Systems: Characteristics, Quality of service management, Resource management, Stream adaptation–WebServices:-Introduction, Service descriptions and IDL, Directoryservice,XMLSecurity,Coordinationofwebservices-CaseStudy:-CORBA.

(Total : 60 Periods)

Content beyond Syllabus:

1. Mobile and Ubiquitous Computing
2. Design of Distributed System

Text Books:

1. GeorgeCoulouris, JeanDollimore, Tim Kindberg, DistributedSystems:Conceptsand Design, 5th Edition, Addison – Wesley, 2012

Reference Books:

1. Ajay D. Kshemkalyani and MukeshSinghal, Distributed Computing: Principles, Algorithms, and Systems, Cambridge University Press, 2011
2. Andrew S. Tanenbaum, Maarten Van Steen, Distributed System: Principles and Paradigms, SecondEdition,Prentice-Hall,2006

Websites:

1. http://www.webopedia.com/TERM/D/distributed_computing.html
2. http:// www.distributed.net/
3. http:// www.journals.elsevier.com/journal-of-parallel-and-distributed-computing.html

IT-P81 PROJECT WORK PHASE-II

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P81	Project Work Phase-II	0	0	3

Pre-requisite:

- Fundamentals of Software Engineering, Problem-solving skills and Application Development Knowledge
- Project Work Phase I

Course Objectives:

The students are expected to complete the project (Phase - II) and to submit a full-fledged report comprising of the complete system developed along with the implementation and the test results. This phase of project work focuses on the following activities:

- Project Implementation
- Testing
- Project Documentation

Course Outcomes:

On successful completion of this Project Phase, the students will be able to:

1. Master a programming language or software tool used for implementation
2. Test the project and compare it with benchmark standards
3. Prepare the Project Report
4. Develop the presentation skills
5. Develop the ability to work in a Group

Exercises:

On successful completion of this Project Phase students will be able to:

1. Master a programming language or software tool used for implementation
2. Test the project and compare it with benchmark standards
3. Prepare Project Report
4. Develop Presentation skills
5. Develop ability to work in a Group

Content beyond Syllabus:

Real-time projects.

Text Books:

1. Books related to the Project Title
2. Papers published in Reputed Journals and Conferences related to the Project Title

IT-P82 COMPREHENSIVE VIVA VOCE

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-P82	Comprehensive Viva Voce	0	0	3

Course Objectives:

The students will be tested for their understanding of subjects of study in the curriculum from 3rd semester to 8th semester. A comprehensive examination, preferably with objective type questions, will be conducted and evaluated the performance of the students for 50 marks. A comprehensive viva voce examination will be conducted for 50 marks with one internal examiner and one external examiner appointed by the University.

Course Outcomes:

Upon completion of the course, the students will be in a position to

- To grasp all the subjects they have learnt related to IT so far.
- face the placement tests conducted for the campus recruitment

IT-E51 COMPUTER HARDWARE AND TROUBLESHOOTING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E51	Computer Hardware and Troubleshooting	3	1	0

Course Objectives:

1. It provides insight to the various parts and types of computer.
2. It familiarizes the hardware types and the evolution in each of them.
3. It also gives the basics of troubleshooting.

Course Outcomes:

On successful completion of this course students will be able to:

- The students will have theoretical exposure as well as hands on exposure to know about the hardware aspects of computer.

Unit I

PC Hardware Overview: Introduction–BasicPartsofPC–Functionalblockdiagram–systemboard–Microprocessor– Interrupts–DMA–SMPS–BIOS–POSTsequence-Systemconfigurationion–Memory–Massstorage–I/Ointerfacestandards.

Unit II

Bus Standards and Networking: ISA–PCI–SCSI–IDE–USB–comparativestudyandcharacteristics–NetworkInterface Cards–Cables and connectors-MODEM–AT command set.

Unit III

Peripheral Devices & Display Adapters: Functional descriptions of keyboard – mouse – printers – joystick – scanners – CGA – SVGA.

Unit IV

Mass Storage Devices: Floppy disk and drive – Hard disk and drive – MFM and RLL recording standards – CD technology – DVD technology – pen drives – tape drives.

Unit V

Troubleshooting tools: In-CircuitEmulators–LogicState/TimingAnalyzers–DigitalMultimeters–CROs–Signature Analyzers–Troubleshooting problems of system boards ,add oncards and peripherals.

(Total: 60 Periods)

Content beyond Syllabus:

1. Advanced data structures and their implementation
2. Implementation of the data structures in different language platforms

Text Books:

1. Hans Peter Messmer, Indispensable PC Hardware Book , Pearson Education, 4th edition,2003.
2. Govindarajulu, IBM PC and Clones , Tata McGraw Hill, 4th edition, 2002.

Reference Books:

1. Barry Brey, The Intel Microprocessors 8086/88, 80186/188, 80286, 80386,80486, PENTIUM and PENTIUM PRO architecture, Programming and Interfacing, 6th edition, PHI, 2002.
2. Ed Tittel, David Johnson, Networking Essentials: Study Guide, Comdex Computer Publishing,1998.
3. Scott Muller, Upgrading and Repairing PCs, 15th edition, 2002.

IT-E52 OPERATIONS RESEARCH

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E52	Operations Research	3	1	0

Pre-requisite: Mathematics

Course Objectives: Importance of need to take intelligent decisions is to be emphasized. Using OR major focus should be on how to model various situations in industries and solve them.

Course Outcomes: This module aims to introduce students to use qualitative methods and techniques for effective Decisions–making; model formulation and applications that are used in solving business decision problems.

Unit I

INTRODUCTION: Linear programming, Definition, scope of Operations Research (O.R) approach and limitations of OR Models, Characteristics and phases of OR Mathematical formulation of L.P. Problems. Graphical solution methods.

Unit II

LINEAR PROGRAMMING PROBLEMS: The simplex method - slack, surplus and artificial variables. Concept of duality, two phase method, dual simplex method, degeneracy, and procedure for resolving degenerate cases.

Unit III

TRANSPORTATION PROBLEM: Formulation of transportation model, Basic feasible solution using different methods, Optimality Methods, Unbalanced transportation problem, Degeneracy in transportation problems, Applications of Transportation problems. Assignment Problem: Formulation, unbalanced assignment problem, Traveling salesman problem.

Unit IV

QUEUING THEORY: Queuing system and their characteristics. The M/M/1 Queuing system, Steady state performance analyzing of M/M/ 1 and M/M/C queuing model.

PERT-CPM TECHNIQUES: Network construction, determining critical path, floats, scheduling by network, project duration, variance under probabilistic models, prediction of date of completion, crashing of simple networks.

Unit V

INTEGER PROGRAMMING: Gommory's technique, branch and bound Algorithm for integer programming problems, zero one algorithm.

(Total : 60 Periods)

Content beyond Syllabus:

CASE STUDIES: REAL-TIME Projects using LPP, TRANSPORTATION PROBLEM, QUEUING THEORY, PERT-CPM TECHNIQUES and INTEGER PROGRAMMING

Text Books:

1. Operations Research and Introduction, Taha H. A. – Pearson Education edition
2. Operations Research, S. D. Sharma –KedarnathRamnath& Co 2011.

Reference Books:

1. "Operation Research" AM Natarajan, P. Balasubramani, A Tamilaravari Pearson 2005
2. Introduction to operation research, Hiller and liberman, Mc Graw Hill. 5th edition 2001.
3. Operations Research: Principles and practice: Ravindran, Phillips & Solberg, Wiley India lts, 2nd Edition 2007
4. Operations Research, Prem Kumar Gupta, D S Hira, S Chand Pub, New Delhi, 2007

IT-E53 PARALLEL PROCESSING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E53	Parallel Processing	3	1	0

Course Objectives:

1) To introduce Parallel Programming Platforms.
2) To study the Principles of Parallel Algorithm Design
3) To understand Parallel Programming Paradigms.

Course Outcomes:

On successful completion of this course students will be able to:

1) Understand the concepts of parallel processing as it pertains to high performance computing.
2) Apply parallel strategies and paradigms to design parallel/distributed algorithms.

UNITI

Introduction: Needofhighspeedcomputing–increasethespeedofcomputers–historyofparallelcomputers and recent parallel computers; solving problems in parallel –temporal parallelism – data parallelism–comparisonoftemporalanddataparallelprocessing–dataparallelprocessingwith specialized processors–inter-task dependency.

UNITII

Instruction level parallel processing: Pipelining of processing elements–delays in pipeline execution–difficulties in pipelining – superscalarprocessors–verylonginstructionword(VLIW)processor–commercialprocessors–multithreadedprocessors–futureprocessorarchitectures.

UNITIII

Structure of Parallel Computers: A generalized structure of a parallel computer –classification of, parallel computers – vectorcomputers–atypicalvectorsupercomputer–arrayprocessors–systolicarrayprocessors–sharedmemoryparallelcomputers – interconnection networks – distributed shared memory parallel computers–message passing parallel computers–cluster of workstations.

UNITIV – Parallel Algorithms Classification

Classification of parallel algorithms: Synchronized and Asynchronized parallel algorithms – Performanceofparallelalgorithms–Elementaryparallelalgorithms:Sorting and Searching.

UNITV

Advanced parallel Algorithms: Matrix operations: Transposition -Matrix-by-matrix multiplication-Matrix-by-vector multiplication-Solvingsystemsoflinearequations–Graphalgorithms:Connectivitymatrix- Connected components- All-pairs shortest path-Minimum spanning tree.

(Total : 60 Periods)

Content beyond Syllabus:

1) Implementation of the Parallel Algorithms in Multi-core Architectures.

Text Books:

1. V. RajaramanandC. Siva RamMurthy, Parallel Computers – Architecture and Programming,Prentice-HallofIndia,2004.
2. MichaelJ.Quinn,ParallelComputing–TheTheoryandPractice,McGraw-Hill,1994.

Reference Books:

1. David E. Culler and JaswinderPal Singh, Parallel Computing Architecture: A Hardware/SoftwareApproach,MorganKaufmanPublishers,1999.
2. MichaelJ.Quinn,Parallel ProgramminginCwithMPIandOpenMP,McGraw-Hill,2004.
3. SelimG.Akl,The DesignandAnalysisofParallelalgorithms,PHI,1999.

Websites:

1) https://computing.llnl.gov/tutorials/parallel_comp/
2) https://www2.cisl.ucar.edu/docs/parallel_concepts

IT-E54 BUSINESS PROCESS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E54	Business Process	3	1	0

Course Objectives:

To introduce the fundamental concepts of Business Process to the students and make them understand the usage of the Business Process in the current industry scenario.

Course Outcomes:

1. The student is able to understand the concepts of Business Process.
2. The student is able to differentiate between the various Business Processes
3. The student is able to model the Business Process using the standard notation.

Unit I

Introduction – Definition of Business Process- the need and the importance of Business Process – Examples of Business Process - Business Process Excellence.

Unit II

Business Process Platforms – Specification and Modeling of Business Process – Integration of Business and Production Process – Integration of Business Process and Business Intelligence.

