

PONDICHERY UNIVERSITY
BACHELOR OF TECHNOLOGY PROGRAMMES
(EIGHT SEMESTERS)

REGULATIONS

Approved by 17th Board of Studies (Engineering) meeting
(Operated from the Academic Year 2003-2004)

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 40% marks (a mere pass for SC/ST candidates) in aggregate of subjects – Mathematics, Physics and Chemistry.

OR

An Examination of any University or Authority recognised by the Executive Council of the Pondicherry University as equivalent thereto.

- (B)** Lateral Entry for Diploma passed candidates for admission to third semester of the eight semester B.Tech programme should be required to have passed three year diploma or four year sandwich diploma course in engineering/technology with a minimum of 60% marks in aggregate in the subjects covered in 3rd to 6th semester (a mere pass for SC/ST candidates). A list of diploma programmes approved for admission for each of the degree programme is given in **Annexure – A**.

2. 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 limit is 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 :

Branch 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	- Mechatronics

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 practicals as given in the scheme of examination 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 semesters in all subjects as well as university examinations conducted by Pondicherry University at the end of the semester (November / December or April / May).

(a) 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) Practicals 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.

(iv) In addition, the candidate shall satisfy the following conditions.

(a) To be permitted to register for courses in 5th semester, the candidate should have earned a minimum of 30 credits for the I & II semesters put together.

(b) To be permitted to register for the courses in 7th semester, the candidate should have completed all credit requirements for the I and II semester and 30 credits for the 3rd and 4th semesters put together.

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.

10. Passing Minimum and Classification of Successful Candidates :

(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 examination.

- (c) If a candidate has failed in more than two 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.

The internal assessment marks obtained by the candidate shall be considered only in the first attempt for theory subjects alone. For the subsequent attempts, University examination marks will be made upto the total marks. 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.

(iii) AWARD OF LETTER GRADES

The assessments of a course will be done on absolute marks basis, however, for the purpose 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) obtained by 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 of courses registered and the corresponding grades points scored in those courses, taken for all the courses and sum of the number of credits o all the courses

$$\text{GPA} = \frac{\text{Sum of [c x GP]}}{\text{Sum of C}}$$

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

(iv) A candidate who satisfies the course requirements for all semesters and who passes all the examinations prescribed for all the eight semesters within a **MAXIMUM PERIOD OF 7 YEARS** 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.

(v) 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**.

(vi) For the Award of University ranks and Gold Medal for each branch of study, the CGPA secured from 3rd to 8th semester alone should be considered. Rank certificates would be issued to the first ten candidates in each branch of study

(vii) 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 8 semesters after his/her commencement of study in the third semester and in addition secures CGPA not less than 6.5 shall declared to have passed the examination in **FIRST CLASS**.

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

11. Provision for withdrawal :

A candidate may, for valid reasons, and on the recommendations 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.

12. 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 semester at 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 not in any case exceed 7 years, including of the period of discontinuance.

13. Revision of Regulations and Curriculum :

The University may from time to time revise, amend or change the regulations of curriculum and syllabus as and when found necessary.

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 Civil Engineering (Sandwich)
Mechanical Engineering	Mechanical Engineering Automobile Engineering Agricultural Engineering Mechanical and Rural Engineering Refrigeration and Air-conditioning Agricultural Engineering & Farm – Equipment – Technology Metallurgy Production Engineering Machine Design & Drafting Mechanical Engineering (Sandwich) Machine tool maintenance and Repairs (Sandwich) Printing Technology / Engineering Textile Engineering / Technology Tool Engineering
Electrical and Electronics Engineering	Electrical Engineering Electrical and Electronics Engineering Electronics and Instrumentation Instrumentation Technology
Electronics & Communication Engineering	Electronics and Communication Engg., Electronics Engineering Electrical Engineering Electrical and Electronics Engineering Medical Electronics
Computer Science & Engineering	Computer Science & Engineering Computer Technology
Electronic and Instrumentation Engineering, Instrumentation and Control Engineering	Instrumentation and Control Instrumentation Engineering Electronics and Instrumentation Electronics Engineering Applied Electronics Medical Electronics Electrical & Electronics Electronics and Communication Engineering
Chemical Engineering	Chemical Engineering Chemical Technology Petrochemical Technology Petroleum Engineering Ceramic Technology Plastic Engineering Paper & Pulp Technology (Sandwich) Polymer Technology (Sandwich)
Information Technology	Computer Science and Engineering Computer Technology Electrical and Electronics Engineering Electronics & Communication Engineering Electronics and Instrumentation Engineering Instrumentation Engineering

PONDICHERRY UNIVERSITY
B.Tech - CURRICULUM
I B.TECH – COMPUTER SCIENCE & ENGINEERING
I Semester

Code No.	Name of the Subjects	Periods			Credits	Marks		
		L	T	P		IA	UE	TM
	Theory							
UCC0041	Computer Programming	3	-	-	3	25	75	100
UCC1202	Mathematics – I	3	1	-	4	25	75	100
UCC1213	Physics	3	-	-	3	25	75	100
UCC1224	Chemistry	3	-	-	3	25	75	100
UCC0135	Elements of Electrical Electronics Engineering	3	1	-	4	25	75	100
UCC0026	Thermodynamics	2	1	-	3	25	75	100
	Practicals							
UCC0047	Computer Lab	-	-	3	1	50	50	100
UCC0028	Engineering Graphics	2	-	3	2	50	50	100
UCC0059	Basic Electrical & Electronics Lab	-	-	3	1	50	50	100
	Total	19	3	9	24	300	600	900

II Semester

Code No.	Name of the Subjects	Periods			Credits	Marks		
		L	T	P		IA	UE	TM
	Theory							
UCC 0231	Technical English	3	-	-	3	25	75	100
UCC 2202	Mathematics – II	3	1	-	4	25	75	100
UCC 2213	Material Science	3	-	-	3	25	75	100
UCC 2224	Environmental Science	3	-	-	3	25	75	100
UCC 0125	Basic Engineering	4	-	-	4	25	75	100
UCC 0016	Engineering Mechanics	2	1	-	3	25	75	100
	Practicals							
UCC 0217	Physics lab	-	-	3	1	50	50	100
UCC 0228	Chemistry lab	-	-	3	1	50	50	100
UCC 0029	Workshop Practice	-	-	3	1	50	50	100
	Total	18	2	9	23	300	600	900

PONDICHERY UNIVERSITY
CURRICULUM AND SYLLABI FOR
B.TECH. (COMPUTER SCIENCE AND ENGINEERING)

III SEMESTER

CODE	SUBJECT	L	T	P	Cr	IA	UE	TM
UCC 3201	MATHEMATICS –III	3	1	0	4	25	75	100
UCS 3032	ELECTRONIC DEVICES AND CIRCUITS ♣	3	0	0	3	25	75	100
UCS 3053	ELECTRICAL ENGINEERING	3	0	0	3	25	75	100
UCS 3044	DIGITAL COMPUTER FUNDAMENTALS AND ARCHITECTURE ♣	3	0	0	3	25	75	100
UCS 3045	DATA STRUCTURES ♣	3	0	0	3	25	75	100
UCS 3046	PRINCIPLES OF PROGRAMMING LANGUAGES	3	0	0	3	25	75	100
UCS 3037	ELECTRICAL AND ELECTRONICS LAB	0	0	3	2	50	50	100
UCS 3048	DIGITAL LAB ♣	0	0	3	2	50	50	100
UCS 3049	DATA STRUCTURES LAB ♣	0	0	3	2	50	50	100
UCC 30410	GENERAL PROFICIENCY - I	0	0	3	1	50	-	50
	TOTAL	18	1	12	26	-	-	950

IV SEMESTER

CODE	SUBJECT	L	T	P	Cr	IA	UE	TM
UCS 4201	DISCRETE MATHEMATICS AND GRAPH THEORY ♣	3	1	0	4	25	75	100
UCS 4042	MICROPROCESSORS AND APPLICATIONS ♣	3	0	0	3	25	75	100
UCS 4043	OPERATING SYSTEMS ♣	3	0	0	3	25	75	100
UCS 4044	DESIGN AND ANALYSIS OF ALGORITHMS ♣	3	0	0	3	25	75	100
UCS 4045	OBJECT ORIENTED PROGRAMMING AND SYSTEM DESIGN	3	0	0	3	25	75	100
UCS 4046	COMPUTER GRAPHICS	3	0	0	3	25	75	100
UCS 4047	MICROPROCESSOR LAB ♣	0	0	3	2	50	50	100
UCS 4048	OPERATING SYSTEMS LAB ♣	0	0	3	2	50	50	100
UCS 4049	ALGORITHMS LAB	0	0	3	2	50	50	100
UCC 40410	GENERAL PROFICIENCY - II	0	0	3	1	50	-	50
	TOTAL	18	1	12	26	-	-	950

V SEMESTER

CODE	SUBJECT	L	T	P	Cr	IA	UE	TM
UCS 5201	AUTOMATA LANGUAGE AND COMPUTATION	3	0	0	3	25	75	100
UCS 5042	SYSTEM SOFTWARE	3	0	0	3	25	75	100
UCS 5043	VISUAL PROGRAMMING ♣	3	0	0	3	25	75	100
UCS 5044	COMPUTER HARDWARE AND TROUBLE SHOOTING ♣	3	0	0	3	25	75	100
UIDE 5005	IDE - I	3	0	0	3	25	75	100
UCS 5046	SYSTEM SOFTWARE LAB	0	0	3	2	50	50	100
UCS 5047	VISUAL PROGRAMMING LAB ♣	0	0	3	2	50	50	100
UCS 5048	HARDWARE TROUBLE SHOOTING LAB ♣	0	0	3	2	50	50	100

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UCC 5049	GENERAL PROFICIENCY - III	0	0	3	1	50	-	50
	TOTAL	15	0	12	22	-	-	850

VI SEMESTER

CODE	SUBJECT	L	T	P	Cr	IA	UE	TM
UCS 6041	COMPUTER NETWORKS ♣	3	0	0	3	25	75	100
UCS 6042	DATABASE MANAGEMENT SYSTEMS ♣	3	1	0	4	25	75	100
UCS 6043	SOFTWARE ENGINEERING AND ARCHITECTURE ♣	3	0	0	3	25	75	100
UCS 6044	PARALLEL ARCHITECTURE AND ALGORITHMS	3	0	0	3	25	75	100
UIDE 6005	IDE - II	3	0	0	3	25	75	100
UCS 6046	COMPUTER NETWORKS LAB ♣	0	0	3	2	50	50	100
UCS 6047	DATABASE MANAGEMENT SYSTEMS LAB ♣	0	0	3	2	50	50	100
UCS 6048	SOFTWARE ENGINEERING AND ARCHITECTURE LAB	0	0	3	2	50	50	100
UCS 6049	INDUSTRIAL TRAINING/VISIT (Report)	0	0	3	1	50	-	50
UCC 60410	GENERAL PROFICIENCY - IV	0	0	3	1	50	-	50
	TOTAL	15	1	15	24	-	-	900

VII SEMESTER

CODE	SUBJECT	L	T	P	Cr	IA	UE	TM
UCS 7041	PRINCIPLES OF COMPILER DESIGN	3	0	0	3	25	75	100
UCS 7042	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS	3	0	0	3	25	75	100
UCS 7043	INTERNET TECHNOLOGY AND WEB DESIGN ♣	3	0	0	3	25	75	100
UCS 7044	ELECTIVE – I	3	0	0	3	25	75	100
UCS 7045	ELECTIVE – II	3	0	0	3	25	75	100
UCS 7046	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM LAB	0	0	3	2	50	50	100
UCS 7047	INTERNET TECHNOLOGY LAB ♣	0	0	3	2	50	50	100
UCS 7048	PROJECT WORK (PHASE - I)	0	0	3	2	50	-	50
UCS 7049	SEMINAR	0	0	3	1	50	-	50
	TOTAL	15	1	12	22	-	-	800

VIII SEMESTER

CODE	SUBJECT	L	T	P	Cr	IA	UE	TM
UCS 8231	ENGINEERING ECONOMICS AND MANAGEMENT	3	0	0	3	25	75	100
UCS 8042	DISTRIBUTED COMPUTING ♣	3	0	0	3	25	75	100
UCS 8043	EMBEDDED SYSTEMS ♣	3	0	0	3	25	75	100
UCS 8044	ELECTIVE – III	3	0	0	3	25	75	100
UCS 8045	ELECTIVE – IV	3	0	0	3	25	75	100
UCS 8046	DISTRIBUTED COMPUTING LAB ♣	0	0	3	2	50	50	100
UCS 8047	PROJECT WORK (PHASE - II)	0	0	9	4	50	100	150
UCS 8048	COMPREHENSIVE VIVA VOCE	0	0	3	2	50	50	100

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	TOTAL	15	0	15	23	-	-	850
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♣ Common to B.Tech (CSE) and B.Tech (IT)

LIST OF ELECTIVES

VII SEMESTER

UCS 704E1	NEURAL NETWORKS AND PATTERN RECOGNITION
UCS 704E2	INTERNET PROGRAMMING
UCS 704E3	HIGH SPEED NETWORKS ♣
UCS 704E4	SOFTWARE QUALITY ASSURANCE AND TESTING
UCS 704E5	DEPENDABLE COMPUTING
UCS 704E6	WIRELESS TECHNOLOGY
UCS 704E7	ADVANCED DATABASES ♣
UCS 704E8	BUSINESS ENVIRONMENT AND HUMAN RESOURCE MANAGEMENT ♣
UCS 704E9	GENETIC ALGORITHMS
UCS 704E10	E-BUSINESS ♣
UCS 704E11	COMPONENT ENGINEERING

VIII SEMESTER

UCS 804E1	VLSI DESIGN ♣
UCS 804E2	ROBOTICS
UCS 804E3	NATURAL LANGUAGE PROCESSING AND KNOWLEDGE BASED SYSTEMS
UCS 804E4	IMAGE PROCESSING
UCS 804E5	NETWORK ADMINISTRATION AND MANAGEMENT ♣
UCS 804E6	INDUSTRIAL PSYCHOLOGY AND SAFETY MEASURES ♣
UCS 804E7	GRID COMPUTING
UCS 804E8	NET FRAME WORK AND APPLICATIONS ♣
UCS 804E9	OPTICAL COMMUNICATION NETWORKS ♣
UCS 804E10	MOBILE COMMUNICATION NETWORKS ♣
UCS 804E11	CLIENT SERVER COMPUTING

INTERDEPARTMENTAL ELECTIVES (IDEs)

UIDE 011	EXPERIMENTAL STRESS ANALYSIS
UIDE 012	COMPUTER AIDED PLANNING AND DRAFTING
UIDE 021	MECHATRONICS
UIDE 022	TOTAL QUALITY MANAGEMENT
UIDE 031	COMMUNICATION ENGINEERING
UIDE 032	COMPUTER NETWORKS #
UIDE 041	RELATIONAL DATABASE MANAGEMENT SYSTEMS #
UIDE 042	VISUAL PROGRAMMING #
UIDE 051	INTRODUCTION TO SOFT COMPUTING
UIDE 052	INDUSTRIAL ELECTRONICS
UIDE 061	ELEMENTS OF BIOTECHNOLOGY
UIDE 062	INDUSTRIAL POLLUTION ABATEMENT
UIDE 071	INDUSTRIAL CONTROL SYSTEMS
UIDE 072	TRANSDUCERS AND INSTRUMENTATION
UIDE 081	IT FOR ENGINEERS #
UIDE 082	BIO INFORMATICS
UIDE 201	FINITE ELEMENT METHODS
UIDE 202	COMPUTATIONAL FLUID DYNAMICS
UIDE 211	INTRODUCTION TO NANO TECHNOLOGY
UIDE 212	NOVEL AND INTELLIGENT MATERIALS

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UIDE 221 INSTRUMENTAL METHODS OF ANALYSIS
UIDE 222 CERAMIC TECHNOLOGY

♣ Common to B.Tech (CSE) and B.Tech (IT) # will not be offered for B.Tech (CSE) and B.Tech (IT)

Note :

1. (Each department is assigned a unique code for reference : CE - 01, ME - 02, ECE - 03, CSE - 04, EEE - 05, ChE - 06, EIE - 07, IT - 08, ICE - 09, Maths - 20, Physics - 21, Chemistry - 22, Social Science - 23, Management - 24)
2. Subject Code : (undergraduate)(branch) (semester)(dept code that handles subject)(paper-no.)

UCC 0041 COMPUTER PROGRAMMING

UNIT – I

Introduction to basic concepts of Hardware/Software – System Software – Application Software – Low level and High level Languages – CAD/CAM – Graphics – AutoCAD – LAN-MAN-WAN – Internet and Intranet.

UNIT – II

Fundamentals of C Programming:– Sample 'C' Program. Introduction to Data types: – Identifier, keyword, data type, ASCII, variables, constants. Input/output:– Printf, Scanf, format string - escape sequences. Operators and constructs: – Relational, logical, conditional operators, expression, statements, if, else if, shorthand operators.

UNIT III

Loops - Functions –Recursion – String handling – Programming examples -Type conversion.

UNIT IV

Storage class specifiers – User defined data types – Enumerated data types, typedef – Structures – Union.

UNIT V

C Preprocessor – Pointers – File handling - problems using these concepts

Text Books:

1. Subburaj. R, Programming in C, Vikas Publishing House Pvt Ltd., First Edition, 2000.
2. Balagurusamy. E, Programming in ANSI C, Tata McGraw Hill, Second Edition, 2002.

UCC 1202 MATHEMATICS - I

UNIT-I

APPLICATION OF DIFFERENTIATION: Sub tangent and subnormal – Curvature, evolutes and involutes.

INTEGRAL CALCULUS: Properties of definite integrals – Reduction formulae for $x^n e^{ax}$, $\sin^n(x)$, $\cos^n(x)$, $\tan^n(x)$, $\sin^m(x) \cos^n(x)$, $x^n \sin(ax)$, and $x^n \cos(ax)$.

UNIT –II

MULTIPLE INTEGRALS AND APPLICATIONS: Multiple integrals – change of order of integration. Applications: Areas and volumes (Cartesian and polar) – mass and center of mass (constant and variable densities).

UNIT-III

ANALYTICAL SOLID GEOMETRY: Directional cosines and ratios – angle between two lines – the equation of plane - equations to a straight line and shortest distance between two skew lines.

UNIT-IV

DIFFERENTIAL EQUATIONS: Exact equations, First order linear equations, Bernoulli's equation, orthogonal trajectories, growth and decay, geometrical applications and electric circuits. 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 – simple applications to electric circuits.

Text Book:

Dr.M.K.Venkataraman, Engineering Mathematics (First Year), Second Edition, The National Publishing Company, Madras, July 2001.

Reference Book:

P. Kandasamy, K. Thilagavathy and K. Gunavathy, Engineering Mathematics, Volume-I, Second Edition, S. Chand and Company Ltd., New Delhi 1996.

UCC 1213 PHYSICS – I

Unit I – Optics

Interference: Newton's rings – Michelson's interferometer – wavelength determination – interference filter – antireflection coatings. *Diffraction:* diffraction grating – resolving power of grating & prism. *Polarization:* Fresnel's theory of double refraction – quarter and half wave plates – Optical Rotation.

Unit II – Acoustics

Ultrasonics: ultrasonic waves productions and detections – piezoelectric – magnetostriction – NDT applications. *Acoustics of auditoria:* – Sabine's formula – Reverberation time.

Unit III – Wave mechanics

Matter waves – de Broglie wavelength – uncertainty principle – Schroedinger wave equation – time dependent – time independent – application to particle in a box – barrier penetration – tunneling effect – tunnel diode.

Unit IV – Nuclear energy source

Binding energy – mass defect – packing fraction – mass and binding energy – disintegration in fission – fission and fusion – nuclear reactor – PHWR – FBTR – materials used in nuclear reactors.

Unit V – Lasers

Principles of Laser – Einstein's Coefficients – Threshold Conditions – Optical resonators – *Solid State laser:* NdYAG – *Gas Laser:* CO₂ laser – Dye laser, *Semiconductor Laser:* GaAs Laser – *Laser in NTD:* Holographic Interferrometry, Single and Double exposure

Text Books:

1. **Engineering Physics R K Gaur and S L Gupta, Dhantath Rai and Sons (1996)**
2. Optics – 2nd Edition Ajay Ghatak TMH (1995)

Reference Books:

1. Introduction to Modern Physics – Richtwmeier, Kennard and cooper TMH (1998).
2. Laser and Application – Thiagarajan and Ghatak
3. Corept of Modern Physics Beiser – Mc graw Hill (1998).

UCC 1224 CHEMISTRY

UNIT I WATER

Hardness of water – units and calcium carbonate equivalent.
Determination of hardness of water – O – Hehner’s method.
Disadvantages of hardwater – boiler scale and sludge, caustic embrittlement, priming & foaming and boiler corrosion.
Water softening method – lime-soda process, zeolite process and Ion exchange process

UNITII HIGH POLYMERS

Monomers – functionality, degree of polymerization -Tacticity -
Addition & Condensation Polymerization – Molecular weight distribution.
Polymerization techniques - Thermoplastics and Thermosets -
Preparation, properties and uses of Polyester, Teflon, nylon 6,6, PVC, Bakelite.
Polymer composites - Fibre reinforced plastics.

UNIT-III ELECTROCHEMICAL CELLS

Galvanic cells, Single electrode potential, Standard electrode potential. Elctromotive series. EMF of a cell and its measurement.
Nernst equation. Electrolyte Concentration cell. Reference electrodes - Hydrogen, Calomel & Glass electrodes.
Batteries - Primary and secondary cells, laclanche cell, lead acid storage cell & Ni-Cd battery.
10 hrs

UNIT-IV CORROSION AND ITS CONTROL

Chemical and Electrochemical corrosion. Types of corrosion-Galvanic, pitting, concentration cell corrosion. Passivity. Corrosion control Methods - Cathodic protection and corrosion inhibitors.
Protective coatings: Types of protective coatings-Metallic coating, - cladding, electroplating and anodizing.

UNIT-V PHASE RULE

Phase rule-definition and explanation of terms in phase rule.
Water, lead -silver alloy system, copper – nickel alloy system and iron-carbon alloy system

TEXT BOOKS

1. P C Jain and Monika Jain, “Engineering Chemistry” Dhanpat Rai and Sons, New Delhi, 2000
2. S S Data, “A Textbook of Engineering Chemistry” S Chand & Co., Ltd., New Delhi.

REFERENCES :

J C Kuriacose and Raja Ram J, “Chemistry in Engineering and Technology Vol.-I & II, Tata McGraw-Hill Co-Ltd., New Delhi.

**UCC 0135 – ELEMENTS OF ELECTRICAL AND
ELECTRONICS ENGINEERING**

ELECTRICAL:

PART – A

UNIT – I

Active and passive elements - review of Kirchoff's laws – star/delta conversion – equivalent resistance – Node and mesh methods of analysis of DC circuits.

UNIT – II

Concepts of AC circuits – rms value, average value, form and peak factors – real and reactive power – power factor – Node and mesh analysis of AC circuits.

UNIT – III

Introduction to three phase balanced circuits – two watt meter method of power measurement – Principle of DC generator, DC motor, Transformer and single phase motor.

ELECTRONICS:

PART - B

UNIT – I

Solid state devices - characteristic of diode, BJT, FET,UJT and SCR – RC coupled amplifier- Principle of Hartley oscillator and RC phase – shift oscillator – Introduction to IC.

Transducers – Linear variable differential transformer (LVDT, Strain gauge, Tachogenerator, Resistance Temperature Detector (RTD), Thermocouple, Thermistor, Piezoelectric transducer.

UNIT – II

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 – Principle of counters and registers

UNIT – III

Model of a communication system – Types of electrical communication channel- wire and wireless channel – wire, Coaxial cable and optical fiber – Microwave radio link and satellite link. Advantage of Digital Communication – Overview of ISDN.

TEXT BOOKS:

1. R. Muthusubramanian, S Salivahanan, and K A Muraleedharan, "Basic Electrical, Electronics and Computer Engineering", Tata McGraw Hill, New Delhi, 2000.

Reference Books:

1. D.P. Kothari and I.J. Nagrath, "Theory and Problems of Basic Electrical Engineering" Prentice Hall of India Ltd. New Delhi.
2. Allen Mottershead , "Electronic Devices and Circuits: An Introduction", Prentice Hall of India Ltd. New Delhi.
3. George Kennedy and Bernard Davis, "Electronic Communication Systems", Tata McGraw-Hill Ltd. New Delhi. Year 2001.

UCC 0026 THERMODYNAMICS

UNIT I : BASIC CONCEPTS AND DEFINITIONS

Energy conversion and efficiencies - System, property and state - Thermal equilibrium - Temperature - Zeroth law of Thermodynamics.

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 - Gas refrigeration cycle - Absorption refrigeration system - Liquifaction and solidification of gases

Text Books :

1. **Nag,P.K., "Engineering Thermodynamics", 2nd edition, Tata Mc Graw Hill Publishing Co. Ltd., New Delhi,1995**
2. Wark, K., "Thermodynamics", 4th edition ,Mc Graw 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. Van Wylen, G.J and R.E Sonntag., "Fundamental of Classical Thermodynamics", 4th edition, John Wiley & Sons , 1994.
5. Cengel, Y.A. and Boles, M.A., 1989, "Thermodynamics - An Engineering Approach", Mc-Graw Hill.

UCC 0047 COMPUTER PROGRAMMING LAB (0 0 3 2)

There are three cycles of experiments. Write C programs to solve the problems wherever required.

CYCLE I - BASIC CONCEPTS

1. Study of Turbo C IDE – Compilation and execution using simple C Programs – Simple OS Interface/ commands.
2. Solve quadratic equation for various possible inputs.
3. Generation of all prime numbers in a given range. (Using iteration construct).
4. Sort given array of numbers and names.
5. Matrix operations (addition, subtraction, transpose)

CYCLE II - STRUCTURES AND FILES

6. Create an array of structures for student information with the following details:
 - Name -
 - DOB -
 - Age
 - Marks - percentage or CGPA
 - Roll No. -
 - Gender -
 - i. Compute the overall pass percentage of the class.
 - ii. List of the students roll numbers who failed in the current semester.
 - iii. Compute the average
 - 1v. Given a name, print the marks and other details.
7. Using files implement the above problem and print the mark sheet of each student after storing structure information in an input file. Also read the input file and create two output files containing male student information and female student information separately.
8. Develop the following functions to perform matrix multiplication:
 - i. Read any given general matrix
 - ii. Print a given matrix
 - iii. Identify the compatibility
 - iv. Multiplication of two matrices
9. Recursive program to
 - i. Find Factorial of a number
 - ii. Generate Fibonacci Series.

CYCLE III - APPLICATIONS

10. Using AutoCAD,
a) Draw a National flag/house/car/layout of a street using basic objects.
b) Create a village layout and manipulate it with different edit commands.
11. Using MS WORD,
a) Prepare a practical experiment report for any one of Physics experiments. (report should include diagrams, tables, formulae, using mathematical symbols.)
b) Prepare a letter containing the facilities available in a department addressed to N companies (using mail merge).

12. The placement data from the year 1996 to 2001 of Pondicherry Engineering College is given in the following table.

Year	Number of Students placed
1996	168
1997	179
1998	272
1999	245
2000	292
2001	192

- Using extrapolation method, find the expected number of students to be placed in the year 2005.
13. To identify the position of a pendulum at a given time instant after formulating equation for simple pendulum.
14. Accept a chemical equation and check whether it is balanced or not.
15. To Count the number of words and sentences in a given paragraph.

UCC 0231 – TECHNICAL ENGLISH

UNIT – I - BASIC COMMUNICATION THEORY

Communication as sharing; context of communication; the speaker/writer and the listener/reader; medium of communication; barriers to communication; accuracy, brevity, clarity and appropriateness in communication.

UNIT – II READING

Comprehension of technical and non-technical material, skimming, scanning, Inferring, Guessing, the meaning of words from contexts, Note making and extension of vocabulary, predicting and responding to context.

Include Intensive Reading.

UNIT – III WRITING

Effective sentences, Cohesive writing, Clarity and Conciseness in writing, Introduction to technical writing, Better paragraphs, Definition, Description, Practice in summary writing.

Include I. Four modes of writing – Description, Narration, Exposition and Argument.

II. Use of dictionaries, Library references, Use of indices. Making bibliographical entries with regard to sources from books, journals, internet, etc. Developing reference skills relating to note taking, collating information and organizing it.

UNIT IV WRITTEN COMMUNICATION

Report writing – informal and formal reports, Memoranda, Notice, Instruction.

Include: Business Letters, Resumes, Job Applications.

UNIT V - SPEAKING

Features of effective speech, practice in speaking fluently, Dialogue practice, Simple social exchanges, short extempore.

Include : Basics in Phonetics, Group Discussions and Presentations.

Importance of Listening Skills.

Text Books :

1. Boove, Courtland R, et al. Business Communication Today. Delhi: Pearson Education, 2002.
2. Lakshminarayanan, K.R. English for Technical Communication, Chennai: Scitech Publication, 2001.

Reference Books:

1. Davis, Llyod and Susan McKay, Structures and Strategies. Hyderabad; Universities Press, 1999.

2. Jones, Daniel, Everyman's English Pronunciation Dictionary, New Delhi; Universal Book Stall, 2001.

UCC 0028 ENGINEERING GRAPHICS

Unit 0

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

Unit I

Conic sections, Involute, 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, A Text Book of Engineering Drawing, Vol. I & II
2. K.V. Natarajan, A Text Book of Engineering Drawing.
3. BIS, Engineering Drawing practice for Schools & College.

REFERENCES:

1. N.D. Bhatt, Engineering Drawing.
2. K. Venugopal, Engineering Drawing.
3. Warren. T. Luzadder, Fundamentals of Engineering Drawing.
4. David I cook and Robert N Mc Dougal, Engineering Graphics and Design with computer applications, Holt – Sounders Int. Edn. 1985.
5. James D Bethune and et al., Modern Drafting, Prentice Hall Int., 1989.

UCC 0059 - BASIC ELECTRICAL AND ELECTRONICS LAB

List of Experiments

Electrical:

1. Study of tools and accessories
2. Study of joints
3. Staircase wiring
4. Doctor's room wiring
5. Godown wiring
6. Tube Light and Fan connection
7. Lamp controlled from three different places-wiring

Electronics:

1. Study of Analog and digital instruments
2. Study of CRO
3. Calibration of Voltmeter and Ammeter
4. Calibration of Energy meter and Wattmeter
5. Verification of Kirchoff's laws
6. Characteristics study of transducers (LVDT, Straingauge, thermocouple)
7. Digital Logic Gates

UCC 2202 MATHEMATICS - II

Unit I

ALGEBRA: Binomial, exponential and logarithmic series (without proof) – problems on summation, approximation and coefficients.

Unit II

MATRICES: Inverse of matrix by row transformation – Eigen values and Eigen vectors - Cayley-Hamilton theorem (without proof) – Diagonalisation – rank of matrix – solution of a general system of m linear algebraic equations in n unknown ($m \leq n$).

Unit III

TRIGONOMETRY: Expansions for $\sin(n\theta)$, $\cos(n\theta)$, $\tan(n\theta)$, $\sin^n(\theta)$, $\cos^n(\theta)$. Exponential, circular, hyperbolic, inverse hyperbolic and logarithmic functions of a complex variable – separation of real and imaginary parts. (Sec.6.1 to 6.3, 6.5 in Chapter6 and Chapter 7 in the Text Book given below)

Unit IV

VECTOR ANALYSIS: Scalar fields and Vector fields – Gradient, Divergence and Curl – their properties and relations – Gauss and Stokes theorems (without proof), simple problems for their verification.

Unit V

STATISTICS: Moments, kurtosis and skewness based on moments only. Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions. Correlation and regression – rank correlation.

Text Book:

Dr.M.K.Venkataraman, Engineering Mathematics (First Year), Second Edition, The National Publishing Company, Madras, July 2001.

Reference Book:

P. Kandasamy, K. Thilagavathy and K. Gunavathy, Engineering Mathematics, Volume-I, Second Edition, S. Chand and Company Ltd., New Delhi, 1996.

UCC 2213 Material Science

Unit I - Crystal structure and x – ray diffraction

Miller indices – Bravais lattices – unit cell – reciprocal lattice vector – Atomic packing fraction – Debye–Scherrer X– ray Diffraction method – co-ordination number – radius of atom and size of cell.