Unit III

Global View of Business Process – Local View of Business Process – Business Process Modelling – Events in Business Process Modeling – Semantics of Events.

Unit IV

Decomposing Business Process – Motivation – Seamless Business Process – Business Process Specification.

Unit V

The Business Process Lifecycle — Classification of Business Process - Workflow Management – Business Process Management – Life Cycle of Business Process Management –Tools of BPM.

(Total: 60 Periods)

Content beyond Syllabus:

The standard Business Process as used by the various MNCs have to be taught to the students.

Text Books:

1. Dirk Draheim–Business Process Technology : A unified view on Business Processes, Workflows and Enterprise Solutions, Springer 2010.
2. M.Weske, Business Process Management : Concepts, Languages, Architectures Springer , 2012

Reference Books:

1. Martyn A Ould, Business Process Management: A Rigorous Approach,British Computer Society, 2004.

Websites:

1) www.bpmn.org
2) *www.bpmi.org*

IT-E55 DIGITAL SIGNAL PROCESSING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT- E55	Digital Signal Processing	3	1	0

Pre-requisite:
The course requires knowledge of mathematical concepts in linear algebra and integral transform, and fundamental linear system theory.

Course Objectives:
1) To understand the basics of signals and system by analyzing the various transformations available and determine their use to DSP
2) To study on the various digital filtering techniques and how to apply to DSP
3) To study on the ways to estimate signal parameters, and transform a signal into a form that is more informative.
4) To give students a flavor on the applications of DSP in the areas of speech and image.

Course Outcomes:
On successful completion of this course the students should be able to
1) Comprehend the performance enhancements provided by DSP in the areas of speech and image processing
2) Develop tools and methods for DSP.
3) Describe fundamental concept about implementation of real time systems

Unit I
SIGNALS AND SYSTEMS: Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution (linear and circular) – Correlation

Unit II
FREQUENCY TRANSFORMATIONS: Introduction to DFT – Properties of DFT – Filtering methods based on DFT – FFT Algorithms - Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT.

Unit III
IIR FILTER DESIGN: Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation

Unit IV
FIR FILTER DESIGN: Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

Unit V
APPLICATIONS: Multirate signal processing – Speech compression – Adaptive filter – Musical sound processing – Image enhancement.

(Total: 60 Periods)

Content beyond Syllabus:
Study on Matlab tool used in developing applications related to DSP

Text Books:
1. John G. Proakis& Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth edition, Pearson education / Prentice Hall, 2007.
2. Emmanuel C..Ifeachor, &Barrie.W.Jervis, "Digital Signal Processing", Second edition, Pearson Education / Prentice Hall, 2002.

Reference Books:
1) Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Tata McGraw Hill, Fourth Edition, 2007 .
2) Alan V.Oppenheim, Ronald W. Jchafer&Hohn. R.Back, "Discrete Time Signal Processing", Pearson Education, Second Edition, 2001.
3) 3. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill, 2006.

Websites:
1) http://ocw.mit.edu/resources/res-6-008-digital-signal-processing-spring-2011/study-materials/
2) https://www.coursera.org/course/dsp

IT-E61 PRINCIPLES OF PROGRAMMING LANGUAGES

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E61	Principles Of Programming Languages	3	1	0

Course Objectives:

1. To introduce several paradigms of Programming,
2. To get used to these paradigms by example Programming Languages,
3. To understand the concepts of syntax, translation, abstraction, and implementation of Programming Languages

Course Outcomes:

On successful completion of this course, the students will be able to:

1. Develop the understanding of the major design concepts of a Programming Language
2. Understand the trade-offs between important language design goals
3. Differentiate between major languages' paradigms: imperative, functional, object oriented and logic.

Unit I

Introduction: Characteristics of Programming Languages - Factors influencing the evolution of Programming Language - Development of programming methodologies - Desirable features and design issues.

Unit II

Elementary and Structured Data Type: Data object variables – constants - data types - elementary data types - declaration - assignments and initialization – enumeration - characters string. Structured data type and objects: Specifications of data structured types - vectors and arrays - variable size data structure - pointers and programmer constructed data structure.

Unit III

Object Oriented Languages: the class notion- Information hiding and data abstraction using Classes - Derived Classes and inheritance- Polymorphism - Parameterized types.

Unit IV

Functional Language: Functional programming concepts – Referential transparency – Types - Type systems – Name – bindings - environment and scope - Recursive functions - Polymorphic functions - Type variables.

Unit V

Logic Languages: Review of Predicate Logic, Clause Form, Logic, Logic as a Programming Language - UnificationAlgorithm - Abstract Interpreter for Logic Programs - Theory Of Logic Programs.

(Total: 60 Periods)

Content beyond Syllabus:

1. Event Driven Programming Concepts
2. Concurrent Programming Concepts

Text Books:

1. Terrence W. Pratt, Marvin V. Zelkowitz, Programming Languages: Design and Implementation, Prentice Hall, 2000.
2. Daniel P. Friedman, Mitchell Wand, Christopher Thomas Haynes, Essentials of Programming Languages, The MIT Press 2001.
3. Allen B. Tucker, Robert Noonan, Programming Languages: Principles and Paradigms, TMH, 2006.

Reference Books:

5. John C. Mitchell: Concepts in Programming Languages, Cambridge University Press 2002.
6. Benjamin C. Pierce: Types and Programming Languages, The MIT Press 2002.
7. Michael L. Scott: Programming Language Pragmatics, Morgan Kaufmann Publishers 2005.
8. B. Stroustrup, The C++ Programming Language, Addison-Wesley, 2000.
9. E Horowitz, Fundamental of Programming Languages, Galgotia, 1984.
10. M. Hennessey, The Semantics of Programming Languages, John Wiley, 1990.
11. Ravi Sethi: Programming Languages: Concepts and Constructs, 2nd edition, Addison-Wesley 1996.

Websites:

1) http://www.cs.rice.edu/~javaplt/411/12-fall/
2) http://forum.jntuworld.com/showthread.php?19715-Principles-Of-Programming-Language-(PPL)-Study-Materials-Notes

IT-E62SOFTWAREPROJECTMANAGEMENT

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E62	Software Project Management	3	1	0

Course Objectives: This course aims at the role of software developers in getting exposure on planning and controlling of software development

- 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

Course Outcomes:

On successful completion of this course students will be able to:

- Analyze / compare the given algorithm
- Compute the time complexity/space complexity of any recursive/non recursive algorithms
- Solve any given problem using the fundamental design techniques

Unit I

Software Process: Process Maturity – Capability Maturity Model (CMM) – KPA Project Management, Variations in CMM - Productivity improvement process.

Unit II

People Management: Organization structure – Difficulties in people management - Effective team building – Role of Project manager - Team structures – Comparison of different team structures.

Software Metrics: Role Of Metrics In Software Development - Project Metrics – Process Metrics – Data Gathering - Analysis Of Data For Measuring Correctness, Integrity, Reliability And Maintainability Of Software Products.

Unit III

Project Management And Planning: Project initiation – standard process, Process Tailoring - Feasibility study - Planning – Estimation - Resource allocation The project Plan – Software Development Process – Defects – Finding Defects – Code Review Checklist – Projecting Defects Inspection And Review: Need- Process of Inspection- SRS- Design Document Inspection.

Unit IV

Project Scheduling And Tracking: Scheduling - Critical path – Tracking - Timeline chart – Earned value chart. Software Configuration Management: Baselines - Software configuration items -The SCM process - Version control - Change control - Configuration audit - SCM standards.

Unit – V

Working Capital Policy: Importance of Working Capital Management – Risk- Risk analysis and management – Types of Risk involved - RMM plan- Return Tradeoff for Current Asset Investments – Financing Current Assets – The Costs and Risks of Alternative Debt Maturities. Quality Planning: Quality process - Quality control –Defect preventive process- Total Quality Management.

(Total : 60 Periods)

Content beyond Syllabus:

1) Tutorial for real-time Mini-project with CMM

Text Books:

1. Pankaj Jalote, Software Project Management in Practice, Pearson Education, New Delhi, 2010.
2. 2. KrishRangarajan and Anil Misra, Working Capital Management, Excel Book, New Delhi, 2009.

Reference Books:

1) Watts Humphrey, Managing the Software Process, Pearson Education, New Delhi, 2005.
2) Roger S Pressman, Software Engineering – A Practitioner's Approach, McGraw Hill International Edition, Singapore, Sixth Edition, 2007.
3) Hughes, Software Project Management, Tata McGraw-Hill, 2004.

Websites:

1) http://www.techsoup.org/learningcenter/software/page7648.cfm
2) http://www.spmassets.com/index.php/spm-projects.html

IT-E63 GRID COMPUTING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E63	Grid Computing	3	1	0

Course Objectives:

1. To understand Grid Architecture
2. To understand different types of grids
3. To know Grid standards
4. To apply grid computing in various areas

Course Outcomes:

The student will be able to

1. Create a Grid Middleware architecture
2. Explain the services offered by grid
3. To utilize grid for various applications

UNIT I

INTRODUCTION: Parallel and Distributed Computing - Cluster Computing - Grid Computing Anatomy and Physiology of Grid - Web and Grid Services.

UNIT II

FRAMEWORK: Architecture – Implementation of Grid Architecture – Grid Services OGSI, OGSA, WSRF – Grid Resource and Service Management –Resource Management Framework – Service Negotiation and Acquisition Protocol – Layers of Grid Computing – Building Reliable Services - Grid Monitoring – Sensors and Sensor Management - Grid Security – WS Security – GSI.

UNIT III

DATA AND KNOWLEDGE GRID: Data Source – Collective Data Services - Data Management – Collective Data Management – Federation Services – Representing Knowledge – Processing Knowledge - Knowledge Oriented Grid.

UNIT IV

GRID MIDDLEWARE: List of Globally Available Toolkits – GT3 – Architecture Details – Grid Service Container – OGSI Implementation – Security Infrastructure - System Level Services – Hosting Environments- Programming Model.

UNIT V

APPLICATIONS: Scientific – Medical – Bioinformatics – Federated Computing – ERM – Multiplayer Games - Collaborative Science – Case Study.

(Total: 60 Periods)

Content beyond Syllabus:

1. The course content is to be applied into the real engineering applications

Text Books:

1. Ian Foster, Carl Kesselman, "The Grid 2: Blueprint for a New Computing Infrastructure", Elsevier Series, Second edition, 2009.

Reference Books:

1. SrikumarVenugopal, Krishna Nadiminti, Hussein Gibbins and RajkumarBuyya, "Designing a Resource Broker for Heterogeneous Grids, Software: Practice and Experience", Wiley Press, New York, USA, 2010.
2. Fran Berman, Geoffrey Fox, Anthony J.G. Hey, "Grid Computing: Making the Global Infrastructure a Reality", Wiley, 2010.
3. Maozhen Li, Mark Baker, "The Grid: Core Technologies", Wiley, 2009.