Unit II – Defects

Point defects – Qualitative ideas of point, line and volume defects - Lattice vibration – Specific heat of solids – Einstein’s-Debye’s Theory – Thermal conductivity in metals

Unit III – Dielectric properties

Dielectric Polarization and Mechanism – Clausius-Mossotti relation – Dielectric constant measurements – Temperature and frequency dependence of dielectric constant – Dielectric loss – Measurement of Dielectric constant and loss using Scherring bridge – Elementary ideas of Piezoelectrics, ferroelectrics and pyroelectric materials and its applications

Unit IV – Magnetic Properties

Classification of Magnetic Materials – Quantum Theory of Ferro and Anti-ferromagnetism – hysteresis curves and parameters – Curie temperature – domain theory – magnetic anisotropy – soft and hard magnetic materials – magnetic bubble – memory devices - Magnetic circuits

Unit V – Semiconductors and superconductors

Compound semiconductors – Hall effect – origin of energy band and energy gap – Kronig penny model – Basic concepts superconductivity – transition temperature – Meissner effect – Type I and II superconductors – high temperature superconducting materials – 123 superconductor.

Text books

1. Materials Science – M Arumugam, Anuratha Printers, 1994.
2. Solid State Physics – S.O Pillai – Wiley Easton, 1994.

Reference

- 1 Solid State Physics – C Kittel 7th Edition – Wiley Eastern Ltd., 1987
- 2 Science of Engg. Materials – C M Srivastava – Wiley Eastern Ltd., 1987
- 3 Elementary Physics – M Ali Omar – Addison Sesley Publishing Co.India,1990.

UCC 2224 ENVIRONMENTAL SCIENCE

Unit I

Environmental segments – brief outline. Pollution – Definition – classification. Pollutants – classification of pollutants.

Air pollution–I - Reactions in atmosphere – Sources of air pollution – Gaseous pollutants – oxides of nitrogen, oxides of sulfur, oxides of carbon, hydrocarbons and particulates.

Unit II

Air pollution II – Greenhouse effect – Sources - Effect on Global climate-consequences. Chlorofluro carbons- (CFC). Ozone depletion – Cause -Mechanism-Effects on environment. Smog-Sulfurous or London Smog – Photochemical Smog or Los Angles Smog –Effects on environment.

Acid rain – Theory of acid rain – Effects.

Unit III

Water pollution – Types of water pollution–Sources-Classification of water pollutants cause and effect of :- (i) Inorganic pollutants and toxic metals, (ii) Organic pollutants, (iii) Radioactive pollutants and (iv) Pesticides.

Unit IV

Pollution monitoring and control methods - Air pollution - Analysis of CO_x, NO_x, SO_x, H₂S, Hydrocarbons, particulate matter.

Water pollution. Monitoring pH, Dissolved oxygen –Winkler's method - BOD, COD, TOC.

Unit V

Noise pollution – Sound levels – Sources of Noise – Effects of Noise – Noise Limits – Some control measures

Basic concept of Environmental impact assessment – Types of impact – Quantifying specific impact – Elementary aspects of impact identification and evaluation.

TEXT BOOKS:

1. Anil Kumar De, "Environmental Chemistry", 3rd Edition, New Age International (P) Ltd., Publishers, New Delhi (1996)
2. B K Sharma, "Environmental Chemistry" GOEL Publishing House, Meerut, (2000).

REFERENCE BOOKS:

1. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd., New Delhi, (1994).
2. S A Abbasi, "Environmental Pollution and its control", Cogent International, Pondicherry, (1998). (For Unit V)..
3. A textbook in Environmental Science, V Subramanian, Narosa Publishing House, New Delhi.

UCC0125 Basic 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- classification and methods of improving bearing capacity of soils.

Foundations-Functions and classification.

Masonry-Types of stone and brick masonry.

Flooring-functions and types-cement, concrete, mosaic, granolithic-marble, timber and granite flooring.

Roofs-Flat roofs - steel trusses - roof covering.

Unit III

Utilities and Services:

Surveying-classification, general principles of surveying – Basic terms and definitions in chain, compass, leveling surveying and uses of surveying – definition, characteristics and uses of contours.

Roads-types, Water bound macadam road, cement concrete road, bituminous road.

Bridges-types, T-beam, steel, arch, culvert and causeway.

Dams-Purpose, selection of site, types of dams - gravity and earthen dams..

Water supply-sources-surface and ground water quality and quantity requirements.

Rainwater harvesting.

Text Book:

- 1.Purushothama Raj.P., Basic civil engineering,3rd Edn., Dhanam Publications, Chennai, 2001.
2. Natarajan, K V, Basic Civil Engineering, 11th Edition, Dhanalakshmi Publications, Chennai, 2001.

Reference Books:

1. Rajpat, R K, Engineering Materials, S Chand & Co. Ltd., New Delhi, 2002
2. Punmia, B.C. etal, Surveying , Vol-I, Laxmi Publishers, New Delhi, 2002
3. Arora, S P and Bevidra, S P., Building Construction, Dhanpat rai & Sons, New Delhi, 2002.

UCC 0125 BASIC ENGINEERING

**PART-B
MECHANICAL ENGINEERING**

Unit IV

INTERNAL AND EXTERNAL COMBUSTION SYSTEMS:

Working principles of IC engines – Classification – Diesel and petrol engines: two stroke and four stroke engines. Steam generators(Boilers) – Classification – Constructional features (of only low pressure boilers) – Boiler mountings and accessories.

CONVENTIONAL POWER GENERATION SYSTEMS:

Hydraulic, steam and gas turbines power plants – Schemes and layouts – Selection criteria of above power plants.

Unit -V

NON-CONVENTIONAL ENERGY SYSTEMS (Description only)

Solar thermal systems – Solar photovoltaic – Solar pond – wind, wave, tidal, geothermal and ocean thermal energy conversion systems.

CASTING:

Green and dry sand moulding processes for ferrous and non-ferrous metals – applications.

Unit – VI.

METAL JOINING:

Elements of arc and gas welding, brazing and soldering – Bolted joint types – Adhesive Bonding; classification of adhesives – applications.

SHEET METAL PROCESSING:

Punching, blanking, shearing, bending, and deep drawing processes; descriptions and applications

TEXT BOOKS:

1. Lindberg, R.A.Process and Materials of Manufacture, PHI.
2. Nagpal, Power Plant Engineering, Khanna Publishers, Delhi.

REFERENCES:

1. E1.Wakil, M.M.Power Plant Technology, Mc Graw Hill Book Co.
2. Campbell, J.S.Principles of Manufacturing Materials and processes, TMH.
3. Hajra Choudhry, et. A1, Workshop Technology, Media Promoters Publishers Pvt. Ltd., Bombay.
4. Chapman, A.J.Production Technolgoy.

UCC 0016 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, definition of rigid body and degrees of freedom, Condition of static equilibrium for coplanar force system, stability of equilibrium, concept of free body diagrams, applications in solving the problems on static equilibrium of bodies.

Unit – II

Plane Trusses

Degrees of freedom, 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, screws and belt friction, introduction to virtual work principle

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

Rectilinear motion, curvilinear motion, Relative motion, equations of motion, D'Alembert's principle, work, power, energy and efficiency – 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. Rajesekaran.,S and Sankara Subramanian., G., Engineering Mechanics, Vikas Publishing House Private Ltd., 2002
2. Natesan, S C., Engineering Mechanics, Umesh Publications, New Delhi, 2002

Reference Books

1. Meriam, J.L., "Statics", John Wiley, 2002
2. Meriam, J.L., "Dynamics", John Wiley, 2002
3. Natarajan, K V., Engineering Mechanics, Dhanalakshmi Publishers, Chennai, 2003.

PHYSICS LABORATORY: UCC 0217

(ANY 10 EXPERIMENTS)

- 1 THERMAL CONDUCTIVITY – LEE'S DISC
- 2 THERMAL CONDUCTIVITY RADIAL FLOW
- 3 SPECTROMETER – PRISM AND HOLLOW PRISM
- 4 SPECTROMETER – GRATING
- 5 SPECTROMETER - ORDINARY & EXTRAORDINARY RAYS
- 6 NEWTON'S RINGS
- 7 AIR – WEDGE
- 8 POLARIMETER
- 9 I – H CURVE
- 10 FIELD ALONG THE AXIS OF COIL CARRYING CURRENT
- 11 MELDE'S STRING
- 12 KUNDT'S TUBE
- 13 LASER EXPERIMENT: Wavelength Determination Using Grating and Vernier Calipers.
- 14 JOLLY'S EXPERIMENT FOR α
- 15 VIBRATION MAGNETOMETER – CALCULATION OF MAGNETIC MOMENT AND POLE STRENGTH

UCC 0029 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.Funnel
- 3.Waste collection tray

IV.Carpentry

- 1.Study of tools and machineries
- 2.Half lap joint
- 3.Corner mortise joint.

UCC 0228 CHEMISTRY PRACTICALS

(Any 10 Experiments)

1. Determination of total hardness of water by EDTA method.
2. Determination of alkali by Flame photometer.
3. Estimation of iron by colorimetry.
4. Molecular weight determination of a polymer by viscometry.
5. Percentage composition of sugar solution by viscometry.
6. Determination of dissolved oxygen content in water.
7. Estimation of mixture of alkali ($\text{HCO}_3 + \text{CO}_3$)
8. Determination of Pb in polluted water by conductometry.
9. Estimation of Fe^{2+} by Potentiometry.
10. Determination of COD of a waste water sample.
11. Determination of chloride content in water.
12. Determination of copper in brass.
13. Determination of available chlorine in bleaching powder.

UCC 3201 : MATHEMATICS - III

UNIT I

LAPLACE TRANSFORM: Definitions - Laplace transform of unit impulse and step functions - Laplace transform of periodic functions - Exponential shift formula- Initial and final value theorems - Laplace transform of derivatives and integrals - Convolution theorem - Inverse Laplace transform - Methods of determining inverse Laplace transform -Solution of linear differential equations using Laplace transforms. (12 Hours)

UNIT II

FUNCTION OF A COMPLEX VARIABLE: Functions of a complex variable - continuity, derivative and analytic function - Cauchy - Riemann equations – Necessary and sufficient conditions for analyticity - Harmonic and orthogonal properties of real and imaginary parts - Conformal mapping - Bilinear transformations. (12 Hours)

UNIT III

COMPLEX INTEGRATION: Cauchy's theorem -Cauchy's integral formula - Taylor's and Laurent series - Residue theorem - Contour integration round the unit circle and semi-circular contour. (12 Hours)

UNIT IV

FOURIER SERIES: Dirichlet's conditions - Expansion of periodic functions into Fourier series- Change of interval- Half-range Fourier series. (10 Hours)

UNIT V

Complex form of Fourier series - Root mean square value - Parseval's theorem on Fourier coefficients - Harmonic analysis. **FOURIER TRANSFORM:** Definition and properties - Fourier Integral theorem - statement - Fourier sine transform and cosine transforms - Inverse Fourier transform. (12 Hours)

TEXT BOOKS

1. M.K.Venkataraman, '*Engineering Mathematics*', Third Year Part A &B, The National Publishing Company, Madras (1995).
2. S. Naryanan, T.K. Manicavachagam Pillai, and C. Ramanaiah, '*Advanced Mathematics for Engineering students*', C. Viswanathan & Co Pvt. Ltd., Madras (1985).

REFERENCE BOOKS:

1. Erwin Kreyszig, '*Advanced Engineering Mathematics*', Wiley Eastern Ltd. (1985).

2. B.S.Grewal, '*Higher Engineering Mathematics*', Khanna Publishers, Delhi (1985).

UCS 3032 / UIT 3032 : ELECTRONIC DEVICES AND CIRCUITS

UNIT I

DIODES AS AN ELECTRONIC CIRCUIT ELEMENT: Diode as a Circuit element, Equivalent circuits, Elementary diode circuits, Half-wave rectifiers, Ripple factors, Efficiency of rectification, clippers, capacitor input filters, Zener diode, Zener regulator, series and shunt regulators.

UNIT II

SMALL SINGLE AMPLIFIERS: Small single equivalent circuit for BJT, BJT amplifiers, Voltage gain, Current gain, input impedance for CE, CB & CC amplifiers, Class A, Class B & Class C, Power amplifiers, FET amplifiers, Voltage gains, current gain, input-output impedance of common drain configuration, multistage amplifiers, Darlington pair.

UNIT III

OPERATIONAL AMPLIFIERS: Op-amp parameters, Op-amp circuits: Design of inverting, Non-inverting amplifier, Frequency response, Voltage Follower, summer, integrator, Differentiator, Difference amplifier, Instrumentation amplifier, Comparators, Voltage to frequency converters, Analog multipliers and demultiplexers.

UNIT IV

FEEDBACK AMPLIFIERS AND OSCILLATORS: Feedback amplifiers, Four types of feedback, Effect of feedback of a amplifier, performance and Distortion oscillators, Condition for oscillators, Analysis and design of various oscillators employing BJT, FET and Op-Amp, LC-oscillators, frequency stability.

UNIT V

VOLTAGE REGULATORS: Regulator using op-amp IC regulators, production switching for voltage regulators, feedback current building, Negative voltage regulators using IC current boosting of IC regulators, Switching regulators.

TEXT BOOKS

1. Jacob Milman and Arvin Grabel, "*Microelectronics*", McGraw Hill EDIT, Fifth EDIT, 1998.
2. R. Boybested and Louis Nishalsky, "*Electronic Devices and circuit Theory*". Prentice Hall.

UCS 3053 : ELECTRICAL ENGINEERING

UNIT I

Application of kirchoff's laws- Thevenin's and Norton's theorem - superposition theorem-maximum power transfer theorem - Resiprocity theorem.

UNIT II

A.C Networks –resonance-series-parallel- series-parallel combinations-coupled circuits-effect of variation of Q on resonance-dot conversions-single tuned,double tuned circuits. Simple RL,RC and RLC transients(DC Excitation)-transient analysis using Laplace Transformation method.

UNIT III

Single phase transformer-construction-principle of operation-EMF equation-phjator diagram-OC and SC test – Equivalent circuit-losses-all day efficiency-regulation-Elementary treatment of three phase transformer.

UNIT IV

DC generator-construction-principle of operation-EMF equation –classification of DC generators-DC motors-Torque equation-commutation starters-Swinburne's test-Losses and Efficiency of DC machines-Speed control applications of DC machines.

UNIT V

Single phase induction motor-construction-principle of operation-condition for starting-equivalent circuit-Applications-Stepper motor-Universal motor-Reluctance motor-AC servo motor-Applications.

TEXT BOOKS

1. B.L.Theraja,A.K.Theraja "A Text book of Electrical Technology",Volume-II , S.chand &company limited,New Delhi,2002
2. M.Arumugam, N.Premakumaran,"Electric circuit Theory",Kama publishers,New Delhi,2001.

REFERENCE BOOK

1. Stephen J. Chapman,"Electric Machinery Fundamentals" , McGraw – Hill international editions, New Delhi,2002.

**UCS 3044 / UIT 3084 : DIGITAL COMPUTER FUNDAMENTALS
AND ARCHITECTURE**

UNIT I

Digital Logic Fundamentals: revision of RTL, DTL, I²L, TTL, ECL, MOS, CMOS logic families – revision of binary number systems, boolean algebra and logic gates – simplification of boolean functions.

UNIT II

Combinational Circuits: adders – subtractors – code converters – binary parallel adder – decimal adder – magnitude comparator – encoders – decoders – multiplexers – demultiplexers – ROM - PLA.

Sequential Circuits: flip-flops – triggering – clocked sequential circuits – excitation tables – flip-flop conversion – design procedure – registers – shift registers – synchronous and asynchronous counters.

UNIT III

Processor Organization: general register organization – stack organization – instruction formats – addressing modes – data transfer and manipulation – program control.

Pipeline and Vector Processing: parallel processing – pipelining – arithmetic pipeline – instruction pipeline – RISC pipeline – vector processing – array processors.

UNIT IV

Memory Organization: memory hierarchy – main memory – auxiliary memory – associate memory – cache memory – virtual memory.

UNIT V

Input-Output Organization: input-output interface – asynchronous data transfer – modes of transfer – priority interrupt – DMA – IOP – serial communication.