IT-E64 BUSINESS INTELLIGENCE

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E64	Business Intelligence	3	1	0

Pre-requisite: Fundamentals of DBMS

Course Objectives:
To equip the students with the understanding of the concepts of Business Intelligence

Course Outcomes:
The students are to gain complete understanding of Business Intelligence.

Unit I
Business Intelligence Definition - Business Decisions- Decision Support Systems- Group Decision Support - Groupware Technologies- Expert Systems.

Unit II
Data Warehousing-Features-System Databases-Creating Databases and Tables- Specifying Constraints- Data Manipulation Language - OLTP & OLAP,-Data Marts- Data Warehousing, Data Warehouse Architecture.

Unit III
Data Mining and Knowledge Discovery- Data Mining Techniques- Applications of Data Mining- Real-time case studies.

Unit IV
Business Performance Management – Key Performance Indicators (KPI) – Significance of KPI – Dashboards –Balanced Scoreboard - Performance Monitoring.

Unit V
Emerging trends of BI - Real-world use of BI – Case studies of BI.

(Total: 60 Periods)

Content beyond Syllabus:
RapidMiner Software and XLMiner,

Text Books:

1. Turban, Sharda, Delen and King, Business Intelligence: A Managerial Approach, Prentice Hall, Edition: 2nd, 2011.
2. Efraim Turban, E. Aronson, Decision Support Systems and Intelligent Systems. Eighth Edition, Pearson Education, 2008.
3. Sam Anahory, Dennis Murray, Data Warehousing in the Real World. Pearson.2005.

Reference Books:

1. Larson. B., "Delivering Business Intelligence with MS SQL Server 2012, McGraw Hill

Websites:

1. www.businessintelligence.com

IT-E65ENTERPRISE SOLUTIONS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E65	Enterprise Solutions	3	1	0

Pre-requisite: Introduction to Software Engineering and DBMS

Course Objectives: The students are to understand the concepts of Big Data

Course Outcomes:

1) The students can able to build solutions for enterprise problems
2) The students can be able to work on the problems of the enterprise
3) The students can able to share the enterprise resources with the enterprise peers to gain competitive advantage.

Unit I

Enterprise Solutions – the problems – the challenges – the characteristics.

Unit II

The Notion of Patterns – Patterns and Enterprise Solutions – How Patterns provide solution to real life situations.

Unit III

Web Applications – construction of solutions using Patterns for Web Applications.

Unit IV

The requirements of users of Enterprise solutions.

Unit V

Case Studies

(Total: 60 Periods)

Content beyond Syllabus:

To optimize technology with enterprise solutions

Text Books:

1. Microsoft Corporation, "Enterprise Solution Patterns Using Microsoft .NET", O'Reilly 2010

Reference Books:

1. Dino Esposito, "Architecting Mobile Solutions for the Enterprise", The McGraw Hill, 2012
2. "Planning for Big Data", Microsoft, 2012

IT-E66 OBJECT ORIENTED ANALYSIS AND DESIGN

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E66	Object Oriented Analysis and Design	3	1	-

Pre-requisite:
Knowledge in the features of Object Oriented Programming Languages

Course Objectives:
To familiarize the students to carry out object oriented analysis and design for developing object oriented software projects

Course Outcomes:
Students acquire the skills to apply Industry recommended Unified Modeling Language Practices for OOAD and document them effectively

Syllabus:

Unit I

Object Oriented Methodologies: Software System Life Cycle – Traditional cycle models – Object Oriented approach – Rambaugh et al Object Modeling Technique – Booch Methodology – Jacobsonet al methodology –Rational Unified Process (RUP) – Unified Modeling Language (UML) – UML Models.

Unit II

UML Diagrams: Use case diagram – UML class diagram – interaction diagram – state diagram – activity diagram – Requirements for ATM banking system – case study.

Unit III

Object Oriented Analysis: Use case driven Object analysis – approaches for identifying classes – identifying objects, relationships attributes, methods for ATM banking system –Object oriented design process – design axioms.

Unit IV

Object Oriented Design: Designing Classes, methods – access layer object storage and object interoperability –access layer for the ATM banking system View layer – designing interface objects – prototyping User interface – view layer for the ATM banking system.

Unit V

Design Patterns: Design Patterns – Describing design patterns - catalog of design patterns – organizing the catalog – How design patterns solve design problems – How to select a design pattern – How to use a design pattern – creational pattern : Abstract factory – structural pattern : Adapter – behavioral pattern : chain of responsibility.

(Total : 60 Periods)

Content beyond Syllabus:

1. Students are encouraged to prepare the document for Mini project and Final year project applying OOAD for the system they implement.
2. Using CASE tools for performing OOAD.

Text Books:

1. Ali Bahrami, Object Oriented systems development, Tata Mcgraw Hill Education Private Ltd, 1999.
2. Carol Britton and Jill Doake, A student Gide to Object Oriented Development, Elsevier, Butterworth – Heinemann, Eighth Edition, 2007.
3. Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides, Design Patterns – elements of reusable object oriented software, Addition Wesley, 1994.

Reference Books:

1. Craig Larman,"Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development", Third Edition, Pearson Education, 2005
2. Mike O'Docherty "Object-Oriented Analysis & design – understanding system development with UML 2.0", John Wiley, 2005.
3. Grady Booch, James Rumbagh, IvarJacobson, "The UML user Guide", Pearson Education, 2005
4. Timothy C. Lethbridge, Robert Laganiere" Object-Oriented Software Engineering – A practical software development using UML and Java", Tata McGraw-Hill, New Delhi, March 2003.
5. David William Brown, "An Introduction to Object Oriented Analysis Objects and

UML in Plain English", 2nd Edition, Wiley, 2001

Websites:

1. www.omg.org
2. http://www.ibm.com/developerworks/rational/products/rose/
3. http://www.smartdraw.com/resources/tutorials/jacobson-oose-diagrams/

IT-E67GEOGRAPHICAL INFORMATION SYSTEMS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E67	Geographical Information Systems	3	1	0

Course Objectives:

1) To introduce students to concepts and principles of GIS
2) To provide students with fundamental skills of operating GIS software (ArcGIS)
3) To make students carryout mapping geographic features and basic analyses
4) To provide students with techniques of operating GPS for data gathering and using for GIS
5) students with basic concepts of Remote Sensing and skills on image/photo interpretation.

Course Outcomes:

On successful completion of this course students will be able to:

1) Define what GIS is and know different types of GIS data
2) Know what are the questions that GIS can answer
3) Differentiate between Raster and Vector Models
4) Create maps and overlay features/raster data for basic analyses
5) Handle and operate GPS instruments to collect data and transform for GIS applications
6) Understand basic theory and principles of EMR for data interpretation and analyses.

UNIT I

Introduction: Maps–Definition–Types of Maps–Characteristics of Maps–Map Projections– GIS–Definition–ComponentsofGIS–Hardware,SoftwareandOrganizationalContext–GISsoftware;DataInput:DataTypes–SpatialandNon-Spatial–SpatialData–Points,LinesandPolygons– Non-spatial data– Nominal, Ordinal, Interval and Ratio – Digitizer – Scanner –Editing and Cleaning–Geo referencing.

UNIT II

RemoteSensing: Datacollection,Datatypes-EMspectrum,RadiationandEarth–Simulatedand False-color Images-LUTsandBandCorrelationthesewebsitesImageenhancement.RemotesensingoftheEarth'ssurfaceutilizingtheelectromagneticspectrum.TechniquesofphotographyMultispectralScanning,andMicrowaveImageryfromAirplane,Satellite,andmanned-spacecraft platforms.Imageinterpretation,practicalapplicationsinearthscienceanduseofremotelysensed data in geographic information systems.

UNIT III

DataStructureandAnalysis: RasterandVectorDataStructure–Rasterdatastorage–Runlength, ChainandBlockCoding–VectorDataStorage–Topology–TopologicalModels–ArcNodeStructure–SurfaceData–DEM–GriddedDEMandTINstructure-Applications of DEM.

UNIT IV

DataAnalysisandDataQuality: Reclassification–Measurement–Buffering–Overlaying–SQLforQueries–Neighbourhood and zonaloperations–DataQuality–Componentsofdataquality-SourcesoferrorsinGIS–Metadata.

UNIT V

Data Output and GIS Applications: Output–Maps, Graphs, Charts, Plots, Reports–Printers–Plotters –Fields of application – Natural Resource Management, Parcel based, AM/FM applications examples–Casestudy: Urban growth studies using GIS.

(Total : 60 Periods)

Content beyond Syllabus:

1) Study about Geo referencing, Geo statistics

Text Books

1.PeterA.BurroughandRachaelA.McDonnell,PrinciplesofGeographical Systems,Oxford, UniversityPress,1988.
2.AnjiReddyStarJ.andEstes.J.,GIS –AnIntroduction,PrenticeHall,USA,2002.
3.RobertLauriniandDerekThompson,FundamentalsofSpatialInformation Systems,AcademicPress,2002.

Reference Books:

1) Kennedy M (2006) Introducing Geographic Information systems with ArcGIS. John Wiley & Sibs.

Website:

2) http://www.esri.com/industries/Forestry/watershed.html

IT-E68 USER INTERFACE DESIGN

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E68	User Interface Design	3	1	0

Course Objectives:

1) To study the basic characteristics of graphics and web interfaces, Human Computer Interaction, multimedia interfaces for the web and the principles of evaluating interfaces.

Course Outcomes:

On successful completion of this course students will be able to:

1) The students learn concepts of user interface and used for web applications, human interfaces and for multimedia interfaces.

UNIT I

Introduction: A Taxonomy Of Software Design–Goal-Directed Design– TheThreeModels–VisualInterfaceDesign–Forms–IdiomsAndAffordances–HistoryofRectanglesontheScreen –Windows- Files– Storage and Retrieval Systems – Choosing Platforms.

UNIT II

Interface Design: BehaviorofPresentation–OrchestrationandFlow–TechniquesforInducingandMaintaining Flow–CharacteristicsofGoodUserInterface–PosturesandState–Idiocy–TheSecretWeaponofInterfaceDesign.

UNIT III

Mouse Operations: TheInteraction–MouseOperations–Selection–DirectManipulation–Manipulatinggizmos– Repositioning–Resizing and reshaping– Arrowing– Direct-Manipulation visual feedback – Drag-and-Drop.

UNIT IV

Menu Selection: The Cast– The Meaning of Menus–Menu–Dialog Boxes–DialogBox Etiquette–Toolbars–The Gizmos–Imperative and Selection Gizmos–Entry and Display Gizmos–New Gizmos.

UNIT V

Managing Exceptions & Personalization: EliminatingtheErrorMessages–ManagingExceptions–Undo–Troubles–Redo–SpecialUndo Functions– Installation–Configuration–Personalization.

(**Total: 60 Periods**)

Text Books:

1. Alan Cooper, The Essentials of User Interface Design,Wiley Dream techIndia (P) Ltd., 2002.
2. Ben Schneiderman, Designing theUserInterface,AddisonWesley,2000.