TEXT BOOKS

1. M. Morris Mano, “*Digital Logic and Computer Design*”, Prentice-Hall of India Pvt. Ltd., 2002.
2. M. Morris Mano, “*Computer System Architecture*”, 2nd edition, Prentice-Hall of India Pvt. Ltd., 1999.

REFERENCE BOOKS:

1. Carl Hamacher, Zvonko G. Vranesic, Safwat G. Zaky, “*Computer Organization*”, 4th edition, McGraw-Hill, 1996.

UCS 3045 / UIT 3085 : DATA STRUCTURES

UNIT I

Introduction, algorithmic notation, Space and Time analysis of an algorithm, information and its storage representation, Representation and its manipulation of strings, Pattern Matching, Searching and sorting techniques.

UNIT II

Linear data structures, array of structures, stacks, application of stacks, queues, priority queues, pointers and linked allocation, Singly Linked List, linked stacks, Linked queues, Polynomial Addition, Sparse matrices, Equivalence relations, Doubly Linked List, Circular Linked List, Dummy headed Linked List – Garbage Collection and Compaction

UNIT III

Non-linear data structures, Trees – Binary tree, Terminology, Representation, Traversal, Applications. Graph – Terminology, Representation, traversals, spanning trees, shortest path and Transitive closure, Topological sort.

UNIT IV

Symbol tables – Static, Dynamic and Hash tables

UNIT V

File structures, external storage devices, sequential files, indexed sequential files, direct files, external searching, linear and virtual hashing, virtual memory, VSAM Files, multiple key access.

TEXT BOOKS

1. Ellis Horowitz and Sartaj Sahni “*Fundamentals of Data Structures*” Galgotia Booksource, 1995.
2. Robert Kruse ‘C.L. Tondo and Bruce Leung, “*Data Structures and Program Design in C*”, 2nd edition, Pearson Education Asia, 2001.

REFERENCE BOOKS

1. Jean Paul Tremblay and Paul G. Sorenson, “*An Introduction to data structures with applications*” 2nd edition, Tata McGraw-Hill, 2001
2. D. Samanta, “*Classic Data structures*”, Prentice-Hall of India private ltd., 2001.

UCS 3046 : PRINCIPLES OF PROGRAMMING LANGUAGES

UNIT I

Language design Issues: Reasons for studying concepts of programming languages- language evaluation criteria - influence on language design - structure and operation of computer-Virtual computers and binding times- language paradigms. **Language Translation Issues:** Programming language syntax- stages in translation – formal translation models.

UNIT II

Data types: Properties of types and objects – elementary data types – structured data types. **Abstraction:** Abstract data types – encapsulation by subprograms – type definition – storage management.

UNIT III

Sequence Control: Implicit and explicit sequence control – sequencing with arithmetic and non-arithmetic expressions – sequence control between statements. **Subprograms Control:** Subprogram sequence control – attributes of data control – shared data in subprograms.

UNIT IV

Inheritance: Inheritance – polymorphism. **Advances in language design:** Variations on subprogram control – language constructs for parallel processing – language semantics – software architecture.

UNIT V

Logic Programming : Formal logical systems – PROLOG. **Functional Programming:** Features of functional languages – LISP – Implementing functional languages- Applications of functional and logic programming languages.

TEXT BOOKS

1. Terrance W.Pratt, Marvin V Zelkowitz, “*Programming Languages, Design and Implementation*”, PHI, 2002, (4th edition).

REFERENCE BOOKS

1. Ravi Sethi, “*Programming Languages – Concepts & Constructs*”, Addison-Wesley, (2nd edition),1996.
2. E.Horowitz, “*Fundamentals of programming languages*”, Galgotia Publishers,1984.
3. A.B.Tucker, Robert, Noonan,“*Programming Languages*”, McGraw Hill,2002.

4. D.Appleby, J.J.VandeKopple, “*Programming languages – Paradigm and practice*”, McGraw Hill, International Editions, (2nd edition), 1997.

UIT 3037: ELECTRICAL AND ELECTRONICS LABORATORY

A list of experiments is given below. The students should carry out them in the respective departments.

ELECTRICAL:

1. OC and SC test on transformers
2. Load test on single phase transformers
3. Load test on 3-phase transformers
4. Power measurement through two wattmeter method
5. Load test on DC shunt motor and Speed control of DC shunt motor
6. Load test on single phase induction motor
7. RLC series resonance
8. Verification of theorems (Thevenin, Norton, super position, reciprocity)

ELECTRONICS :

1. VI characteristics of Semiconductor and Zener diodes
2. Application of Diodes (clippers, clampers, rectifiers)
3. Static characteristics of common emitter transistor configuration and determination of h parameters.
4. Drain characteristics of FET and determination of Drain resistance, Mutual conductance and Amplification factor.
5. V.I. Characteristics of silicon controlled rectifier and Uni-Junction transistor.
6. R.C. Coupled amplifier: Determination of Z_{in} , Z_{out} and frequency response.
7. Class B push – pull power amplifier and to find the efficiency as a function of load.
8. Applications of Operational amplifier
 - i) Adder and subtractor
 - ii) Integrator and differentiator
 - iii) Wien’s bridge oscillator and R.C Phase shift

UCS 3048/ UIT 3088 : DIGITAL LAB

1. Implementation of logic circuits using gates
 - A. Full adder/full subtractor
 - B. Implementation of logic functions using universal gates only
 - C. Design of priority encoder
 - D. Design of demux using nor gates only
 - E. Code convertor
2. Implementation of circuits using MSI
 - A. Synchronous counters
 - B. Asynchronous counters
 - C. Binary multiplier
 - D. Decimal Adder
 - E. Universal shift register
 - F. Design of Arithmetic unit

3. Interface experiments with MSI
 4. design of ALU
 4. Interface of ALU with registers
- B. Interface of ALU with memory

UCS 3049/ UIT 3089 : DATA STRUCTURE LAB

The problems are to be developed and solved in C.

Implementation of stacks, queues, sorting and searching techniques, singly linked list, doubly linked list, circular linked list, circular queue, de-queue, priority queue, polynomial addition, building a binary tree, binary search tree, expression evaluation using binary tree, implementing graph, finding shortest path

UCC 30410 : GENERAL PROFICIENCY - I

UNIT 1

BASICS OF COMMUNICATION : Essential Communication Skills; Elements of Communication; Basic Models of Communication; Frames of Reference; Purposive Communication; Channels of Communication; Developing Good Communication Style.

UNIT II

LANGUAGE DEVELOPMENT THROUGH READING : TOEFL based Reading Comprehension; Current Affairs; Vocabulary Building; Idioms and Phrases; Basic Phonetics.

UNIT III

SPEAKING PRACTICE : Dialogue/Conversation; Types of Conversations; Listening Skills; Telephone Etiquette; Public Speaking; Debate.

UNIT IV

QUANTITATIVE ANALYSIS : Aptitude Tests

REFERENCE BOOKS :

1. Bovee, Courtland L and John V Thill. *Business Communication Today*. Pearson Education, 2003.
2. Rymniak, Marilyn J and Janet A Shanks. *TOEFL CBT Exam*. Simon and Schuster, 2002.
3. Lewis, Norman. *Word Power Made Easy*. Bloomsbury, 2003.
4. Nicholls, Anne. *Mastering Public Speaking*. Jaico Publishing House, 2003.
5. Jones, Daniel. *Cambridge English Pronouncing Dictionary*. CUP, 2003.
6. Aggarwal, R.S. *Quantitative Aptitude*. S. Chand & Co., 2004.

UCS 4201 / UIT 4201 : DISCRETE MATHEMATICS AND GRAPH THEORY
UNIT I

Connectives, Statement formulae, Equivalence of Statement formulae, Functionally complete set of connectives-NAND and NOR connectives, implication, Principal conjunctive and disjunctive normal forms

UNIT II

Inference calculus-Derivation process-Conditional proof-Indirect method of proof-Automatic theorem proving-Predicate calculus

UNIT III

Partial ordering-Lattices-Properties-Lattices as algebraic system-sub lattices-Direct product and homomorphism-Special lattices-Complemented and Distributive lattices

UNIT IV

Graphs-Applications of graphs-degree-pendant and isolated vertices-isomorphism-sub graphs-walks-paths and circuits- connected graphs –Euler graphs-operations on graphs-More on Euler graphs –Hamilton paths and circuits-complete graph

UNIT V

Trees-properties of Trees-Pendant vertices in a Tree-Distance and Center in a Tree-rooted and binary trees-spanning trees-Fundamental Circuits-Distance between spanning trees-shortest spanning trees-Kruskal algorithm

TEXT BOOKS

1. J.P.Tremblay and R.Manohar, "*Discrete Mathematical Structures with applications to Computer science*", Tata McGraw-Hill Publishing company pvt. Ltd., New Delhi, 1997.
2. Narsingh Deo, "*Graph Theory with applications to Engineering and Computer science*", Prentice-Hall of India pvt. Ltd., New Delhi, 1987.

REFERENCE BOOKS

1. Kenneth H.Rosen, "*Discrete Mathematics and its Applications*", Fifth edition, Tata McGraw-Hill Publishing company pvt. Ltd., New Delhi, 2003.
2. C.L.Liu, "*Elements of Discrete Mathematics*", Second Edition, McGraw-Hill Book Company, New York 1988.
3. F.Harary, "*Graph Theory*", NarosaPublishing House, New Delhi –Chennai-Mumbai, 1988.
4. Douglas B.West, "*Introduction to Graph Theory*", Second Edition (Indian) Pearson Education Singapore) Pvt.Ltd, 2002.

UCS 4042 / UIT 4083 : MICROPROCESSORS AND APPLICATIONS

UNIT I

INTRODUCTION TO MICROPROCESSORS : Concept and need for microprocessors – evolution - general architecture - control unit – internal registers – arithmetic and logic unit – state transition – architecture of 8085 and 8086 – timing and sequencing.

UNIT II

INSTRUCTION SET AND PROGRAMMING : Addressing modes – instruction set summary of 8085 – overview of 8086 instruction set – assembly language programming: arithmetic and logic – code conversion – counters and delay routines - stacks and subroutines.

UNIT III

INTERRUPTS AND DMA : Data transfer techniques – interrupt structure of 8085 – overview of 8086 interrupts – interrupt vectors – interrupt service subroutines – priority – multiple interrupts – applications – real time clock - concept of DMA data transfer

UNIT IV

MEMORY & I/O INTERFACING : Types of memory – memory mapping – address decoders – dynamic RAM interfacing – concept of I/O map – types – I/O decode logic – interfacing key switches and LEDs – programmable peripheral interface 8255 – programmable interval timer 8253 – programmable interrupt controller 8259 – programmable DMA controller 8237

UNIT V

SERIAL COMMUNICATION AND MICROPROCESSOR APPLICATIONS : Concept of Serial Communication – 8251 USART – RS232C interface – traffic light control – data acquisition system – temperature monitoring system – architectural features of Pentium and 8051 microcontroller.

TEXT BOOKS:

1. Ramesh S.Gaonkar, “*Microprocessor Architecture, Programming and Applications with 8085*”, Penram Publications, 2002
2. A.K.Ray and Bhurchandi , “*Advanced Microprocessors And Peripherals*”, Tata McGraw Hill, 2000

REFERENCE BOOKS

1. Douglas V.Hall, “*Microprocessors And Interfacing Programming and Hardware*”, Tata McGraw Hill, 2003
2. Ajit Pal, “*Microprocessors Principles & Applications*” , Tata McGraw Hill, 2001

UCS 4043 / UIT 4085 : OPERATING SYSTEMS

UNIT I

Introduction: Mainframe Systems -- Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems - Real Time Systems — Hardware Protection – System Components – Handheld Systems -Operating System Services – System Calls – System Programs – System Structure – Visual Machines - System Design and Implementation.

UNIT II

Process Management: Process Concept – Process Scheduling – Operation on Process – Cooperating Processes – Interprocess Communication – Threads – Overview – Multithreading Models - Process Synchronization – The Critical Section Problem –Synchronization Hardware – Semaphores – Classical Problems of Synchronization – Deadlocks – System Model – Deadlock Characterization – Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection –Recovery from Deadlock.

UNIT III

CPU Scheduling and Memory Management: CPU Scheduling - Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple- Processor Scheduling – Real-Time Scheduling – Algorithm Evaluation - Memory Management -Background – Swapping –Contiguous Memory Allocation –Paging – Segmentation – Segmentation with paging.

UNIT IV

Virtual Memory: Virtual Memory – Demand paging – Page Replacement – Thrashing – Allocation of Frames - Other Considerations - File Systems – File Concepts -Access Methods – Directory Structure – File System Mounting – File Sharing – Protection - File System Structure – File System Implementation – Recovery.

UNIT V

Files and Secondary Storage Management: Allocation Methods - Free-Space Management – Directory Implementation – Recovery - Disk Structure – Disk Scheduling – Disk Management – Swap Space management – Case Study: Linux System – Components of a Linux Systems – Process Management – Process Scheduling – Security.

TEXT BOOK

1. Silberschatz , Galvin, GAGNE “*Operating System Concepts*” , Sixth edition, John wile & Sons, INC, 2002.

REFERENCE BOOKS

1. D.M.Dhamdhare, “*Operating Systems*”, Tata McGraw Hill, 2002.
2. Charles Crowley, “*Operating Systems: A Design Oriented Approach*”, Tata McGraw Hill 1999.
3. Andrew S.Tanenbaum, “*Modern Operating Systems*”, Prentice Hall of India, 1995.

4. William Stallings, “*Operating Systems*”, Prentice Hall of India, 1997.

UCS 4044 / UIT 4084 : DESIGN AND ANALYSIS OF ALGORITHMS

UNIT I

Analysis of algorithms : Introduction - analyzing control structures - average case analysis solving recurrences. **Analysis** : Sorting – heap, radix, insertion, selection and bubble. Searching – binary, sequential and fibonacci.

UNIT II

Divide and Conquer method : General method – binary search – finding maximum and minimum – merge sort and quick sort – strassen’s matrix multiplication. **Greedy method** : General method – Knapsack problem – minimum spanning tree algorithms – single source shortest path algorithm – scheduling, optimal storage on tapes, optimal merge patterns.

UNIT III

Dynamic programming : general method – multi stage graphs – all pairs shortest path algorithm – 0/1 Knapsack and traveling salesman problem – chained matrix multiplication – approaches using recursion – memory functions. **Basic search and traversal technique** : the technique – and/or graphs – biconnected components – depth first search – topological sorting – breadth first search.

UNIT IV

Backtracking : The general method – 8 queens problem – sum of subsets – graph coloring – Hamiltonian cycle – Knapsack problem.

UNIT V

Branch and bound method : 0/1 Knapsack problem – travelling salesman problem.

TEXTBOOKS

1. Gilles Brassard & Paul Bratley, “*Fundamentals of algorithms*”, PHI, 1997.
2. E. Horowitz & Sahni, “*Fundamentals of Computer Algorithms*”, Galgotia Publications. 1997.
3. S.E.Goodman and S.T. Hedetniemi, “*Introduction to the Design and Analysis of Algorithms*”, McHraw Hill.

REFERENCE BOOKS

1. Aho, Ullman & Hopcraft, '*The Design and analysis of algorithms*', Addison Wesley publication 1974.

2. Sara Baase, “*Computer Algorithms, Introduction to Design and Analysis*”, Addison-Wesley Publishing Company – 1991.

UCS 4045 : OBJECT ORIENTED PROGRAMMING AND SYSTEM DESIGN

UNIT I

Limitations in structured programming-Characteristics of Object Oriented Language – data types – loops – pointers – arrays – structures – functions – Classes – Objects.

UNIT II

Operator overloading – Inheritance – Polymorphism – Templates – Exception Handling – class Hierarchies – library organization and containers – Strings – Stream – Design and programming.

UNIT III

Object Orientation – System development – Review of objects - inheritance - Object relationship – Dynamic binding – OOSD life cycle – Process – Analysis – Design – prototyping – Implementation – Testing- Overview of Methodologies.

UNIT IV

OMT – Booch methodology, Jacobson methodology – patterns – Unified approach – UML – Class diagram – Dynamic modeling. Use case model – Creation of classes – Noun phrase approach – responsibilities – Collaborators – Object relationships – Super-Sub class – Aggregation.