Reference Books:

1. AlanDix, JanetEFinlay,GregoryD.AbowdandRussellBeale, Human-ComputerInteraction,PrenticeHall,3rd Edition,2003.
2. JacobNielson, Usability Engineering, AcademicPress,1993.

IT-E69 SYSTEM MODELING AND SIMULATION

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E69	**System Modeling and Simulation**	4	0	0

Pre-requisite:

Knowledge in basic and Object oriented programming languages.

Course Objectives:

- To learn, develop, design and implement state-of-the-art, and technically correct Simulation models.
- To learn various simulation languages and program using the simulation languages.
- To develop and execute Simulation models in known computer high level languages.
- To learn the differences in Simulation approaches.

Course Outcomes:

On successful completion of this course

- The students will get acquainted with simulation domains.
- They will understand the major intricacies of of simulation and testing domains.
- They will be able to convert verbal descriptions to models and programs

SYLLABUS:

UNIT I

Introduction to Simulation: Need for Simulation – System and its terminologies – Types of simulation – Advantages and Limitations of Simulation – Discrete event simulation – Monte Carlo Simulation – Areas of Application – Components of System – System and its Environment – Models of a System – Continuous Systems – Discrete Systems – Modeling approaches.

UNIT II

Random Numbers: Desirable attributes of Random Numbers – Random Number generation – Mid-square Method – Congruential Methods - Recursive generator – Testing Randomness – Chi-square test – Kolmogorov Smirnov test – Bartels Ratio test – Runs up and down test – Run test.

Probability distributions and Random Variates: Probability distributions– Discrete and Continuous distributions **–** Uniform distribution – Exponential distribution – Poisson distribution – Normal distribution – Gamma distribution – Erlang distribution – Inverse Transform Technique –Weibull distribution – Empirical continuous distribution – Generating approximate normal variates –Discrete uniform distribution –Geometric distribution – Acceptance Technique for Poisson distribution – Rejection Technique for Poisson distribution.

Queueing Theory: Terminologies of Queueing system – Empirical Queueing Models.

UNIT III

Simulation Languages and Simulation Models: Simulation language requirements – Evolution of Simulation languages – General Activity Simulation Programme – Single server Queueing system with single, two queues – Multiple server Queueing system – Balking – Reneging – Bulk arrivals – simple simulation problems.

UNIT IV

General Purpose Simulation System Language: GPSS blocks for creation, queue, print, transfer, conditional transfer, Priority, Select, Table, Test, Tabulate Loop, Logic, Gate, etc – Standard Numerical Attributes in GPSS – Transaction

parameter – Equivalence declaration – Transaction times – single and matrix Variables in GPSS – Programming in GPSS for simple simulation problems.

UNIT V

Other Simulation Languages: SIMULA Language – SIMULA language structures – file operations – Object oriented concepts in SIMULA – array structures in SIMULA.

SIMSCRIPT – SIMSCRIPT language notations – SIMSCRIPT language structures – Object oriented Programming and simulation in SIMSCRIPT.

NS3 - Events and Simulator- Callbacks - Implementation details- Object model NS3 - Examples – Attributes

MATLAB - MATLAB Constructs - Variables - Arithmetic Operations -mathematical and Graphical Functions - Structures - Cell Arrays - MATLAB Programming - MATLAB Editor and Debugger - Projects - Simple Menu - Files - Sorting - Sub-image - Multiple Images

(Total : 60 Periods)

TEXT BOOKS:

1. R. Panneerselvam and P. Senthilkumar, "System Simulation, Modelling and Languages", PHI Learning Private Limited, 2013

Reference Books:

1. Averill M Law, "Simulation Modeling and Analysis", Fourth Edition, McGraw-Hill

Education, 2008.

2. Jerry Banks, John Carson, Barry L. Nelson and David Nicol, "Discrete - Event System

Simulation", Prentice Hall, Fourth edition, 2005.

3. NarasingDeo, "System Simulation with Digital Computer", Prentice-Hall of India, 2004.

4. Averill. M. Law and W. David Kelton, "Simulation Modeling and Analysis", McGraw-Hill

Inc., 2000

IT-E71 INFORMATION RETRIEVAL

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E71	Information Retrieval	3	1	0

Pre-requisite:
Mathematical especially (vector) inner products and probability, Machine Learning, Artificial intelligence, Language Engineering and Database Technology.

Course Objectives:
To gain in-depth understanding:

1. The foundation concepts of information retrieval techniques
2. About different information retrieval techniques in various application areas
3. The IR principles to locate relevant information large collections of data
4. Analyze the performance of retrieval systems when dealing with unmanaged data sources
5. Able to implement retrieval systems for web search tasks

Course Outcomes:

1. Understand and discuss current issues and research in online searching and information retrieval
2. Appreciate the capabilities and limitations of information retrieval systems
3. Identify search concepts in an information request
4. Employ appropriate search strategies and vocabularies for online and Internet searching
5. Identify and discuss problems, issues, and future developments in information retrieval and online searching.

Unit I

INTRODUCTION: Basic Concepts – Retrieval Process – Modeling – Classic Information Retrieval – Set Theoretic, Algebraic and Probabilistic Models – Structured Text Retrieval Models – Retrieval Evaluation –Word Sense Disambiguation.

Unit II

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

Unit III

TEXT OPERATIONS AND USER INTERFACE: Document Preprocessing – Clustering – Text Compression - Indexing and Searching – Inverted files – Boolean Queries – Sequential searching – Pattern matching – User Interface and Visualization – Human Computer Interaction – Access Process – Starting Points –Query Specification - Context – User relevance Judgment – Interface for Search.

Unit IV

MULTIMEDIA INFORMATION RETRIEVAL: Data Models – Query Languages – Spatial Access Models – Generic Approach – One Dimensional Time Series – Two Dimensional Color Images – Feature Extraction.

Unit V

APPLICATIONS: Searching the Web – Challenges – Characterizing the Web – Search Engines – Browsing – Meta- searchers – Online IR systems – Online Public Access Catalogs – Digital Libraries – Architectural Issues – Document Models, Representations and Access – Prototypes and Standards.

(Total : 60 Periods)

Content beyond Syllabus:

1. Introduction to Semantic Web
2. Introduction to Knowledge representation

Text Books:

1. Ricardo Baeza-Yates, Modern Information Retrieval, Pearson Education, 2007.

Reference Books:

1. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, Introduction to Information Retrieval, Cambridge University Press. 2008.
2. William B Frakes, Ricardo Baeza-Yates, Information Retrieval Data Structures and Algorithms Pearson Education, 1992

3. Robert Korfhage, Information Storage & Retrieval, John Wiley & Sons, 1997.

Websites:

1. http://www.inf.unibz.it/~ricci/ISR/
2. http://www.sigir.org/forum/2008J/2008j-sigirforum-belkin.pdf
3. http://www.liacs.nl/~mlew/mir.survey16b.pdf
4. http://sunset.usc.edu/classes/cs572_2010/
5. http://grupoweb.upf.es/WRG/mir2ed/pdf/slides

IT-E72 SOFTWARE TESTING

Subject Code	Subject Name	Lectures (Periods)	Tutorial (Periods)	Practical (Periods)
IT E72	SOFTWARE TESTING	3	1	0

Course Objectives:

3. To learn, practice and apply the software testing industry practices
4. To acquire knowledge on the various test design strategies, levels of testing and test management

Course Outcomes:

4. Ability to apply appropriate testing methods for varying requirements of the software industry
5. Understanding and executing the responsibility of the software testing personal and producing error free software

UNIT I

INTRODUCTION: 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.

UNIT II

TEST CASE DESIGN: Introduction to Testing Design Strategies – The Smarter Tester – Test Case Design Strategies – Using Black Box Approach to Test Case Design Random Testing – Requirements based testing – positive and negative testing -— Boundary Value Analysis – decision tables - Equivalence Class Partitioning state-based testing– causeeffect graphing – error guessing - compatibility testing – user documentation testing – domain testing Using White–Box Approach to Test design – Test Adequacy Criteria –static testing vs. structural testing – code functional testing - Coverage and Control Flow Graphs – Covering Code Logic – Paths – Their Role in White–box Based Test Design – code complexity testing – Evaluating Test Adequacy Criteria.

UNIT III

LEVELS OF TESTING: The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests. The Test Harness – Running the Unit tests and Recording results – Integrationtests – Designing Integration Tests – Integration Test Planning – scenario testing – defect bash elimination -System Testing – types of system testing - Acceptance testing – performance testing - Regression Testing – internationalization testing – ad-hoc testing - Alpha – Beta Tests – testing OO systems – usability and accessibility testing

UNIT IV

TEST MANAGEMENT: People and organizational issues in testing – organization structures for testing teams –testing services - Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process - Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

UNIT V

CONTROLLING AND MONITORING: Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation - Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – evaluating software quality – defect prevention – testing maturity model.

(**Total: 60 Periods**)

Content beyond the Syllabus:

The students can be encouraged to apply concepts learnt in this course in their programming laboratory and project

Text Books:

1) Srinivasan Desikan and Gopalaswamy Ramesh, " Software Testing – Principles and Practices", Pearson education, 2006.
2) AdityaP.Mathur, "Foundations of Software Testing", Pearson Education, 2008.

Reference Books:

1. Boris Beizer, "Software Testing Techniques", Second Edition, Dreamtech, 2003.
2. Elfriede Dustin, "Effective Software Testing", First Edition, Pearson Education, 2003.
3. RenuRajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.

Websites:

1. *www.mtsu.edu/~storm*

IT-E73MANAGEMENTCONCEPTSANDSTRATEGIES

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E73	Management Concepts and Strategies	3	1	0

Course Objectives:

1) To introduce the fundamental of Management concept strategies
2) To study the concepts of Software Management
3) To get acquainted with Software Quality Assurance Standardization

Course Outcomes:

On successful completion of this course students will be able to:

1) Manage Software projects in organization
2) Follow Social responsibility, standards, policies and Ethics

Unit I

Management: Science Theory and Practice - Management and Society: Social responsibility and Ethics. The nature and purpose of planning - objectives – Strategies-Policies and planning premises.

Unit II

Decision making: The Nature and purpose of organizing - Basic departmentation - Line /staff Authority and decentralization - Effective Organizing and organizational culture.

Unit – III

Human Resource Management and selection - Performance appraisal and career strategy - Manager and organizational development.

Unit – IV

Managing and the Human factor - Motivation - Leadership - communication.

Unit – V

The system and Process of controlling control techniques and information Technology - Productivity and Operations Management - Overall and Preventive Control - Towards a unified, Global management theory.

(Total :60 Periods)

Content beyond Syllabus:

1) How to make Global standards and policies.

Text Books:

1. Herald Knootz and Heinz Weihrich, Essentials of Management, McGraw-Hill Publishing Company, Singapore International Edition, 2000.
2. Ties AF, Stoner and R.Edward Freeman, Management, Prentice Hall of India Pvt., Ltd., New Delhi, 2003.
3. Joseph, Massie, Essentials of Management, Prentice Hall of India Pvt., Ltd., New Delhi, 2002.