UNIT V

OO Design axioms – Class visibility – refining attributes – Methods –Access layer – OODBMS – Table – class mapping view layer. Quality assurance testing - Inheritance and testing – Test plan – Usability testing – User satisfaction – Testing.

Note: Unit I & II deals with C++

TEXT BOOKS

1. Bjarne Stroustrup, “*The C++ Programming Language*”, (3rd and Special Edition) Addison Wesley, 2000
2. Ali Bahrami, “*Object Oriented System Development*”, McGraw-Hill International Edition, 1999.

UCS 4046 : COMPUTER GRAPHICS

UNIT I

GRAPHICS SYSTEMS & GRAPHICAL USER INTERFACE : Pixel, Resolution, Interactive Vs Non-interactive - video display devices - types – Input devices – Hard copy devices – GKS. User dialogue – graphics data Input – Input function – Interactive picture construction techniques.

UNIT II

DISPLAY PRIMITIVES & ATTRIBUTES : Points display – Line drawing : DDA, Bresenham's algorithms – Circle, Ellipse and Curve generating algorithms – Fill area primitives – Character generation – Pixel addressing - Line attributes – Area fill attributes – bundled attributes.

UNIT III

TWO DIMENSIONAL TRANSFORMATIONS & VIEWING : Transformations - types – matrix representation – Concatenation - Scaling, Rotation, Translation, Shearing, mirroring. Homogeneous coordinates – Window to viewport transformations.
WINDOWING AND CLIPPING : Lines, Polygons - boundary intersection and mid-point subdivision methods - Character and Text clipping.

UNIT IV

THREE DIMENSIONAL CONCEPTS & TRANSFORMATIONS : Three dimensional display methods. Three dimensional curves & surfaces – Sweep representations – Solid geometry methods – Octrees – fractal geometry. Three dimensional transformations – Modeling & Coordinate transformations.

UNIT V

THREE DIMENSIONAL VIEWING, VISIBLE SURFACES, RENDERING & ANIMATION : World to viewing transformations – Projections – view volumes – Clipping. Visible surface detection methods, Light sources – Illuminations models – Light intensities – Half tone patterns – Polygon rendering methods – Ray tracing. Animation sequences – animation function – Raster animations – Morphing – Motion animation sequences.

TEXT BOOK

1. Donald Hearn & M. Pauline Baker, “*Computer Graphics*”, Prentice Hall of India – 2nd edn., 2000.

REFERENCE BOOK

1.Newmann W.M. and Sproull R.F., "*Principles of Interactive Computer Graphics*",
Tata McGrawHill, Second Edn., 2000

UCS 4047 / UIT 4088 : MICROPROCESSOR LABORATORY

LIST OF EXPERIMENTS

1. Study of 8085 Microprocessor trainer kit
2. Assembly language programming: arithmetic
3. Assembly language programming: block operations
4. Assembly language programming: code conversion
5. Assembly language programming: sorting and searching
6. Digital clock simulation
7. Printer interfacing
8. Serial communication
9. Elevator simulation
10. Traffic light control
11. Music synthesizer
12. ADC & DAC interfacing
13. Stepper motor and DC motor interfacing
14. 8086 assembly language programming using MASM
15. Assembly language programming using 8051

UCS 4048 / UIT 4089 : OPERATING SYSTEMS LAB

LIST OF EXPERIMENTS

1. Basic UNIX commands
2. Shell Programming
3. Implementation of scheduling algorithms.
4. Simulation of Paging, Segmentation.
5. File systems.
6. Process management – Fork-Exec.
7. Message queues, Pipe, FIFO's
8. Signals.
9. Shared memory and Semaphores

UCS 4049 : ALGORITHMS LABORATORY

The following problems are to be solved in C++

- Simple Experiments on time and space complexity of a program – Graphical representation of time and space complexity.
- Implementation of Sorting and Searching algorithms (analysis of time complexity)

- Implementation of the following methods on the given problems and determination of time complexity: Divide and Conquer method – Greedy method – Dynamic Programming – Traversal techniques – Backtracking – Branch and Bound.
- Game Simulation.

UCC 40410: GENERAL PROFICIENCY - II

UNIT I

IMPORTANCE OF COMMUNICATION : Introduction; Verbal and Non-verbal Codes of Communication; Barriers to Communication; Self-Assessment; SWOT Analysis; Identifying Strengths and Weaknesses.

UNIT II

PERSONALITY DEVELOPMENT : Body Language; Non-verbal Skills; Leadership Qualities; Emotional Quotient; Effective Time Management; Surviving Stress; Overcoming Failure; Professional Ethics

UNIT III

VERBAL COMMUNICATION : Social Exchanges; Planned Speech; Extempore; Basics of Attending & Organizing Meetings; Informal Discussions

UNIT IV

QUANTITATIVE ANALYSIS : Aptitude Tests

REFERENCE BOOKS

1. Mohan, Krishna and Meera Banerji. *Developing Communication Skills*. Macmillan, 2002.
2. Leigh, Andrew and Michael Maynard. *The Perfect Leader*. Random House Business Books, 1999.
3. Minchinton, Jerry. *Maximizing Self-confidence*. Jaico Publishing House, 2003.
Thorpe, Edgar. *Course in Mental Ability and Quantitative Aptitude*. Tata McGraw-Hill, 2003.

UCS 5201 : AUTOMATA LANGUAGE AND COMPUTATION

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, applications of finite automata.

UNIT II

Regular Sets and Context Free Grammars: Properties of regular sets, context-Free Grammars – derivation trees, Chomsky Normal Forms and Greibach Normal Forms, ambiguous and unambiguous grammars; minimization of finite automata.

UNIT III

Pushdown Automata and Parsing Algorithms: Pushdown Automata and context-free languages; Top-down parsing and Bottom-up parsing; properties of CFL; Applications of pumping lemma, closure properties of CFL and decision algorithms.

UNIT IV

Turing machines: Turing machines(TM) – computable languages and functions – turing machine constructions – storage in finite control – variations of TMs – recursive and recursive enumerable languages.

UNIT V

Introduction to Computational Complexity: Time and Space complexity of TMs – complexity classes – introduction to NP-Hardness and NP-Completeness.

TEXT BOOK

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 Computaiton*”, Tata McGraw-Hill, 2003.

UCS 5042 : SYSTEM SOFTWARE

UNIT I

INTRODUCTION TO SYSTEM SOFTWARE AND MACHINE STRUCTURE :

System programs – Assembler, Compiler, Interpreter, Operating system. Machine Structure – instruction set and addressing modes.

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.

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

MACROPROCESSORS : Basic Macroprocessor functions – machine independent features, Macroprocessor design – recursive, one pass macroprocessor –two pass macroprocessor-general-purpose and macroprocessing with language translators.

UNIT V

Debugger- Introduction-debugger architecture-H/W debugger facilities-OS debugger infrastructure- controlling execution-breakpoints and single stepping-inspecting data and variables – debugging GUI applications.

TEXT BOOKS

1. Leland L. Beck , “*System Software – In introduction to System Programming*”, Addison Wesley,(Chapter 1,3,4,5,7.2 & 7.3).
2. Jonathan B. Rosenberg, “*How Debuggers Work : Algorithms, Data Structures, and Architecture*”, John Wiley & Sons -1 edition (September 27, 1996)

REFERENCE BOOK

1. Damdhare, “*Introduction to System Software*”, Mcgraw Hill 1986.

UCS 5043 / UIT 5083 : VISUAL PROGRAMMING

UNIT I

Introduction to Windows Programming: Different paradigms of programming – Comparison – Event driven programming – Windows programming fundamentals – Data types – Resources – Windows messages – Device contexts – Document interface – Dynamic linking libraries.

UNIT II

Visual Basic Programming: Creating and using Controls – Menus and Dialogs – Managing projects – Programming fundamentals – Objects and instances – Programming user events – Using custom controls and grid control – inbuilt and user defined functions - Debugging - Creating graphics for application – Displaying and printing information – File system controls - Accessing databases with the data controls – VB and the Internet.

UNIT III

Visual C++ Programming: Visual C++ components – Developing simple applications – Microsoft Foundation classes – Controls – Message handling - Document-view architecture – Dialog based applications – Mouse and keyboard events – Reading and writing documents – SDI and MDI environments.

UNIT IV

Advanced Features in VB and VC++: Creating user defined DLL's – Dynamic data transfer functions – User interface classes – Database management with ODBC – Object Linking and Embedding – Communicating with other applications.

UNIT V

Visual J++: Introduction to VJ++ - Applet Wizard – Handling events – Multithreading – Animation Techniques – Animating images – Applets and networking.

TEXT BOOKS

1. Charles Petzold, “*Windows Programming*”, Microsoft Press, 1995.
2. Gray J. Bronson, “*Afirst book of Visual C++*”, Vikas Publishing House, 2000.
3. Lars Klander, “*Core Visual C++ 6*”, Pearson Education Asia, 2000.
4. Deitel and Deitel, T.R. Nieto, “*Visual Basic 6 – How to Program*”, Prentice Hall of India, 1999.
5. H.M. Deitel and P.J. Deitel, “*Java how to program with an introduction to Visual J++*”, Prentice Hall, 1998.

REFERENCE BOOKS

1. C.H. Pappas, W.H. Murray, III “*Visual C++: The Complete Reference*”, Tata McGraw-Hill Publishing Company, 1999.

2. G. Cornell, “*Visual Basic 6*”, Tata McGraw Hill, 1998.
3. David Kruglirski. J, “*Inside Visual C++*”, Microsoft press, 1993.

UCS 5044 / UIT 6081 : COMPUTER HARDWARE AND TROUBLESHOOTING

UNIT I

PC HARDWARE OVERVIEW: Introduction – Basic Parts of PC – Functional block diagram – system board – Microprocessor – Interrupts – DMA – SMPS – BIOS – POST sequence - System configuration – Memory – Mass storage – I/O interface standards

UNIT II

BUS STANDARDS and NETWORKING: ISA – PCI – SCSI – IDE – USB – comparative study and characteristics – Network Interface 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-Circuit Emulators – Logic State/Timing Analysers – Digital Multimeters – CROs – Signature Analysers – Troubleshooting problems of system boards, add on cards and peripherals.

TEXT BOOKS

1. Hans Peter Messmer, “*Indispensable PC Hardware Book*”, Pearson Education, 4th edition 2003
2. Govindarajulu, “*IBM PC and Clones*” Tata McGraw Hill, 3rd edition

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, Que

UCS 5046 : SYSTEM SOFTWARE LABORATORY

Experiments will be carried out using C/C++/Visual Basic.

- Simulation of DOS commands, File Operations, Development of software utilities like explorer(Exploring File System), Web Browser, Editors.
- Simulation of Two Pass Assembler and One Pass Assembler.
- Simulation of Absolute loader and Relocatable loader.
- Simulation of Two Pass Macroprocessor and One Pass Macroprocessor.
- Development of simple language processor, debugger.

UCS 5047 / UIT 5087 : VISUAL PROGRAMMING LAB

LIST OF EXPERIMENTS

1. **VISUAL BASIC**

- i. Simple programs with control structures
- ii. Adding menus to forms
- iii. Creating dialog boxes with various options
- iv. MDI applications
- v. Writing code for various keyboard and mouse events
- vi. OLE container control
- vii. Simple programs with classes and objects
- viii. Data access through Data control, DAO and ADO.

2. **VISUAL C++**

- i. Creating applications with App wizard
- ii. Drawing in documents
- iii. Working with MFC
- iv. Creating simple SDI and MDI applications
- v. Exception handling
- vi. Loading - Editing and - Adding resources - Linking resources To applications
- vii. Drawing bitmaps
- viii. Threads
- ix. OLE

- x. Active X
- xi. DLL's
- 3. **VISUAL J++**
 - i. Applet programs – Animating images, Multithreading
 - ii.

UCS 5048 / UIT 6086 : HARDWARE TROUBLESHOOTING LABORATORY

LIST OF EXPERIMENTS

1. Study of In-Circuit Emulator
2. Study of Logic State/Timing Analyzers
3. Hot and cold test of electronic components
4. PC system integration and Hard disk partitioning
5. Circuit Tracing
6. Adding I/O ports to an existing hardware (kit or PC)
7. Troubleshooting PC Mother board problems
8. Troubleshooting Printer related problems
9. Troubleshooting keyboard related problems
10. Troubleshooting 8085 kit using Logic Analyser
11. Troubleshooting 8085 kit using In-Circuit Emulator
12. PC to PC communication using direct cable connection
13. MODEM programming
14. Troubleshooting Floppy disk drive problems
15. Study and programming of USB port

UCC 5049 : GENERAL PROFICIENCY - III

UNIT I

COMPOSITION ANALYSIS : Technical and Non-technical Passages (GRE Based); Differences in American and British English; Analyzing Contemporary Issues; Expanding Terminology

UNIT II

DEXTERITY IN WRITING : Importance of Writing; Written vs. Spoken Language; Formal and Informal Styles of Writing; Resources for Improving Writing; Grammar and Usage; Letter-writing; Application Essays; Project Proposals

UNIT III

PRESENTATION SKILLS : Collecting and Organizing Materials; Audience; Content; Rehearsing; Delivering Matter; Questions; Controlling Anxiety; Seminar Presentations (Subject Oriented/ General Topics); Language lab Practice

UNIT IV

QUANTITATIVE ANALYSIS : Aptitude Tests; Puzzles; Psychometric Tests

REFERENCE BOOKS

Curriculum & Syllabi (B.Tech. CSE)

1. Bhatnagar, R.P and Rajul Bhargava. *English for Competitive Examinations*. Macmillan, 1999.
2. Thorpe, Edgar and Showick Thorpe. *Objective English*. Pearson Education, 2004.
3. Staff of Kaplan. *GRE Exam 2004*. Simon and Schuster, 2003.
4. Leigh, Andrew and Michael Maynard. *The Perfect Presentation*. Random House Business Books, 1999.
5. Thorpe, Edgar. *Test of Reasoning*. Tata McGraw-Hill, 2003.

UCS 6041 / UIT 6084 : COMPUTER NETWORKS

UNIT I

Introduction To Networks And Communication Media: Uses – Network Hardware – Network Software – Reference Models – Example Networks – Network Standardization. Basis for data communication - Transmission media – Wireless Transmission – Telephone Systems – Satellite Communication.

UNIT II

The Data Link Layer : Data Link Layer design issues – Error Detection and Correction Methods - Elementary Data Link Protocols – Sliding Window Protocols – Protocol Verification Methods – Channel Allocation – Multiple Access protocols – IEEE 802 Standards – Bluetooth.

UNIT III

The Network Layer: Network Layer design issues – Routing algorithms – Congestion Control algorithms – Internetworking – Network Layer in Internet.

UNIT IV

The Transport Protocols: Transport Service – Transport Protocols – Internet Transport Protocols UDP – TCP - Performance issues.

UNIT V

The Application Layer: Application Layer design issues – Domain Name System - Electronic Mail – World Wide Web – Multimedia - Other Applications – Network Security - Basic Cryptography - DES - RSA.

TEXT BOOK

1. Andrews S. Tanenbaum, “*Computer Networks*”, Prentice Hall of India Private Limited, (4th Edition), 2003.

REFERENCE BOOK

1. Leon Garcia and Widjaja, "*Communication Networks - Fundamental concepts and key architecture*", Tata McGraw Hill, 2001.

UCS 6042 / UIT 6082 : DATABASE MANAGEMENT SYSTEMS

UNIT I

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 – Reduction of E-R Schema to Tables – The Unified Modeling Language UML.

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 Subqueries – Views – Complex Queries – Modification of the database – Joined Relations – Data-Definition Language – Embedded SQL –Dynamic SQL – Other SQL Features. Other Relational Languages: Query-by-Example – Datalog – User Interfaces and Tools

UNIT III

Integrity and Security: Domain Constraints – Referential Integrity – Assertions – Triggers – Security and Authorization – Authorization in SQL – Encryption and Authentication. Relational-Database Design: First Normal Form – Pitfalls in Relational-Database Design – Functional Dependencies – Decomposition – Desirable Properties of Decomposition – Boyce-Codd Normal Form – Third Normal Form – Fourth Normal Form – More Normal Forms – Overall Database Design Process.

UNIT IV

Storage and File Structures: Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary Storage – Storage Access – File Organization – Organization of Records in Files – Data-Dictionary Storage. Indexing and Hashing: Basic Concepts – Ordered Indices – B⁺-Tree Index Files – B-Tree Index Files – Static Hashing – Dynamic Hashing – Comparison of Ordered Indexing and Hashing – Index Definition in SQL – Multiple-Key Access

UNIT V

Transactions: Transaction concept – Transaction State – Implementation of Atomicity and Durability – Concurrent Executions – Serializability – Recoverability – Implementation of Isolation – Transaction Definition in SQL – Testing for Serializability Concurrence Control: Lock-Based Protocols – Timestamp-Based Protocols – Validation-Based Protocols – Multiple Granularity – Multiversion Schemens – Deadlock Handling – Insert and Delete Operations – Weak Levels of Consistency – Concurrency of Index

Curriculum & Syllabi (B.Tech. CSE)

Structures. Recovery System: Failure Classification – Storage Structure – Recovery and Atomicity – Log-Based Recovery – Shadow Paging – Recovery with Concurrent Transactions – Buffer Management – Failure with Loss of Nonvolatile Storage – Advance Recovery Techniques – Remote Backup Systems

TEXT BOOK

1. Silberschatz, Korth, Sudarshan, “*Database System Concepts*”, 4th Edition – McGraw-Hill Higher Education, International Edition 2002. Chapters: 1 to 7, 11, 12, 15 to 17.

REFERENCE BOOKS

1. Fred R McFadden, Jeffery A Hoffer, Mary B. Prescott, “*Modern Database Management*”, Fifth Edition, Addison Wesley, 2000.
2. Elmasri, Navathe, “*Fundamentals of database Systems*”, Third Edition, Addison Wesley, 2000.
3. Jeffrey D.Ulman, Jennifer Widom, “*A First Course in Database Systems*”, Pearson Education Asia, 2001.
4. Bipin C Desai, “*An Introduction to Database Systems*”, Galgotia Publications Pvt Limited, 2001.

UCS 6043 / UIT 6083 : SOFTWARE ENGINEERING AND ARCHITECTURE

UNIT I

OVERVIEW OF SOFTWARE ENGINEERING – Introduction – FAQs about Software Engineering – Professional and Ethical responsibility – Computer-based system engineering – Emerging system properties – System and their environment – System modeling – System engineering process – System procurement. **SOFTWARE PROCESSES** -- Process models – Process iteration – Software specification – Software design – Software validation – Software evolution - Automated process support. **PROJECT MANAGEMENT** - Management activities – Project planning – Project scheduling – Risk management.

UNIT II

REQUIREMENTS – Functional and non-functional requirements – User requirements – System requirements – Software requirements document – Requirements engineering processes – Feasibility studies – Requirements elicitation and analysis – Requirements validation Requirements management. **SYSTEMS MODELS** – Context models – Behavioral models – Data models – Object Models – CASE workbenches. **SOFTWARE PROTOTYPING** – Prototyping in the software process – Rapid prototyping techniques – User interface prototyping. **FORMAL SPECIFICATION** – Formal specification in the software process – Interface specification – Behavioral specification.

UNIT III

ARCHITECTURE AND SOFTWARE DESIGN – System structuring – Repository model – Client server model – Abstract machine model – Control models – Modular decomposition – Domain-specific software architecture – Distributed system architectures – multiprocessor architectures – client server architectures - CORBA. **OBJECT-ORIENTED DESIGN** – Objects and object classes – Object oriented design process – Design evolution. **REAL-TIME SOFTWARE DESIGN** – System design – Real-time executives – Monitoring and control systems. **DESIGN WITH REUSE** – Component-based development – Application families – Design patterns. **USER INTERFACE DESIGN** - User interface design principles – User interaction – Information presentation – User support - Interface evaluation.

UNIT IV

CRITICAL SYSTEMS AND DEPENDABILITY – Critical systems – Availability and reliability – Safety – Security. **CRITICAL SYSTEMS SPECIFICATION AND DEVELOPMENT** – Software reliability specification – Safety specification – Security specification – Fault minimization – Fault tolerance – Fault-tolerant architectures – Safe system design. **VERIFICATION AND VALIDATION** – Verification and Validation planning – Automated static analysis – Cleanroom software development. **SOFTWARE TESTING** – Defect testing – Integration testing – Object oriented testing – Testing

Curriculum & Syllabi (B.Tech. CSE)

workbenches. **CRITICAL SYSTEMS VALIDATION** – Formal methods and critical systems – Reliability validation – safety assurance – Security assessment.

UNIT V

SOFTWARE COST ESTIMATION – Productivity – Estimation techniques – Algorithmic cost modeling – Project duration and staffing. **QUALITY MANAGEMENT** – Quality assurance and standards – Quality planning – Quality control – Software measurement and metrics. **PROCESS IMPROVEMENT** – Process and Product Quality – Process analysis and modeling – Process measurement – The SEI Process Capability Maturity Model – Process classification.

TEXT BOOK

1. Ian Sommerville, "*Software Engineering*", Sixth Edition, Pearson Education, 2001.

UCS 6044 : PARALLEL ARCHITECTURE AND ALGORITHMS

UNIT I

Introduction: Need of high speed computing – increase the speed of computers – history of parallel computers and recent parallel computers; solving problems in parallel – temporal parallelism – data parallelism – comparison of temporal and data parallel processing – data parallel processing with specialized processors – inter-task dependency

UNIT II

Instruction level parallel processing: pipelining of processing elements – delays in pipeline execution – difficulties in pipelining – superscalar processors – very long instruction word (VLIW) processor – commercial processors – multithreaded processors – future processor architectures.

UNIT III

Structure of Parallel Computers: A generalized structure of a parallel computer – classification of parallel computers – vector computers – a typical vector super computer – array processors – systolic array processors – shared memory parallel computers – interconnection networks – distributed shared memory parallel computers – message passing parallel computers – cluster of workstations.

UNIT IV

Analysis of parallel algorithms – merging on the CREW, EREW models and better algorithm for EREW model, sorting: a network for sorting, sorting on a linear array, sorting on CRCW, CREW, EREW models; searching a sorted sequence – searching a random sequence on SM SIMD; searching on a tree and on a mesh.

UNIT V

Matrix operations: transposition, matrix-by-matrix multiplication, matrix-by-vector multiplication; solving systems of linear equations – fast fourier transform, discrete fourier transform; Graph theory: connectivity matrix, connected components, all-pairs shortest paths, minimum spanning tree.

TEXT BOOKS

1. V. Rajaraman and C. Siva Ram Murthy, “*Parallel Computers – Architecture and Programming*”, PHI, 2000.
2. Selim G. Akl, “*The Design and Analysis of Parallel algorithms*”, PHI, 1999.
3. Michael J. Quinn, “*Parallel Computing – The Theory and Practice*”, McGraw-Hill, INC, 1994.

REFERENCE BOOK

1. M.J. Quinn, “*Parallel Computing – Theory and Practice*”, McGraw-Hill, 1994.

UCS 6046 / UIT 6088 : COMPUTER NETWORKS LAB

LIST OF EXPERIMENTS

1. Write a socket Program for Echo/Ping/Talk commands.
2. Create a socket (TCP) between two computers and enable file transfer between them.
3. Write a program to implement Remote Command Execution (Two M/Cs may be used)
4. Write a program to implement CRC and Hamming code for error handling.
5. Write a code simulating Sliding Window Protocols.
6. Create a socket for HTTP for web page upload & Download.
7. Write a program for TCP module Implementation.(TCP services)
8. Write a program for File Transfer in client-server architecture using following methods.
 - a. USING RS232C
 - b. TCP/IP
9. Write a program to implement RMI (Remote Method Invocation)
10. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
 - a.Shortest path routing
 - b.Flooding
 - c.Link State
 - d.Hierarchical
11. Broadcast /Multicast routing

UCS 6047 / UIT 6087 : DATABASE MANAGEMENT SYSTEMS LABORATORY

Experiments are to be carried out in DB2 / ORACLE AND VB.

1. Study of Database Concepts
RELATIONAL MODEL – TABLE – OPERATIONS ON TABLES – INDEX – TABLESPACE – CLUSTERS – SYNONYM – VIEW – SCHEMA – DATA DICTIONARY – PRIVILEGE – ROLE – TRANSACTIONS
2. Study of SQL
Primitive Data Types – User Defined data Types – Built-in Functions – Parts of Speech of CREATE, ALTER, DROP, SELECT, INSERT, DELETE, UPDATE, COMMIT, ROLLBACK, SAVEPOINT, 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. Study of PL/SQL
Blocks, Exception Handling, Functions, Procedures, Cursors, Triggers, Packages.
5. Application
Design and develop any two 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

Clearly mention the scope of the system. Use standard tools for expressing the design of the systems.

UCS 6048 : SOFTWARE ENGINEERING AND ARCHITECTURE LAB

I. Implementation of project using Software Engineering Tec

1. Problem Analysis and Project Planning
Thorough study of the problem – Identify project scope, Objectives, infrastructure
2. Software Requirement Analysis
Describe the individual Phases/ modules of the project, Identify deliverables
3. Data Modeling
use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.(Cover static and dynamic diagrams of UML)
4. Software Development and Debugging
5. Software Testing
Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.

II. List of experiments

1. Course Registration System
2. Quiz System
3. Online ticket reservation system
4. Remote computer monitoring
5. Student marks analyzing system
6. Expert system to prescribe the medicines for the given symptoms
7. ATM system
8. Platform assignment system for the trains in a railway station
9. Stock maintenance

III. E-mail Client system.

UCS 6049 : INDUSTRIAL TRAINING / VISIT (Report)

In the course of study, during 5th and 6th semesters, each student is expected to undertake a minimum of five industrial visits (leading hardware manufacturing / software development concerns) or undertake a minimum of eight weeks / 60 days of industry training(in a reputed concern). Based on the industrial visits / training, 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 departmental committee for 50 marks. The proof for having undergone visits / training are to be enclosed along with report as enclosures.

UCC 60410 : GENERAL PROFICIENCY - IV

UNIT 1

RESUMES : Introduction to Resumes; Types of Resumes; Organization of Resume Formats; Presenting Information and Content

UNIT II

GROUP DISCUSSIONS/ ACTIVITIES : Introduction; Defining Group Discussions; Types of Group Discussions; Preparation; Participation; Group Dynamics; Intra/Inter Dept. Group Discussions; Team-work; Negotiation Skills; Introduction to Organizational Behaviour; Language lab Practice

UNIT III

INTERVIEWS :Introduction; Honing Verbal and Non-verbal Skills; Rehearsing; Listening Skills; Taking the Interview; Facing Questions; Mock Interviews

UNIT IV

QUANTITATIVE ANALYSIS :Aptitude Tests; Psychometric Tests; Puzzles

REFERENCE BOOKS:

1. Prasad, H.M. *How to Prepare for Group Discussion and Interview*. Tata McGraw-Hill, 2001.
2. Kenendy, Gavin. *The Perfect Negotiation*. Random House Business Books, 1999.
3. Career Press Editors. *101 Great Resumes*. Jaico Publishing House, 2003.
4. Robins, Stephen. *Organizational Behaviour*. Prentice-Hall, 2003
5. Aggarwal, R.S. *A Modern Approach to Verbal & Non-verbal Reasoning*. S. Chand & Co., 2004.

UCS 7041 PRINCIPLES OF COMPILER DESIGN

UNIT I

Phases of a compiler– Compiler construction tools - The role of Lexical Analyzer- Regular Expression- Regular Expression to NFA - NFA to DFA – Minimized DFA- A simple approach to design of Lexical Analyzer –Implementation of a Lexical Analyzer.

UNIT II

Context Free Grammars- Derivation of parse trees - Basic Parsing Techniques – Shift reduce parsing- operator precedence parsing – Recursive descend parsing –predictive parsing –LR parsing – Simple LR parsing – canonical LR parsing – LALR parsing.

UNIT III

Syntax Directed Translation Schemes –Implementation of Syntax Directed Translator – Intermediate code – Representations of intermediate code – Translation of Assignment Statements - Boolean Expressions - Flow Control Statements- Array References in arithmetic expressions- Declaration Statements.

UNIT IV

The contents of Symbol table – Data Structures for Symbol table- Representation of scope information. Runtime storage administration – Implementation of simple stack allocation scheme – Implementation of block structured languages. Lexical phase errors – Syntactic-phase errors – semantic phase errors.

UNIT V

Introduction to code optimization - The principle sources –Basic blocks- Loop optimization –the DAG representation of Basic blocks.
Code generation- Object programs –problems in code generator –A simple code generator – code generation from DAG’s – Peephole Optimization.

TEXT BOOK

1. A.V. Aho, J.D. Ullman, *Principles of Compiler design* , Addison Wesley, 1998

REFERENCE BOOKS

1. Alfred Aho, Ravi Sethi, V.Jeffery Ullman D. “*COMPILERS PRINCIPLES, TECHNIQUES AND TOOLS* “, Addison- Wesley, 1988.
2. Tremblay, A.S., and Sorenson, P.G., *The Theory and Practice of Compiler Writing*, McGraw-Hill Int. Edition, 1985.
3. Allen Holub l., “ *Compiler Design in C*”, Prentice Hall of India. 1998.

UCS 7042 : ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

UNIT I

INTRODUCTION : Definition of AI-Foundations-History-Intelligent Agents- Perception and Language Processing-Problem Solving-Searching-Heuristic Search-Game Playing.

UNIT II

LOGIC , KNOWLEDGE REPRESENTATION AND REASONING : Agents that reason logically-First order logic-Inference in first order logic-Logical reasoning. Semantic Nets and Description matching-Frames-Inheritance and common sense Rules- Rule Chaining, Substrates and cognitive modeling.

UNIT III

REASONING WITH INCOMPLETE AND UNCERTAIN KNOWLEDGE : Uncertainty-Probabilistic Reasoning Systems-Making simple and complex decisions- Nonmonotonic reasoning and Truth Maintenance.

UNIT IV

PLANNING AND LEARNING : Planning-Representation for planning-Partial order planning-Conditional planning-Replanning agent-Learning- Analysing differences- Explaining experience-Correcting mistakes-Recording cases-Version space method- Identification trees-Neural nets and Genetic algorithms.

UNIT V

EXPERT SYSTEM : Introduction – Rule based system architecture – Non-production system architecture – knowledge acquisition and validation – Knowledge system building tools - Expert system shell.

TEXT BOOKS

1. Stewart Russel and Peter Norvig, "*Artificial Intelligence-A Modern Approach*", Prentice Hall Internationa. Second edition, 2003.
2. Patrick Henry Winston, "*Artificial Intelligence and Expert systems*", Third Edition, ISE reprint, Addison Wesley, 1999.

REFERENCE BOOKS

1. Elain Rich and Kevin Knight, "*Artificial Intelligence*", Tata McGraw Hill, Second Edition, 1993.
2. Eugene Charniak and Drew Mc Dermott, Addison Wesley, "*Introduction to Artificial Intelligence*", ISE Reprint 1998.
3. Nils J.Nilsson, "*Artificial Intelligence - A New Synthesis*", Harcourt Asia PTE Ltd, Morgan Kaufmann, 1988.

UCS 7043 / UIT 7081 : INTERNET TECHNOLOGY AND WEB DESIGN

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-HTTP-DNS, 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.

TEXT BOOKS

- 1.Thomas A.Powell ,“*The Complete Reference Web design*” TataMcGraw-Hill ,2000.
- 2.Mathew strebe, charles perkins,”*Firewalls*”,BPB , 2000.

REFERENCE BOOKS

- 1.Eillotte Rusty Harold, “*Java Network Programming*”, O’Reilly Publications, 1997.
2. John paul Mueller,”*Active X from the Ground up*”, TataMcGraw-Hill,1997.
- 3.Michael Girdley, Kathryn A. Jones, *et al.*, “*Web programming with javaTM*”,Sams.net publishing1996.

UCS 7046 : ARITIFICIAL INTELLIGENCE AND EXPERT SYSTEMS LAB

The following problems are to be solved using C++ / PROLOG /LISP.

1. Water Jug Problem (Using DFS And BFS)
2. Single Player Game(Using Heuristic Function)
3. Two Player Game(Using Heuristic Function)
4. A* Algorithm
5. AO* Algorithm
6. Predicate To Propositional Logic
7. Syntax Checking of English sentences-English Grammar.
8. Develop an Expert system for Medical diagnosis.
9. Develop any Rule based system for an application of your choice.
10. Develop an algorithm for morphological derivation / verb derivation and implement it.