Reference Books:

1. Watt S.Hamphery, Managing the Software Process, Pearson Education Inc, New Delhi, 2011.

Websites:

1) http://www.hrfolks.com/articles/strategic%20hrm/essentials%20of%20strategic%20management.pdf
2) http://smallbusiness.chron.com/key-concepts-strategic-management-organizational-goals-10234.html

IT-E74 IMAGEPROCESSING

Subject Code	Subject Name	Lectures (Periods)	Tutorial (Periods)	Practical (Periods)
IT-E74	Image Processing	3	1	0

Course Objectives:

1. Relevance of Computer based drawings and processing of digital images in day to day applications.
2. Adopting the Computer based drawings and animations in relevant situations and circumstances.
3. Understanding the nature of drawings, images and video in support of the evolving concept of engineering and computer applications.

Course Outcomes:

On successful completion of the module students will be able to:
1.Engineering graduates with a strong thinking and ability to draw and process real life like images or pictures.

Syllabus:

Unit I

Digital Image Fundamentals: digital image representation –fundamental steps involved in digital image processing – components of image processing system – image sensing and acquisition – image sampling and quantization – basic relationships between pixels –examples of fields that use digital image processing. Image Transforms: introduction to Fourier transform – Discrete Fourier Transform – Fast Fourier Transform – Cosine, Sine, Hadamard, Haar, Slant and KLT transforms.

Unit II

Image Enhancement: basic gray level transformations – histogram processing – enhancement using arithmetic/logic operations – basics of spatial and frequency domain filtering – smoothing spatial and frequency domain filters - sharpening spatial and frequency domain filters. Color Image Processing: fundamentals – color models – pseudo color image processing – color transformations – color image smoothing and sharpening – color segmentation – noise in color images.

Unit III

Image Restoration: model of the image degradation/restoration process – noise models – restoration in the presence of noise only-spatial filtering – periodic noise reduction by frequency domain filtering – linear, position-invariant degradations – estimating the degradation function – inverse,wiener, constrained least square and geometric mean filtering – geometric transformations. Wavelets and Multi-resolution processing: background – Multi-resolution expansions – wavelet transforms in one dimension and two dimensions – fast wavelet transform – wavelet packets.

Unit IV **(9 Periods)**

Image Compression: fundamentals – image compression models – elements of information theory– error-free compression – lossy compression – image compression standards. Morphological Image Processing: preliminaries – dilation and erosion – opening and closing – hit-or-miss transform – some basic morphological algorithms.

Unit V **(9 Periods)**

Image Segmentation: detection of discontinuities – edge linking and boundary detection – thresholding – region based segmentation. Representation and Description: representation – boundary descriptors – regional descriptors – relational descriptors.

(Total: 60 Periods)

Text Books:

1. RafaelC.Gonzalezand RichardE. Woods, Digital Image Processing,2ndedition,Pearson EducationPvt.Ltd,2002.
2. Anil K.Jain, Fundamentals of Digital Image Processing, Prentice Hall of India,2001.

Reference Books:

1. Gonzalez, Woods, and Eddins, Digital Image Processing Using MATLAB, 2nd Edition, PrenticeHall,2009.
2. S. Sridhar, Digital Image Processing, Oxford Press, 2011.

IT-E75 WIRELESS SENSOR NETWORKS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E75	Wireless Sensor Networks	3	1	-

Pre-requisite: IT-T62 Computer Networks

Course Objectives:

The objectives of this course are to introduce students to the state of the art in wireless sensor actuator networks and to provide hands on training in programming these networks.

Course Outcomes:

On successful completion of this course you will be able to:

1) Apply knowledge of wireless sensor networks to various application areas.
2) Design, implement and maintain wireless sensor networks.
3) Formulate and solve problems creatively.

Unit I

OVERVIEW OF WIRELESS SENSOR NETWORKS : Challenges for Wireless Sensor Networks-Characteristics requirements-required mechanisms, Difference between mobile ad-hoc and sensor networks, Applications of sensor networks- Enabling Technologies for Wireless Sensor Networks.

Unit II

ARCHITECTURES: Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

Unit III

NETWORKING OF SENSORS: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing.

Unit IV

INFRASTRUCTURE ESTABLISHMENT: Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

Unit V

SENSOR NETWORK PLATFORMS AND TOOLS: Operating Systems for Wireless Sensor Networks, Sensor Node Hardware-Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.

(Total: 60 Periods)

Text Books:

1) Holger Karl & Andreas Willig, " Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005.

Reference Books:

1. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.
2. KazemSohraby, Daniel ivlinoli, &TaiebZnati, "Wireless Sensor Networks-Technology, Protocols, and Applications", John Wiley, 2007.
3. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.
4. BhaskarKrishnamachari, "Networking Wireless Sensors", Cambridge Press, 2005.

IT-E76 NETWORK MANAGEMENT AND PROTOCOLS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E76	**Network Management and Protocols**	3	1	-

Pre-requisite: IT T62

Course Objectives:

Review of the principle of Network Management Architectures & Applications, Simple Network Management Protocols, Network Management Functions – Security, Network Management Functions - Accounting & Performance, Remote Network Monitoring RMON, Management Tools, Systems and Applications

Course Outcomes:

Upon completion of this course, students will have an understanding of networking basics including:

1) The course will provide information to students on how to install, maintain, and manage Local Area Networks and internetworks.
2) Students will have an understanding of network management architectures and protocols.
3) Students will be familiar with a variety of network management tools and network security issues.

Unit I

Network Management Fundamentals - Network management requirements − Network monitoring − Network control.

Unit II

SNMPV1: SNMP Network Management Concepts - SNMP Management Information, Standard MIBs.

Unit III

RMON: Remote Network Monitoring: Statistics Collection, Alarms and Filters. RMON2.

Unit IV

SNMP V2: System architecture − Protocols − SNMP V3

Unit V

Network Security Protocols: SSH, RADIUS, SSL, Kerberos, TLS, IPSec, Voice over IP.

(Total: 60 Periods)

Text Books:

1. William Stallings, "SNMP, SNMPV2, SNMPV3 and RMON1 and 2", 3rd Edition, AddisonWesley, 1999.
2. William Stallings, "Data and Computer Communications", 5th Edition, PHI, 1997.

Reference Books:

1. Mani Subramanian, "Network Management−Principles and Practices", Addison Wesley, 2000.
2. 2. William Stallings, "Cryptography and Network Security", PHI, 2000.

IT-E77 UNIX INTERNALS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT E77	Unix Internals	3	1	0

Pre-requisite: IT-T53 Operating Systems

Course Objectives:

1) To introduce the basics and UNIX OS environment and UNIX file system.
2) To understand the structure of process, scheduling etc.
3) To learn the inter-process communication.

Course Outcomes:

On successful completion of this course students will be able to:

1) Use the UNIX operating system conveniently.
2) Learn how to program in the UNIX operating system.

Unit I

Introduction to the Kernel: Architecture of the UNIX operating system – Introduction to the system concepts – Kernel Data Structures; The Buffer Cache: Buffer Headers – Structure – Retrieval of a buffer – Reading and writing disk blocks – Advantages and Disadvantages; Internal Representation of Files: Inode – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super Block – Inode Assignment – Allocation of disk blocks.

Unit II

File System Frame Work: The Vnode / Vfs Architecture – Objectives – Lessons from device I/O – Vnode / Vfs Interface – Implementation – Objectives –Vnode and Open files – The Vnode – Vnode Reference Count – The Vfs Object; Linux ext2fs and Proc file systems; System Calls for the file system: Open – Read – Write – File and record locking – lseek – Close – file creation – creation of special files – change directory and change root – change owner and change mode – Stat and Fstat – Pipes – Dup – Mounting and unmounting file systems – Link – unlink – File system abstractions – file system maintenance.

Unit III

The Structure of Processes: Process states and transitions – Layout of system memory – The context – saving the context – manipulation of the process address space – sleep; Process Control: Process creation – Signals – Process Termination – Awaiting Process Termination – Invoking other programs – The user ID of a process – The shell – SystemBoot and the INIT Process.

Unit IV

Process Scheduling and Time: Process scheduling – System calls for Time – Clock – Scheduler goals – Process priorities – Scheduler Implementation – Run Queue Manipulation – The SVR4 Scheduler; Memory ManagementPolicies: Swapping – Demand Paging – A Hybrid System with swapping and demand paging.

Unit V

Inter Process Communication: Process Tracing – System V IPC – Network Communications - Sockets – Messages – Message Data Structures – Message Passing Interface – Ports – Name Space – Data Structures – Port Translations – Message Passing – Transferring port rights – Out – of – Line Memory – Control Flow – Notifications – Port Operations – Destroying a Port – Backup Ports – Port Sets – Port Implementation; Device Drivers and I/O: Device Driver Frame work – The I/O Subsystem – The poll System Call- Block I/O – The DDI / DKI Specification.

(Total : 60 Periods)

Content beyond Syllabus:

UNIX Network Programming

Text Books:

1. Maurice J. Bach, “The Design of the UNIX Operating System”, Prentice-Hall of India, 2004.
2. UreshVahalia, “UNIX Internals: The New Frontiers”, Pearson Education Asia, 2002.

Reference Books:

1. Silberschatz, Galvin and Gagne, Operating System Concepts, Wiley, Sixth edition, 2003.
2. Graham Glass and King Ables, “The New Frontiers”, Pearson Education, 2001.
3. William Stallings, “Operating System Internals and Design principles”, Prentice-Hall of India, Fourth edition, 2003.

Websites:

1) www.unix.com
2) www.gobookee.org/unix-internals-notes

IT-E78 CLOUD COMPUTING

Subject Code	Subject Name	Lectures (Periods)	Tutorial (Periods)	Practical (Periods)
IT E78	**Cloud Computing**	3	1	-

Pre-requisite:
Computer Architecture, Operating systems, Computer Networks, Client-Server Architecture

Course Objectives:

1. To impart the principles and paradigm of Cloud Computing
2. To understand the Service Model with reference to Cloud Computing
3. To comprehend the Cloud Computing architecture and implementation
4. To realize the role of Virtualization Technologies
5. To have knowledge on Cloud Computing management and security

Course Outcomes:
On successful completion of the course students will be able to:

1. Describe the concept, evolution, architecture , pros and cons of Cloud Computing.
2. Have knowledge of how hypervisors are used in Virtual Machines.
3. To secure and perform identity management in the Cloud.
4. To access and use the services in the Cloud.

Syllabus:

UNIT I
Introduction to Cloud Computing: Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Benefits and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks, Assessing the role of Open Standards.

UNIT II
Cloud Architecture, Services and Applications: Exploring the Cloud Computing Stack, Connecting to the Cloud, Infrastructure as a Service, Platform as a Service, Saas Vs. Paas, Using PaaS Application Frameworks, Software as a Service, Identity as a Service, Compliance as a Service.

UNIT III
Abstraction and Virtualization: Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context.

UNIT IV
Managing & Securing the Cloud: Administrating the Clouds, Cloud Management Products, Emerging Cloud Management Standards, Securing the Cloud, Securing Data, Establishing Identity and Presence.