UCS 7047 / UIT 7086 : INTERNET TECHNOLOGY LABORATORY

Implement the following problems :

1. Creation of HTML Files
2. Working with Client Side Scripting
 - 2.1 VBScript
 - 2.2 JavaScript
3. Configuration of web servers
 - 3.1 Apache
 - 3.2 Internet Information Server(IIS)
4. Working with ActiveX Controls in web documents.
5. Experiments in JAVA
 - 5.1 Applets
 - 5.2 Threads
 - 5.3 Sockets
6. Working with Server Side Scripting

6.1 Active Server Pages

6.2 Java Servlets

UCS 7048 / UCS 8047 PROJECT WORK PHASE-I AND PHASE-II

The objective of the project is to enable the students to work in convenient groups of not more than three 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.

During the *seventh semester*, the students are expected to undergo Phase-I of the project. The project group is required to do literature survey, formulate the problem and form a methodology of arriving at the solution of the problem. The departmental committee shall examine the students for 50 marks and the evaluation is based on continuous internal assessment comprising one seminar (15 marks), demo (15 marks) and one internal viva-voce (20 marks).

During the *eighth semester*, the students are expected to complete the project (Phase - II) and submit a full-fledged report comprising of the complete system developed along with implementation and test results. The departmental committee shall examine the students for 50 marks and the evaluation is based on continuous internal assessment comprising one seminar (25 marks) and demo for complete system developed (25 marks). At end of the semester, a viva-voce examination will be conducted for 100 marks (50 marks for internal examiner and 50 marks for external examiner).

UCS 7049 : SEMINAR

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 50 marks.

UCS 704E1 : NEURAL NETWORKS AND PATTERN RECOGNITION

UNIT I

Introduction to Artificial neural systems – Principles and promises – Perception – Representation – Linear separability – Learning – Training algorithm – The back propagation network – The generalized delta rule – Practical considerations – BPN applications - Hopfield nets – Cauchy training – Simulated annealing – The Boltzman machine – Associative memory – Bi-directional associative memory – Applications.

UNIT II

Counter Propagation Network building blocks – Counter Propagation Network data processing – Adaptive Resonance Theory network description – ART1 – ART2 – Applications. The formal avalanche – Architecture of Spatio temporal networks – Applications of STNS.

UNIT III

Cognition – Structure & training – The neocognitron architecture – Neocognitron data processing – performance – Addition of lateral inhibition and feedback to the neocognitron.- Optical neural networks – Holographic correlators.

UNIT IV

Introduction and general Pattern Recognition concerns: Pattern Recognition, Classification, and Description – Patterns and Feature Extraction with Examples – Training and Learning in PR systems – Pattern Recognition approaches.

UNIT V

Neural Pattern Recognition: Introduction to Neural pattern Associators and Matrix Approaches – Pattern Associator for Character Classification with Feed forward networks – Content Addressable memory approaches and Unsupervised learning in neural pattern recognition

TEXT BOOKS

1. James Freeman A. and David Skapura M., “*Neural Networks – Algorithms, Application and Programming techniques*”, Addison Wesley Publishing Company, 1991.
2. Robert J, Schalkoff, “*Pattern Recognition: Statistical, Structural and Neural Approaches*”, John Wiley & Sons Inc., New York, 1992.

REFERENCE BOOKS:

1. Yegnanarayana B., “*Artificial Neural Networks*”, Prentice Hall of India Private Ltd., New Delhi, 1999.
2. Tou and Gonzalez R. “*Patten Recognition Principles*” Addison Wesley, 1974.

3.

UCS 704E2 : INTERNET PROGRAMMING

Unit I

Foundations for Internet Programming: An overview of Internet Programming-www Design issues-Security and Encryption-Developing Intranet Applications.

UNIT II

SGML-HTML-frames-forms-tables script. Server-Dynamic Web content – Cascading Style Sheets, DHTML, XML – Applet-Servlets communication – Interactive Java Servlets

UNIT III

CGI-Perl: Basics-strings-Program flow-functions-File handling, database connectivity. Active Server Pages: Introduction-variables and constructs-subroutines, functions and Includes-object model-forms and Query strings-ADO-Components.

UNIT IV

ActiveX controls: Creating an activex control to activate a web page-VD olive Technology-creating Netscape navigator plugins-creating a custom, Integrated Application with multiple protocols. Design Tools-Front page 2000: Building basic front page webs-Introduction to web design-exploring front page 2000, creating basic pages, creating sophisticated designs- designing graphics for the web.

UNIT V

Web servers: Understanding Web servers -Functions of web server, Installing IIS-Examining the components-configuring the Internet web site. Apache server: Introduction- History-HTTP, compiling and Installing Apache.

TEXT BOOKS

1. Bob breedlove, et al., “*Web programming Unleashed*”, Sams.net publishing, 1996
2. Eillotte Rusty Harold, “*Java Network Programming*”, O’Reilly Publications, 1997.

REFERENCE BOOKS

- 1.Powell, “*HTML The Complete Reference*”, Tata McGraw Hill,1998.

2. Daniel A. Tauber and Branda Kienan “*Front page 2000*”, bpb publishing, 1999
3. Rich bower, Kencoar, et al “*Apache Server Unleashed*”, Techmedia, 2000
4. Nelson Howell, et al, “*Using IIS 4*”, Prentice-Hall of India, 2000

UCS 704E3 / UIT 7082 : HIGH SPEED NETWORKS

UNIT I

HIGH SPEED LANS: FAST ETHERNET, SWITCHED FAST ETHERNET – FDDI, SONET / SDH: FRAME STRUCTURE, ARCHITECTURE LAYERS, PAY LOADS – FRAME RELAY: PROTOCOLS AND SERVICES, CONGESTION CONTROL.

UNIT II

ISDN: Overview, Standards, Interfaces and functions, ISDN Layers: Physical, Data link, Network, - Services – BISDN Architecture and Protocols.

UNIT III

ATM Networks: Protocol Architecture, ATM Layer, Cell Structure, Cell header, ATM Adaptation Layer, Various types, Segmentation and Reassembly, Convergence sub-layers

UNIT IV

ATM Traffic and Congestion Control: Service categories, Traffic related attributes, Traffic management framework, Traffic management, ABR traffic management, Signaling, Protocol signaling, Meta signaling, TCP/IP over ATM.

UNIT V

Optical Networks: Wavelength Division Multiplexing, Optical Networking evolution, Network Architectures, Enabling Technologies, Various issues in Wavelength Routed Networks, Optical Circuit switching, IP over ATM over SONET over WDM, IP over SONET over WDM, IP over WDM – Various Models.

TEXT BOOKS

1. William Stallings, '*ISDN and broadband ISDN with Frame Relay and ATM*', Fourth edition, Pearson Education, 2000.
2. Rainer Handel, Manfred N. Huber, and Stefan Schroder, '*ATM Networks – Concepts, Protocols, Applications*', Second edition, Addison Wesley, 1994.
3. C.Siva Ram Murthy and G. Mohan, '*WDM optical Networks – Concepts, Design, and Algorithms*', Printice Hall India, 2002.

UCS 704E4 : SOFTWARE QUALITY ASSURANCE AND TESTING

UNIT I

SOFTWARE TESTING PRINCIPLES : Need for testing - Psychology of testing - Testing economics - White box, Black box, Grey box testing – SDLC and Testing - Verification & Validation - Weyuker's adequacy axioms.

UNIT II

TESTING STRATEGIES : White box testing techniques - Statement coverage - Branch Coverage - Condition coverage - Decision/Condition coverage - Multiple condition coverage - Dataflow coverage - Mutation testing - Automated code coverage analysis - Black box testing techniques - Boundary value analysis - Robustness testing - Equivalence partitioning - Syntax testing - Finite state testing - Levels of testing - Unit, Integration and System Testing.

UNIT III

TESTING OBJECT ORIENTED SOFTWARE : Challenges - Differences from testing non-OO Software - Class testing strategies - Class Modality - State-based Testing - Message Sequence Specification.

UNIT IV

TESTABILITY AND RELATED ISSUES : Design for Testability - Observability & Controllability - Built-in Test - Design by Contract - Precondition, Post condition and Invariant - Impact on inheritance - Applying in the real world Regression Testing - Challenges – test optimization.

UNIT V

MISCELLANEOUS TOPICS : Automated Tools for Testing - Static code analyzers - Test case generators - GUI Capture/Playback – Stress Testing - Testing Client -server applications - Testing compilers and language processors - Testing web-enabled applications.

REFERENCE BOOKS :

1. Glenford J. Myers, " *The Art of Software Testing* ", John Wiley & Sons, 1979.
2. Boris Beizer, Black-Box Testing: " *Techniques for Functional Testing of Software and Systems* ", John Wiley & Sons, 1995.
3. P.C.Jorgensen, " *Software Testing - A Craftman's Approach* ", CRC Press, 1995.
4. William E.Perry, " *Effective Methods for Software Testing (2nd Edition)* ", John Wiley & Sons, 2000.
5. Robert V.Binder, " *Testing Object-Oriented Systems: Models Patterns and Tools* ", Addison Wesley, 2000.
6. Boris Beizer, " *Software Testing Techniques (2nd Edition)* ", Van Nostrand Reinhold, 1990.

UCS 704E5 : DEPENDABLE COMPUTING

UNIT I

Reliability: Definition, System reliability, Parameter values, Reliability models for hardware redundancy – Testing: Various testing methods.

UNIT II

Fault tolerance: Definition, Fault types, Detection, Redundancy, Data diversity, Reversal checks, Byzantine failures, Integrated failure handling.

UNIT III

Real Time system: Introduction, Characterizing real time systems, Performance measures for real time systems, Estimating Program run times, Task management and Scheduling – Uni-processor, Fault tolerant scheduling.

UNIT IV

Real Time Communications: Protocols, Contention based, token based, Stop and go multihop, the polled bus, hierarchical round robin, deadline based, and fault tolerance routing, Distributed delay constrained method, Dependable real time channels, recovery approach, Establishing real time channels.

UNIT V

Programming Languages and Tools: Desired Language Characteristics, Data typing, control structures, Hierarchical decomposition, Packages, Exception handling, Over loading and Generics, Multi tasking, Task scheduling, Timing specification., Flex, Euclid, Environments, Run time support.

TEXT BOOKS

1. C. M. Krishna and K. G. Shin, '*Real time Systems*', McGraw Hill International Edition, 1997.
2. C. Siva Ram Murthy and G. Manimaran, '*Resource Management in Real Time Systems and Networks*', The MIT Press, 2001.
3. Phillip A. Laplante, '*Real-Time Systems Design and Analysis – An Engineers Hand book*', Printice Hall India, III edition, 1997.

UCS 704E6 : WIRELESS TECHNOLOGY

UNIT I

Frequencies for radio transmission – Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread Spectrum – Medium Access Control: Motivation, SDMA, FDMA, TDMA, CDMA.

UNIT II

Telecommunication Systems: Architecture, Radio Interface, Protocols, Handover, Security – Cordless systems and WLL: IEEE 802.16, DECT – TETRA - UMTS and MIT 2000 - Satellite Communications: Parameters, FDM, TDM, GEO139, LEO 139, MEO 140, Routing, Localization - Cellular Networks: Principles, First generation Analog, Second Generation TDMA.

UNIT III

Wireless LAN: Infrared vs Radio transmission, IEEE 802.11 protocol: Architecture, Services, Medium access control, Physical layer – Bluetooth technology: Overview, Radio Specification, Baseband Specification, Link Manager Specification, Logical Link Control and Adaptation Protocol.

UNIT IV

Mobile IP: Goals, Assumptions, requirements, IP packet delivery, Agent advertisement and discovery, registration, Tunnelling and encapsulation, Optimization, Reverse tunneling, IPv6, Dynamic host configuration protocol – Ad hoc networking: Routing, destination sequence distance vector, dynamic source routing, hierarchical routing, Alternative metrics – Mobile TCP: Traditional TCP, Indirect TCP, Snooping TCP, Fast retransmit, selective retransmission, Transaction oriented TCP – WAP: Architecture, Protocol description.

UNIT V

Ad-hoc networks: Types – MAC protocols – MARCH –Routing Protocols – Table driven approaches – DSDV, WRP, Cluster switching gateway routing, Source initiated on-demand approaches, Ad-hoc network on-demand distance vector routing, Dynamic source routing, Temporally ordered routing, Signal stability routing, Location aided routing, Power aware routing, Zone routing protocol, Source tree adaptive routing, Relative distance microdiversity routing.

TEXT BOOKS:

1. W. Stallings, Wireless Communications and Networks, Prentice Hall, 2002.
2. J. Schiller, Mobile Communications, Pearson education, 2000.
3. Theodore S.Rappaport, Wireless Communications: Principles and Practice, Prentice Hall, 1996

4. C.K. Toh, Mobile wireless networks: Protocols and systems, Addison Wesley, 2001.

UCS 704E7 /UIT 808E1 : ADVANCED DATABASES

UNIT I

Object Based Databases and XML: Object Oriented Databases – Object Relational Databases – XML

UNIT II

Database System Architecture: Database System Architecture – Distributed databases – Parallel Databases

UNIT III

Query Processing – Query Optimization – Application Development and Administration – Advanced Querying and Information Retrieval (Data Mining and Warehousing) - Advanced Data Types and New Applications (Multimedia Databases) – Advanced Transaction Processing

UNIT IV

Case Studies: Oracle – IBM DB2 Universal Database – Microsoft SQL Server

UNIT V

Database Technologies: ODBC, ADO, RDO, DAO, JDBC, JSQL

TEXT BOOK

1. Silberschatz, Korth, Sudarshan, “*Database System Concepts*”, 4th Edition – McGraw-Hill Higher Education, International Edition 2002. Chapters: 8 to 10, 18 to 20, 13, 14, 21, 22, 23, 24, 25 to 27.

REFERENCE BOOKS

1. Rajesh Narang, “Object Oriented Interfaces and Databases”, Prentice-Hall of India Private Limited, 2002.
 1. Fred R McFadden, Jeffery A Hoffer, Mary B. Prescott, “Moden Database Management:., Fifth Edition, Addison Wesley, 2000.
 2. Elmasri, Navathe, “Fundamentals of database Systems”, Third Edition, Addison Wesley, 2000.
 3. Jeffrey D.Ulman, Jenifer Widom, “A First Course in Database Systems:., Pearson Education Asia, 2001.
 5. V.S.Subrahmanian, “Principles of Multimedia Database Systems”, Harcourt India Private Limited, 1998.

6. C.S.R.Prabhu, “Data Warehousing – Concepts, Techniques, Products and Applications”, Prentice-Hall of India Private Limited, 2001.
7. C.S.R.Prabu, “Object-Oriented Database Systems”, Prentice-Hall of India Private Limited, 2002.

UCS 704E8 / UIT 708E2 : BUSINESS ENVIRONMENT AND HUMAN RESOURCE MANAGEMENT

UNIT I

International Business and its Environment – International Economic Cooperation and Agreements – International Economic Institutions – International Trade and Investment Theories

UNIT II

International Trade and payments – International Investments – Multinational Corporations – Global Competitiveness

UNIT III

International Operations Management – International Monetary System and Foreign Exchange Market – Globalization

UNIT IV

HRM-The Global and Indian Scenario – HRM for Corporate Excellence – Human Resource Planning – Human Resource Information System – Recruitment and Selection Strategies – Socializing, Orienting and Developing Employees – Concept of HRD – Performance Appraisal Systems – Potential Appraisal and Succession Planning – Career Planning and Development – Assessment and Development Centers

UNIT V

Motivation at Work – Participative Management – Empowerment – Labour Relations – Reward System – Quality of Work Life – Compensation Management – Organization Development. Knowledge Creation and Management – Virtual Organization and Emerging HR Trend – Learning Organization – Strategic Human Resource Management – Human Resource in Information Technology Organization – Human Resource in Mergers and Acquisitions – International Human Resource Management

TEXT BOOKS

1. Francis Cherunilan, “*International Business Environment*”, Himalaya Publishing House, 2003
2. Biswajeet Pattanayak, “*Human Resource Management*”, Prentice-Hall of India Private Limited, 2003.