UNIT V
Case-Studies: Using Google Web Services, Using Amazon Web Services, Using Microsoft Cloud Services.

(Total: 60 Periods)

Content beyond the Syllabus:
Cloud Simulation Tools

Text Books:

1. Buyya R., Broberg J., Goscinski A., "Cloud Computing : Principles and Paradigm", First Edition, John Wiley & Sons, 2011.
2. Sosinsky B., "Cloud Computing Bible", First Edition, Wiley Edition, 2011.

Reference Books:

1. Miller Michael, "Cloud Computing: Web Based Applications that Change the Way You Work and Collaborate Online", Pearson Education India
2. Smooth S., Tan N., "Private Cloud Computing", Morgan Kauffman , First Edition, 2011.
3. Linthicium D., "Cloud Computing and SOA Convergence in Enterprise", Pearson Education India.

Websites:

1. www.ibm.com/cloud-computing/
2. www.microsoft.com/enterprise/it-trends/cloud-computing/

IT-E79BIG DATABASES

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E79	**Big Databases**	3	1	0

Pre-requisite: IT-T54 DBMS

Course Objectives: The students are to understand the concepts of Big Data

Course Outcomes:

1) The students can use the tools of Big Data
2) The students can be able to provide security to Big Data
3) The students can able to turn Big Data into big money

Unit I

Introduction to Big Data: Big Data – The Evolution of Big data - Basics - Big Data Analytics and its Importance – challenges- Issues- Future of Big Data.

Unit II

Basic Big Data Analytic Methods and Modeling: Introduction to "R", analyzing and exploring data with "R"-Modeling: Architecture - Hybrid Data Modeling – Data Computing Modeling.

Unit III

Technology and Tools: MapReduce/Hadoop – NoSQL: Cassandra,HBASE – Apache Mahout – Tools.

Unit IV

Big Data Security: Big Data Security, Compliance, Auditing and Protection: Pragmatic Steps to Securing Big Data, Classifying Data, Protecting Big Data Analytics, Big Data and Compliance, The Intellectual Property Challenge –Big Data in Cyber defense.

Unit V

Case Studies: MapReduce: Simplified Data Processing on Large Clusters- RDBMS to NoSQL: Reviewing Some Next-Generation Non-Relational Database's - Analytics: The real-world use of big data - New Analysis Practices for Big Data.

(Total: 60 Periods)

Content beyond Syllabus:

To understand the real-time use of Big Data

Text Books:

1. Frank.J.Ohlhorst, "Big Data Analytics : Turning Big Data into Big Money", Wiley &Sas Business Series, 2013

Reference Books:

1. Paul C. Zikopoulos, Chris Eaton, Dirk deRoos, Thomas Deutsch, George Lapis, "Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data", The McGraw Hill, 2012.
2. "Planning for Big Data", O'Reilly Radar Team, 2012.
3. "Big Data Now Current Perspectives", O'Reilly Media, 2011.

Websites:

1. http://highlyscalable.wordpress.com/2012/03/01/nosql-data-modeling-techniques/
2. http://gigaom.com/2012/12/18/a-programmers-guide-to-big-data-12-tools-to-know/

IT-E81 E-COMMERCE

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT E81	**E-COMMERCE**	3	1	0

Pre-requisite: Fundamentals of Information Systems

Course Objectives:
To familiarize the students with the concepts of e-commerce.

Course Outcomes:

1. The students can learn how companies use e-commerce to gain competitive advantage.
2. The students can learn different models of e-commerce.
3. The students can understand how e-payment is affected.

Unit I

Introduction to e-Commerce: Framework – Architecture - Benefits of e-Commerce - Anatomy of e-Commerce applications- e-Commerce applications, e-Commerce Applications - e-commerce in India.

Unit II

E-commerce Models: Business-to-Business – Hubs - Market Places - Business-to-Business Exchange -Business-to-Consumer - Consumer-to-consumer - Business-to-Government - Government-to-Government.

Unit III

e-Payment: Introduction to Payment Systems - On-Line Payment Systems- Pre-Paid e-Payment System - Post-Paid e-Payment System - Requirements Metrics of a Payment System.

Unit IV

Securing the Business on Internet - Security Policy - Procedures and Practices - Transaction Security, Cryptology - Digital Signatures - Security Protocols for Web Commerce.

Unit V

CRM - what is e-CRM - it's Applications - e-CRM Marketing in India - Major Trends - Global Scenario for e-CRM - CRM utility in India.

(Total : 60 Periods)

Content beyond Syllabus: e-commerce legal issues.

Text Books:

1. Jeffrey F.Rayport and Bernard J.Jaworski, Introduction to E-commerce, TMH, 2003.
2. Kalakota and Winston, Frontiers of E-commerce, Pearson Education, Mumbai, 2002.

Reference Books:

1. Elias M.Awad, Electronic Commerce, Prentice-Hall India, New Delhi,.2007.

Websites:

1. www.shopify.in

IT-E82 EMBEDDED SYSTEMS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E82	Embedded systems	3	1	0

Pre-requisite:
Micoprocessors and Microcontroller

Course Objectives:

1. To understand the architecture of embedded processors, microcontrollers and peripheral devices
2. To program microcontrollers in assembly for embedded systems
3. To understand the challenges in developing operating systems for embedded systems
4. To learn programming the embedded systems in high level language such as C

Course Outcomes:
On successful completion of this course students will be able to:

1. Understand the concepts of embedded processors with microcontrollers.
2. Learn the programming details of microcontrollers.
3. Study the embedded system concepts.

Unit I

Introduction to embedded systems: Definition – Applications involving embedded systems – Product development life cycle – Successive Refinement – Quality design – Debugging – Switch and LED interfaces – **ARM CortexTM Processor:** Archtecture, Instruction sets and Programming

Unit II

Memory and Input/Output management: Programming input and Output – Memory system Mechanisms – Memory and IO devices interfacing – Interrupt handling

Unit III

Processes and operating systems: Multiple tasks and Processes – Context switching – Scheduling Policies – Interprocess communication mechanisms – Performance issues

Unit IV

Embedded C Programming: Programming embedded systems in C – C-looping structures – Register allocation – Function calls – Pointer aliasing – Structure arrangement – Bit fields – Unaligned data and endianness – Inline function and inline assembly – Portability issues

Unit V

Embedded System Development: Meeting real-time constraints – Multi state systems and function sequences – Embedded software development tools – Emulators and debuggers – Design issues – Design Methodologies – Case studies

(Total: 60 Periods)

Content beyond Syllabus:
Study of real-time embedded systems

Text Books:

1. Jonathan W Valvano, "Embedded Systems: Introduction to Arm Cortex™ -M Microcontrollers", Fourth Edition, 2013
2. Andrew N. Sloss, D. Symes, C. Wright, "ARM system developers Guide", Morgan Kauffman/ Elsevier, 2006

Reference Books:

1. Wayne Wolf, "Computer as Components: Principles of Embedded Computer System Design", Elsevier, 2006
2. Michael J. Pont, "Embedded C", Pearson Education, 2007
3. Steve Heath, "Embedded System Design", Elsevier, 2005

Websites:

1. http:// www.slideshare.net/murugan_m1/embedded-system-basics
2. http:// www.embeddedindia.com/
3. http:// www.esc-india.com/

IT-E83DATA MINING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E83	Data Mining	3	1	0

Course Objectives: This course has been designed

1. To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.
2. To introduce the concept of data warehousing with special emphasis on architecture and design.

Course Outcomes: On successful completion of this course students will be able to deals with evolving multidimensional intelligent model from a typical system, representation of multi dimensional data for a data warehouse, discovering the knowledge imbibed in the high dimensional system, finding the hidden interesting patterns in data, and gives the idea to evaluate various mining techniques on complex data objects.

Unit I

Introduction: Definition of data mining - data mining vs query tools – machine learning – taxonomy of data mining tasks – steps in data mining process – overview of data mining techniques.

Unit II

Data Warehousing: Definition – Multidimensional Data Model – Data Cube – Dimension Modelling– OLAP Operations – Warehouse Schema – Data Warehouse Architecture – Data Mart – Meta Data – Types of Meta Data – Data Warehouse Backend Process – Development Life Cycle.

Unit III

Data Pre-Processing And Characterization: Data Cleaning – Data Integration and Transformation – Data Reduction – Discretization and Concept Hierarchy Generation – Primitives – Data Mining Query Language – Generalization – Summarization – Analytical Characterization and Comparison - Association Rule – Mining Multi Dimensional data from Transactional Database and Relational Database.

Unit IV

Classification: Classification – Decision Tree Induction – Bayesian Classification – Prediction – Back Propagation – Cluster Analysis – Hierarchical Method – Density Based Method – Grid Based Method – Outlier Analysis.

Unit V

Cluster analysis: Types of data – Clustering Methods – Partitioning methods – Model based clustering methods – outlier analysis. Advanced topics: Web Mining – Web Content Mining – Structure and Usage Mining – Spatial Mining – Time Series and Sequence Mining – Graph Mining

Applications: Case studies in Data Mining applications

(Total : 60 Periods)

Content beyond Syllabus:

1. Handling large data with Grid Computing
2. Creating cloud to handle terabytes of data
3. Hands on demo with recent tools

Text Books:

1. PaulrajPonnaiah, Data Warehousing Fundamentals, Wiley Publishers, Reprint 2011.
2. Jiawei Han, MichelineKamber, Data Mining: Concepts and Techniques, Morgan Kaufman Publishers, 2009.

Reference Books:

1. UsamaM.Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth, RamasamyUthurusamy, Advances in Knowledge Discover and Data Mining, The M.I.T. Press, 2007.
2. Ralph Kimball, Margy Ross, The Data Warehouse Toolkit, John Wiley and Sons Inc., 2002.
3. Alex Berson, Stephen Smith, Kurt Thearling, Building Data Mining Applications for CRM, Tata McGraw Hill, 2000.
4. Margaret Dunham, Data Mining: Introductory and Advanced Topics, Prentice Hall, 2002.
6. Daniel T. Larose John Wiley & Sons, Hoboken, Discovering Knowledge in Data: An Introduction to Data Mining, New Jersey, 2004.
7. Hand, Mannila and Smyth, Principles of Data Mining, Prentice Hall of India, New Delhi, 2004.
8. Dunham , Data Mining- Introductory and Advanced Topics, Pearson Education, New Delhi, 2003.
9. Arun K Pujari, Data Mining Techniques, Universities press India Pvt Ltd, New Delhi, 2002.
10. Trevor Hastie, Robert Tibshirani, Jerome Friedma, The Elements of Statistical Learning: Data Mining, Inference and Prediction, Prentice Hall, New Delhi, 2002.

Websites:

1. http://dssresources.com/papers/features/langseth/langseth02082004.html
2. http://www-01.ibm.com/software/data/infosphere/data-warehousing/

IT-E84 OPEN SOURCE SOFTWARE

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E84	Open Source Software	3	1	0

Course Objective:

- To provide exposure in FOSS and to develop open source software for society

Course Outcome:

- On successful completion of this course students will be able to Develop software using FOSS.

UNIT I

PHILOSOPHY: Linux, GNU and Freedom, Brief history of GNU, Licensing free software – GPL and copy Left, trend and potential – global and Indian, overview and usage of various Linux Distributions – user friendliness perspective – scientific perspective

UNIT II

SYSTEM ADMINISTRATION: GNU and linux installation – Boot process, Commands Using bash features, The man pages, files and file systems, File security, Partitions, Processes, Managing processes, I/O redirection, Graphical environment, Installing software, Backup techniques.

UNIT III

FOSS PROGRAMMING PRACTICES: GNU debugging tools, Using source code versioning and managing tools, Review of common programming practices and guidelines for GNU/Linux and FOSS, Documentation.

UNIT IV

PROGRAMMING TECHNIQUES: Application programming – Basics of X Windows server architecture – QT programming – GTK + Programming- Python programming – Open source equivalent of existing Commercialsoftware.

UNIT V

PROJECTS AND CASE STUDIES: Linux for portable Devices, Creation of Bootable CD and USB from command line, Case Studies – Samba, Libreoffice, Assistive technology.

(Total: 60 Periods)

Content beyond Syllabus:

- The course content is designed to learn FOSS and applied into the real engineering applications.

Text Books:

1. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, Linux in a nutshell, Sixth edition, OReilly media, September 2009

Reference Books/ Websites:

1. Philosophy of GNU URL: http://www.gnu.org/philosophy/
2. Overview of Linux Distributions URL: http://distrowatch.com/dwres.php?resource=major
3. Introduction to Linux – A Hands on Guide, URL: http://tldp.org/guides.html
4. Linux:Rute's User tutorial and exposition , URL: http://rute.2038bug.com/index.html.gz
5. Version control system , URL: http://git-scm.com/
6. SVN version control , URL: http://svnbook.red-bean.com/
7. GTK+/GNOME – Application, Development, Havoc, Pennington. URL: http://developer.gnome.org/doc/GGAD
8. Python Tutorial, Guido van Rossum, Fred L. Drake, Jr., Editor. URL: http://www.python.org/doc/current/tut/tut.html
9. Doug Abbot, Linux for Embedded and Embedded and Real time applications , Newnes
10. Case study SAMBA: URL : http://www.samba.org/
11. Case study., Libre office: http://www.libreoffice.org/
12. Case study, ORCA: http://live.gnome.org/Orca

IT-E85 COMPONENT TECHNOLOGY

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E85	Component technology	3	1	0

Course Objectives:

1. This course provides a sound knowledge in various component middleware technologies for distributed applications.
2. It provides the basics of client/ server computing and basics on components.
3. Iit gives familiarization web service architectures and their standards.

Course Outcomes:

On successful completion of this course students will be able to:

1. The students learn the architecture, programming of popular component middleware technologies practiced in the industries.

Unit I

Introduction to distributed systems: Client/server computing- building blocks-types of servers-types of clients- types of middleware- aspects of client/server systems- sizing-scalability- tiered architecture-client/server models- Requirements of client/server systems-Distributed objects-benefits-drawbacks-from distributed objects to components.

Unit II

Component technology–basics: Component technology- components- definitions- properties-benefits-components and interfaces- direct and indirect interfaces- versions- interfaces as contracts-callbacks-forms of design level reuse- connection oriented programming-connectable objects- component architecture- component frameworks- composition- data driven, contextual, aspect oriented programming, subject oriented programming, XML components-component development- assembly.

Unit III

Microsoft support: The Microsoft way-component object model- From COM, COM+, DCOM to .NET framework- evolution-web services technologies-XML,WSDL,UDDI,SOAP-Common Language Runtime-.NET framework class library-ADO.NET,ASP.NET.

Unit IV

Sun support: The Sun Way-component variety – applets, Servelets, java beans, enterprise beans-EJB architecture- types of beans- characteristics-Building and deploying distributed applications using EJB.

Unit V

CORBA support: The OMG way-system object model- CORBA timeline-CORBA architecture-ORB-services- facilities-businessobjects-IIOP-transport mechanisms-IDL--CCM-CCM container.

(Total: 60 Periods)

Content beyond Syllabus:

- Evolution in middleware technologies
- Implementation of interoperable middleware distributed applications

Text Books:

1. Clemens szyperski,Dominik Gruntz and Stephan Murer ,Component Software beyond object oriented programming, third edition, Pearson education,2004.
2. Robert Orfali,DanHarkey,JeriEdwards,Client/ Server Survival Guide, Third edition, John wiley Inc,2003.

Reference Books:

1. David Chappell, Understanding .NET, Pearson Education Inc, 2002.
2. Bill Burke, Richard Monson-Haefel, Enterprise JavaBeans, Fifth Edition, O'Reilly, 2001.
3. Dan Harkey, Robert Orfali,Client/Server programming with JAVA and CORBA, second edition, Wiley & sons Inc, 1999.

Websites:

1. 192.9.162.55/docs/books/**j2eetutorial**/index.html
2. www.dot**net**-tricks.com/Home/Archive

IT-E86 NATURAL LANGUAGE PROCESSING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E86	Natural Language Processing	3	1	0

Pre-requisite:
Knowledge in Artificial Intelligence, System software and Theory of computation.

Course Objectives:

1) To tag a given text with basic Language processing features**,** design an innovative application using NLP components,
2) implement a rule based system to tackle morphology/syntax of a Language, design a tag set to be used for statistical processing keeping an application in mind
3) design a Statistical technique for a new application
4) Compare and contrast use of different statistical approaches for different types of applications

Course Outcomes:

On successful completion of this course

1) The students will get acquainted with natural language processing and learn how to apply basic algorithms in this field.
2) They will understand the algorithmic description of the main language levels: morphology, syntax, semantics, and pragmatics, as well as the resources of natural language data - corpora.
3) They will also grasp basics of knowledge representation, inference, and relations to the artificial intelligence.

Unit I
Introduction: Regular Expressions -Finite State Automata -Morphology –Finite state transducers-Probabilistic models - N- grams models.

Unit II
Syntax analysis: Word classes and Part-of-Speech -Context Free Grammars for English –parsing with context free grammar- Syntax-Features and Unification- Lexicalized and Probabilistic Parsing- Language and Complexity.

Unit III
Semantic Analysis: Representing Meaning - Meaning Structure of Language - First Order Predicate Calculus - Representing Linguistically Relevant Concepts -Syntax-Driven Semantic Analysis -Semantic Attachments - Syntax-Driven Analyzer - Robust Analysis - Lexemes and Their Senses - Internal Structure - Word Sense Disambiguation -Information Retrieval.

Unit IV
Pragmatics: Discourse- Reference Resolution - Text Coherence -Discourse Structure - Dialog and Conversational Agents - Natural Language Generation- Machine Translation -Transfer Metaphor – Interlingua – Statistical Approaches.

Unit V
Information Extraction: Entity recognition- relation detection- temporal expression analysis and template-filling.
Question Answering and Summarization: Information retrieval-factoid question answering, single document summarization,- generic multiple document summarization- query-focused summarization.

(Total: 60 Periods)

Content beyond Syllabus:

- Speech processing techniques
- Logic and Model Theoretic semantics

Text Books:

1. Daniel Jurafsky and James, H. Martin, Speech and Language Processing: An Introduction to Natural Language Processing Computational Linguistics, and Speech Recognition, 2nd edition Prentice-Hall, 2009.
2. Tanveer Siddiqui and U.S.Tiwary, “Natural Language Processing and Information Retrieval”, Oxford University Press, 2008.
3. James Allen “Natural Language Understanding”, Benjamin / Cummings Publishing Co., 1995.

Reference Books:

1. Gros, Jones and Webber, “Readings in Natural Language Processing”, Morgan Konfmann publishers, 1986.
2. Popov, “talking with computers in Natural Language”- Springer – Verlag – 1986.
3. E.Reiter and Robert Date “Building Natural Language Generation Systems” Cambridge University Press, 2000.
4.Christopher Manning and Hinrich Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999,

Websites:

1) www.cs.berkeley.edu/~klein/cs294-5/index.html
2) http://www.cse.unt.edu/~rada/CSCE5290/
3) http://www.cl.cam.ac.uk/teaching/1213/L100/materials.html

IT-E87 HIGH SPEED NETWORKS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E87	High Speed Networks	3	1	0

Pre-requisite: IT–T62 Computer Networks

Course Objectives:

1) To provide an in-depth understanding of various existing and emerging high-speed networking technologies.
2) To understand the network architecture of ISDN, frame relay, ATM, WDM, and optical networking.

Course Outcomes:

Upon completion of this course the students can be able to

1) Develop an in-depth understanding, in terms of architecture, protocols and applications of major high-speed networking technologies
2) Evaluate various technologies and identify the most suitable one to meet a given set of requirements for a hypothetical corporate network
3) Perform network design using the technologies to meet a given set of requirements
4) Develop necessary background to be able to manage projects involving any of the high-speed networking technologies

Unit I

PACKET SWITCHED NETWORKS: OSI and IP models, Ethernet (IEEE 802.3), Token ring (IEEE 802.5), Wireless LAN (IEEE 802.11) FDDI, DQDB, SMDS: Internetworking with SMDS

Unit II

ISDN AND BROADBAND ISDN: ISDN - Overview, interfaces and functions, Layers and services - Signaling System 7 – Broadband ISDN architecture and Protocols.

Unit III

ATM AND FRAME RELAY: ATM Main features-addressing, signaling and routing, ATM header structure- adaptation layer, management and control, ATM switching and transmission. Frame Relay: Protocols and services, Congestion control, Internetworking with ATM, Internet and ATM, Frame relay via ATM.

Unit IV

ADVANCED NETWORK ARCHITECTURE: IP forwarding architectures overlay model, Multi-protocol Label Switching (MPLS), integrated services in the Internet, Resource Reservation Protocol (RSVP), Differentiated services.

Unit V

OPTICAL NETWORKS AND SWITCHING: Optical links- WDM systems, cross-connects, optical LAN's, optical paths and networks; TDS and SDS: modular switch designs-Packet switching, distributed, shared, input and output buffers.

(Total: 60 Periods)

Text Books:

1. Jean Walrand and Pravinvaraiya ,"High Performance Communication networks",2nd Edition, Harcourt and Morgan Kauffman,London,2000.
2. SumitKasera, PankajSethi, "ATM Networks ", Tata McGraw-Hill, New Delhi, 2000.
3. Jennifer Bray and Charles F.Sturman,"Blue Tooth" 2nd edition , Pearson Education Asia 2001.

Reference Books:

1. William Stallings,"ISDN and Broadband ISDN with Frame Relay and ATM", 4th Edition, Pearson Education asia, 2002.
2. Leon Gracia, Widjaja, "Communication networks ", 2nd edition ,Tata McGraw-Hill, New Delhi,2003.
3. Rainer Handel, Manfred N.Huber, Stefan Schroder ,"ATM Networks",3rd Edition, Pearson education asia,2002.
4. William Stallings,"High-speed Networks and Internets", 2nd Edition, Pearson education Asia, 2003.

IT-E88 REAL TIME SYSTEMS

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E88	Real time Systems	3	1	-

Pre-requisite: Operating Systems, Computer Networks

Course Objectives:

1) To explain the concept of a real-time system
2) To describe a design process for real-time systems
3) To explain the role of a real-time operating system
4) To understand the real-time communication in networks

Course Outcomes:

On successful completion of this course students will be able to:

1) Understand the differences between general purpose and real-time systems.
2) Understand basic multi-task scheduling algorithms for periodic, aperiodic, and sporadic tasks
3) Understand task and thread scheduling in real-time operating systems.
4) Be able to program real-time applications to run in a realistic operating environment

Unit I

Introduction to Real-Time system – Characteristics – Types of Real-Time tasks – Timing constraints –Real-Time Scheduling:- Basic concepts and classification of Algorithms – Clock- Driven Scheduling – Event-Driven Scheduling – Hybrid schedulers – EDF Scheduling – RM Scheduling and its Issues.

Unit II

Resource Sharing and Dependencies among Real-Time tasks: Resource sharing in Real Time tasks, Priority Inversion, Priority Inheritance Protocol, Highest Locker Protocol, Priority Ceiling Protocol, Handling Task dependencies – Scheduling Real-Time Tasks in Multiprocessor and Distributed Systems – Resource Reclaiming in Multiprocessor Real-Time Systems – Fault- Tolerant Task Scheduling in Multiprocessor Real-Time Systems.

Unit III

Real-Time Operating System (RTOS): Features of RTOS, Commercial Real-Time Operating Systems, Real-time Databases: Applications, Design issues, Characteristics of Temporal Data, Concurrency control, Commercial Real-Time Databases.

Unit IV

Real-Time Communication in Wide Area Networks:- Introduction, Service and Traffic Models and Performance Requirements, Resource Management, Switching Subsystem, Route Selection in Real-Time Wide Area Networks:- Basic Routing Algorithms, Routing during Real-Time Channel Establishment, Route Selection Approaches, Dependable Real-Time Channels.

Unit V

Real-Time Communication in a LAN – Soft Real-Time Communication in a LAN – Hard Real- Time Communication in a LAN – Bounded Access Protocols for LANs – Real-Time Communications over Packet Switched Networks – QoS requirements – Routing and Multicasting.

(Total: 60 Periods)

Content beyond Syllabus:

1) Real-time database administration and maintenance
2) Studying commercial and under research RTOSs

Text Books:

1. Rajib Mall, Real-Time Systems Theory and Practice, Pearson Education, India, 2012.
2. C. Siva Ram Murthy and G. Manimaran, Resource Management in Real-Time Systems and Networks, Prentice-Hall of India, 2005.

Reference Books:

1. Jane W.S. Liu, Real-Time Systems, Pearson Education, 2006.
2. Stuart Bennelt, Real time computer control – and introduction, Pearson Education, 2003.
3. C. M. Krishna and Kang G Shin, Real time systems, McGraw-Hill, 1997.

Websites:

1. http://www.real-time-sys.com/
2. http://www.slideshare.net/sanjivmalik/rtos-concepts

IT-E89 SOFT COMPUTING

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E89	Soft Computing	3	1	0

Pre-requisite: Artificial Intelligence

Course Objectives:

To introduce about the computational methods and hybrid computational methods for optimization

Course Outcomes:

The students will be able to use appropriate soft computing methods for the system modeling

Unit I

Introduction - What is soft computing? Differences between soft computing and hard computing, Soft Computing constituents, Methods in soft computing, Applications of Soft Computing.

Introduction to Genetic Algorithms- Introduction to Genetic Algorithms (GA), Representation, Operators in GA, Fitness function, population, building block hypothesis and schema theorem.; Genetic algorithms operators- methods of selection, crossover and mutation, simple GA(SGA), other types of GA, generation gap, steady state GA, Applications of GA.

Unit II

Neural Networks- Concept, biological neural system,. Evolution of neural network, McCulloch-Pitts neuron model, activation functions, feed forward networks, feedback networks, learning rules – Hebbian, Delta, Perceptron learning and Windrow-Hoff,winner-take-all. Supervised learning- Perceptron learning, single l layer/multilayer perceptron, linear separability, hidden layers, back propagation algorithm, Radial Basis Function network; Unsupervised learning - Kohonen, SOM, Counter-propagation, ART, Reinforcement learning, adaptive resonance architecture, applications of neural networks to pattern recognition systems such as character recognition, face recognition, application of neural networks in image processing.

Unit – III

Fuzzy systems - Basic definition and terminology, set-theoretic operations, Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions, Fuzzy Rules & Fuzzy Reasoning, Fuzzy Inference Systems,

Unit IV

Fuzzy Expert Systems, Fuzzy Decision Making; Neuro-fuzzy modeling- Adaptive Neuro-Fuzzy Inference Systems Coactive Neuro-Fuzzy Modeling, Classification and Regression Trees, Data Clustering Algorithms, Rulebase Structure Identification and Neuro-Fuzzy Control, applications of neuro-fuzzy modeling.

Unit V

Swarm Intelligence- What is swarm intelligence? Various animal behavior which have been used as examples, ant colony optimization, swarm intelligence in bees, flocks of birds, shoals of fish, ant-based routing, particle swarm optimization

(Total : 60 Periods)

Content beyond Syllabus:

1) Implementation of each of the soft computing methods for an application using any of the programming language known
2) Implementation of the soft computing methods for an application using the existing tool environments like MATLAB

Text Books:

1. S.N. Shivanandam, *Principle of soft computing*, Wiley. ISBN13: 9788126527410 (2011)
2. S. RAJASEKARAN, G. A. VIJAYALAKSHMI PAI, NEURAL NETWORKS, FUZZY LOGIC AND GENETIC ALGORITHM, PHI Learning Pvt. Ltd., 01-Jan-2003

Reference Books:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, EijiMizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
2. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
3. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

Websites:

1. http://www.peterindia.net/SoftComputing.html

IT-E810 CYBER CRIME AND ENFORCEMENT

Subject Code	Subject Name	Lectures (Periods)	Tutorials (Periods)	Practical (Periods)
IT-E810	Cyber Crime and Enforcement	3	1	0

Pre-requisite:
Basic Knowledge on Information and Network Security, E-Business and Information Coding Techniques

Course Objectives:

1. enable learner to understand, explore, and acquire a critical understanding Cyber Law;
2. develop competencies for dealing with frauds and deceptions (confidence tricks, scams)
3. and other cyber crimes for example, child pornography etc. that are taking place via the Internet;
4. make learner conversant with the social and intellectual property issues emerging from 'Cyberspace';
5. explore the legal and policy developments in various countries to regulate Cyberspace;
6. develop the understanding of relationship between commerce and cyberspace; and
7. give learners in depth knowledge of Information Technology Act and legal frame work of Right to Privacy, Data Security and Data Protection.

Course Outcomes:
This course provides a knowledge on various threats that arise over the Internet and the ways to tackle those threats. The overwhelming response of the Internet over the years also led to the drastic increase in the rate of cybercrime. If necessary actions are taken, the students will be able to tackle them with full might and enable the right to privacy.

Unit I
Evolution of Computer Technology – Emergence of Cyber Space – Cyber Jurisprudence – Jurisprudence and Law – Doctrinal Approach – Consensual Approach – Real Approach Cyber Ethics – Cyber Jurisdiction – Hierarchy of Courts – Civil and Criminal Jurisdictions – Web Space – Web Hosting and Web Development Agreement – legal and technological significance of domain names – internet as a tool for global access.

Unit II
Overview of IT Act 2000: Amendments and Limitations of IT Act – Digital Signature – Cryptographic Algorithm – Public Cryptography, Private Cryptography - e-governance – legal recognition of electronic records – legal recognition of digital signature – certifying authorities – cybercrime and offences – network service providers liability – cyber regulations appellate tribunal, penalties and adjudication.

Unit III
Cyber law and Related Legislation: Patent Law- Trademark Law- Copyright – Software Copyright or Patented – Domain Name – and Copyright Disputes – Electronic Database and its protection – IT act and civil procedure act – IT act and criminal procedure code – relevant sections of Indian evidence act – relevant sections of banker's book evidence act – relevant sections of Indian Penal Code – relevant sections of RBI – Law relating to employees and internet – Alternative Dispute Resolution – Online Dispute Resolution.

Unit IV
Electronic Business and Legal Issue: Evolution and Development of e-commerce – paper vs. paper – less contracts e- commerce models – B2B, B2C, spamming threats - E-Security.

Unit V
Application Area: Business – Taxation – Electronic Payments – Supply Chain – EDI – e-markets.

(Total : 60 Periods)

Content beyond Syllabus:
The students can also have a knowledge on the Online Vice – Online Fraudulence and Identity Threat, Cyber terrorism and Hacktivism

Text Books:

1) Cyber laws – Intellectual Property and e-commerce, security – Kumar K, Dominant Publisher
2) Information Security Policy and Implementation Issues, NIIT, PHI
3) David J. Loundy, COMPUTER CRIME, INFORMATION WARFARE, AND ECONOMIC ESPIONAGE, Carolina Academic Press (2003) (ISBN:0890891109).
4) Jack Balkin, et al. eds., CYBERCRIME: Digital Cops in a Networked World (NYU Press 2007) (ISBN:0814799833).

Reference Books:

1) Lawrence Lessig, CODE AND OTHER LAWS OF CYBERSPACE, Chapter 7, pp. 85-99 (Basic Books 1999) (ISBN:0465039138) (discussing law, social norms, the market, and architecture as things that regulate).
2) Neal Kumar Katyal, *Architecture as Crime Control*, 111 Yale L.J. 1039, 1047 (2002).
3) Neal Kumar Katyal, *Digital Architecture as Crime Control*, 112 Yale L.J. 2261 (2003).
4) K. A. Taipale, *Internet and Computer Crime: System Architecture as Crime Control,* Center for Advanced Studies (Feb. 2003). *Available at* SSRN: http://ssrn.com/abstract=706161.

5) Lien Tien, *Architectural Regulation and the Evolution of Social Norms* pp. 37-58 in Cybercrime (Jack Balkin, et al. eds., NYU Press 2007).
6) Orin Kerr, *Virtual Crime, Virtual Deterrence: A Skeptical View of Self-Help, Architecture, and Civil Liability*, 1 J.L. Econ. &Pol'y 197 (Winter 2005).
7) Susan W. Brenner and Leo L. Clark, *Distributed Security: A New Model of Law Enforcement*, J. Marshall J. Computer & Info. L. (2005). *Available at* SSRN: http://ssrn.com/abstract=845085.

Websites:

1) http://cybercrime.taipale.info/
2) http://www.information-retrieval.info/cybercrime/index01.html
3) http://cybercrimeindia.org/