UCS 704E9 : GENETIC ALGORITHMS

UNIT I

INTRODUCTION: WHAT ARE GENETIC ALGORITHM?, ROBUSTNESS OF TRADITIONAL OPTIMIZATION AND SEARCH METHODS, DIFFERENCE BETWEEN GA AND TRADITIONAL METHODS, A SIMPLE GA, A SIMULATION.

MATHEMATICAL FOUNDATIONS: FUNDAMENTAL THEOREMS, SCHEMA PROCESSING AT WORK.

UNIT II

IMPLEMENTATION OF GA: DATA STRUCTURES, REPRODUCTION, CROSSOVER, MUTATIONS, A TIME TO REPRODUCE & TO CROSS MAIN PROGRAMS, EFFICIENCY, MAPPING OBJECTIVE FUNCTIONS TO FITNESS FOCUS, FITNESS SCALING, CODING, DISCRETIZATION, CONSTRAINTS.

UNIT III

APPLICATION OF GA: DEJONG AND FUNCTIONS OPTIMIZATION, IMPROVEMENTS, CURRENT APPLICATIONS.

UNIT IV

ADVANCED OPERATIONS & TECHNIQUES: DOMINANCE, ABEYANCE, DIPLOIDY, INVERSION AND OTHER REORDERING OPERATORS, MICRO-OPERATORS, NICHE AND SPECIATION, MULTI-OBJECTIVE OPTIMIZATIONS, KNOWLEDGE BASED TECHNIQUES, GA'S AND PARALLEL PROCESSES.

UNIT V

GENETIC BASED MACHINE LEARNING:

INTRODUCTION CLASSIFIER SYSTEMS, RULE AND MESSAGE SYSTEM, BUCKET BRIGADE.

APPLICATIONS RISE OF GBML, SMITH'S POKER PLAYER, EARLY GBML EFFORTS.

TEXT BOOKS

1. DAVID .E. GOLDBERG, '*GENETIC ALGORITHMS IN SEARCH, OPTIMIZATION & MACHINE LEARNING*', ADDISON-WESLEY,1989

2. MELONIE MITCHELL, '*AN INTRODUCTION TO GENETIC ALGORITHMS*', PHI,1996.
3. KOZA,JOHN.R, '*GENETIC PROGRAMMING, ON THE PROGRAMMING OF COMPUTERS BY MEANS OF NATURAL SELECTION*', CAMBRIDGE ,MA: THE MIT PRESS, 1992.

UCS 704E10 / UIT 808E7 : E-BUSINESS

UNIT I

e-Commerce and e-Business, e-Business trends, e-Business design:- Construction, Self diagnosis, Reversing the value chain, Choosing a narrow focus. e-Business Architecture:- Importance of Application Integration, New era of Cross Functional Integrated Applications, Integrating Application Clusters into an e-Business Architecture, Aligning the e-Business Design with Application Integration.

UNIT II

Customer Relationship Management:- Need for Customer Relationship Management, Defining CRM, New CRM Architecture, Supporting Requirements of the Next-Generation CRM Infrastructure, Organizational Challenges in Implementing CRM, Next-Generation CRM Trends. Selling-Chain Management:- Definition, Business Forces & Technology forces driving the need for Selling-Chain Management, Order Acquisition Process Management, Elements of Selling-Chain Infrastructure.

UNIT III

Enterprise Resource Planning:- Definition, ERP Decision, ERP usage in the Real World, ERP Implementation, Future of ERP Application. Supply Chain management:- Definition, Basics of Internet enabled SCM, e-Supply Chain Fusion, e-Supply Chain Fusion Management Issues, e-Supply Chains in 200X.

UNIT IV

e-Procurement:- Procurement as Top Management Issue, Operating Resource Procurement, Procurement Business Problem, Next Generation Integrated Procurement Applications, Elements of Buy-Side e- Procurement Solutions, Buy-Side Applications for the Procurement Professional, Elements of Sell-Side e-Procurement Solutions.

UNIT V

Developing the e-Business Design:- Knowledge Building, Capability Evaluation, e-Business Design, e-Business Design in Action: The case of E*TRADE. Translating e-Business Strategy into Action.

TEXT BOOK

1. Ravi Kalakota and Marcia Robinson, “*e-Business: A Roadmap for Success*”, Addison-Wesley, 2000.

REFERENCE BOOKS

1. Amor, “*E-Business (R)evolution*”, Pearson Education, 2003.
2. Shurtey, “*e-Business with Net Commerce*”, Pearson Education, 2003.

UCS 704E11: COMPONENT ENGINEERING

UNIT I

COMPONENTS AND MARKETS – Introduction - Market versus technology - Standards.

BASIC CONCEPTS - Software Components – interfaces and re-entrance - Polymorphism - Object versus class composition - Aspects of scale and granularity – Patterns – frameworks – architectures - Programming

UNIT II

COMPONENT MODELS AND PLATFORMS - Object and component “wiring” standards - The OMG way- CORBA - CCM - OMA - MDA - The Sun way—Java – JavaBeans – EJB and Java 2 editions - The Microsoft way: COM - OLE/ActiveX - COM+ and .NET CLR - Some further technologies - Strategic comparison - Efforts on domain standards -Ongoing concerns.

UNIT III

COMPONENTS MEET ARCHITECTURE AND PROCESS - Component architecture - Component frameworks - Component development - Component distribution and acquisition - Component assembly .

UNIT IV

EJB OVERVIEW - EJB’s Role – EJB’s Architecture Overview – High level View of EJB Conversion – RMI Clients – CORBA Clients – Building EJB, Deploying EJB – Roles in EJB – Writing Simple EJB beans – Requirements – Design - Implementation.

EJB SESSION BEANS - Sessions Bean life cycle – Constrains on Session Beans – Usage of Session Beans – Stateful session beans – Example – Stateless Session Beans - Example.

UNIT V

EJB ENTITY BEANS - EJB Entity Bean life cycle - Usage of Entity Beans – Bean Managed Persistence – Example – Container Managed Persistence – Example

Curriculum & Syllabi (B.Tech. CSE)

EJB CLIENTS - EJB Bean as Client – Serializing Handle - Transaction in Clients – Authentication in Clients – Servlet Client – Applet Client - CORBA Client – HTTP Tunneling and SSL.

TEXT BOOKS:

1.Clemens Szyperski, "*Component Software: Beyond Object Oriented Programming*", *Second Edition*, Pearson Education ,2003,.

2.Tom Valesky, "*Enterprise JavaBeans : Developing Component-Based Distributed Applications*", Pearson Education,2000.

UCS 8231 : ENGINEERING ECONOMICS AND MANAGEMENT

UNIT I

Introduction – Micro Economics – Macro Economics – Economic decisions and Technical Decisions – Demand and Supply Concepts – Elasticity of Demand – Cost of Products – Price of products – Break-Even Analysis – Nature of Functioning of Money – Notional Income – GNP and Savings – Inflation an Deflation Concepts.

UNIT II

Introduction – Elementary Economic Analysis – Interest Formulas and their Applications - Comparisons – Present Worth Method – Future Worth Method – Annual Equivalent Method – Rate of Return Method

UNIT III

Replacement and Maintenance Analysis – Depreciation – Evaluation of Public ternatives – Inflation Adjusted Decisions

UNIT IV

Nature and Importance of Management - Development of Management Thought - Ethical and Environmental Foundations - Decision Making - Organizing and Staffing - Planning and Strategic Management – Leadership - Communicating and Controlling Managing Information

UNIT V

Operations Management - Marketing Management - Financial Management - Multinational Management - Entrepreneurship and Small Business - Management of Public Organizations

TEXT BOOKS

1. S.K.Jain, "*Applied Economics for Engineers and Managers*", Vikas Publications House, New Delhi, 1997.

2. R.Panneersevam, “*Engineering Economics*”, Prentice-Hall of India Pvt. Limited, 2001.
3. **Joseph L. Massie, “*Essentials of Management*”, Prentice-Hall of India.**

UCS 8042 / UIT 7083 : DISTRIBUTED COMPUTING

UNIT I

Introduction - Goals - Hardware Concepts - bus based multiprocessor - switched multiprocessor - bus based multicomputer - switched multicomputer - Software Concepts- Network Operating Systems - True Distributed System - Multiprocessor time sharing system - Design issues. Communication-Layered Protocols - ATM networks.

UNIT II

Client Server model - Remote Procedure Call - Group Communication – Synchronization: Clock Synchronization – Mutual Exclusion – Election Algorithms – Atomic Transaction.

UNIT III

Deadlock - Threads - System models - Processor Allocation - Scheduling in Distributed Systems - Fault Tolerance - Real time distributed systems.

UNIT IV

Distributed file systems - Distributed file system design – implementation – Trends in Distributed File Systems - Distributed shared memory - consistency models – page based distributed shared memory - shared variable distributed shared memory – Distributed programming languages

UNIT V

Case studies: Amoeba : Introduction – Objects and capabilities in Amoeba – Process and Memory Management in Amoeba – Communication in Amoeba – The Amoeba Services. DCE :Introduction – Threads – Remote Procedure call – Time, Directory Service and Security Services – Distributed File System..

TEXT BOOK

Andrew S.Tanenbaum, “*Distributed Operating Systems*”, Pearson Education Asia, 2001.

REFERENCE BOOKS

1. Mukesh singhal and Niranjana G.Shivaratri, “*Advanced concepts in Operating system*”, Tata McGraw Hill.
2. Pradeep.k and Sinha, “*Distributed operating systems*”, PHI, Newdelhi, 2001.

UCS 8043 / UIT 8082 : EMBEDDED SYSTEMS

UNIT I

Review of Embedded Hardware: Gates - Timing Diagram- Memory –microprocessors Buses-Direct Memory Access-Interrupts- Built-ins On the Microprocessor-Conventions used on Schematic-schematic. Interrupts Microprocessor Architecture-Interrupt Basics-Shared Data Problem-Interrupt latency

UNIT II

Microchip PIC Micro controller: Introduction, CPU Architecture- Registers- Instruction sets addressing modes- Loop timing- Timers- Interrupts, Interrupt timing, I/O Expansion, I²C Bus Operation Serial EEPROM, Analog to Digital converter, UART-Baud Rate-Data Handling-Initialization, Special Features – Serial Programming-Parallel Slave Port.

UNIT III

Embedded Microcomputer Systems: Motorola MC68H11 Family Architecture, Registers, Addressing modes Programs. Interfacing methods parallel I/O interface, Parallel Port interfaces, Memory Interfacing, High Speed I/O Interfacing, Interrupts-Interrupt service routine-Features of interrupts-Interrupt vector and Priority, Timing generation and measurements, Input capture, Output compare, Frequency Measurement, Serial I/O devices RS 232,RS485.

UNIT IV

Software Development: Round–Robin, Round robin with Interrupts, function-Queue-Scheduling Architecture, Algorithms. Introduction to - Assembler- Compiler -Cross Compilers and Integrated Development Environment (IDE). Object Oriented Interfacing, Recursion, Debugging strategies, Simulators

UNIT V

Real Time Operating Systems: Task and Task States, Tasks and data, Semaphores and shared Data Operating system Services-Message queues-Timer function-Events-Memory Management, Interrupt Routines in an RTOS environment, Basic design using RTOS.

TEXT BOOKS

1. David E Simon, “*An embedded software primer*”, Pearson Education Asia, 2001
2. John B Pitman, “*Design with PIC Micro controllers*”, Pearson Education Asia, 1998
3. Jonarthan W. Valvano, “*Embedded Micro computer Systems, Real time Interfacing*”, Thomson learning 2001.

REFERENCE BOOKS

1. Burns, Alan and Wellings, “*Real-Time Systems and Programming Languages*”, Second Edition. Harlow: Addison-Wesley-Longman, 1997

2. Grehan Moore, and Cyliax, “*Real time Programming: A guide to 32 Bit Embedded Development*”, Addison-Wesley-Longman, 1998.
Heath Steve, “*Embedded Systems Design*”, Newnes 1997.

UCS 8046 / UIT 7087 : DISTRIBUTED COMPUTING LAB

1. Simple exercises to learn the concept of RMI, Servlets, CORBA, COM and DCOM
2. Finding Simple and Compound interest using RMI
3. RMI-based implantation of Airline Reservation system
4. Servlet-based implantation of Airline Reservation system
5. Implementation of Mail Server
6. Implementation of Quiz Server
7. Implementation of ATM
8. Implementation of Online Shopping System
9. Implementation of matrimonial System.

UCS 8048 : COMPREHENSIVE VIVA VOCE

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.

UIT708E11/UCS 804E1 : VLSI DESIGN

UNIT I

MOS DEVICES AND CIRCUITS: The MOS circuit fundamentals – Depletion and enhancement mode pull-ups – Transit times of clock period – Effects of Scaling down its dimensions of MOS circuits and systems. MOS PROCESS: Models of analyse transistor circuits – The MOS fabrication process – N MOS lambda based layout – rules(6).

UNIT II

DATA AND CONTROL FLOW IN SYSTEMATIC STRUCTURE: Notation – Two phase locks – Shift registers – Implementation – Dynamic registers – Designing subsystems – Register to register transfer – Combinational logic – sequential logic finite state machine.

UNIT III

SYSTEM LEVEL DESIGN: Design of an ALU Subsystem – Carry look ahead adders parallel multipliers – PLA – decoders – encoders – Multiplexers – Buses – Encoding and Control Operators data path chip.

UNIT IV

DESIGN SYSTEM CONCEPTS: Definitions – Steps in the design of a VLSI Part-Planning Logic design and simulation – Physical design –Placement and wiring –Development of routing algorithm – testing Design database –CAD Tools.

UNIT V

APPLICATION OF VLSI TO SOLVE COMPUTATION PROBLEM: Concurrency in computers- Algorithms for VLSI process array – Matrices vector multiplication – Convolution algorithm.

TEXT BOOKS

- 1.Pucknell D.Mshraghim.k, "*Basic VLSI Design,Principles and Applications*", Pretince Hall,1985.
- 2.Carver Meed and Lynn Conway, "*Introduction to VLSI Systems*", Addison Wesley-1980 chap1-8.

REFERNCE BOOKS

- 1.Nacolm R.Haskard and Ian,C May, "*Analog VLSI Design NMOS and CMOS* ",Prentice Hall,1985.
- 2.Thomas E.Dillinger, "*VLSI Engineering*", Prentice Hall,1988.

UCS 804E2 : ROBOTICS

UNIT I

Introduction : Robot Arm Kinematics and Dynamics – Manipulator Trajectory Planning and Motion Control, Robot Sensing. The Direct Kinematics Problem, The Inverse Kinematics Solution. Robot Programming – Methods – Interlocks textual languages – Characteristics of Robot level languages, characteristics of task level languages.

UNIT II

The scope of industrial Robotics – Definition of an Industrial Robot – Need for Industrial Robots – Applications – Fundamentals of Robot Technology – Automation and Robotics – Robot Anatomy – Work Volume – Precision of movement End effectors – Sensors.

UNIT III

Puma Robot Arm Control – Computed Torque Technique – Near minimum time control – Variable structure control – Non-linear decoupled feedback control – Reserved motion control – Adaptive control.

UNIT IV

Sensing – Range Sensing, Touch Sensing, Force and Torque Sensing, Robot Cell Design and control – Remote center Compliance – Safety in Robotics.

UNIT V

Advanced Robotics, Advanced Robotics in Space – Specific features of Space Robotics systems - Long term technical developments – Advanced Robotics in underwater operations – Robotics Technology of the future – Future applications.

TEXT BOOK

1. Barry Leatham Jones, “*Elements of Industrial Robotics*”, Pitman Publishing, 1987.

REFERENCE BOOKS

1. Mikell P. Groover, Mitchell Weiss, Roger N.Nagel, Nicholas G. Odrey, “*Industrial Robotics Technology, Programming And Applications*”, McGraw Hill Book Company, 1986.
2. Fu K.S., Gonzalez R.C and Lee C.S.G., “*Robotics – Control, Sensing, Vision and Applications*”, McGraw Hill International Editions, 1987.
3. Bernard Hodges and Paul Hallam, “*Industrial Robotics*”, British Library Cataloging in Publication, 1990.

**UCS 804E3 : NATURAL LANGUAGE PROCESSING AND KNOWLEDGE
BASED SYSTEMS**

UNIT I

Introduction: Issues and difficulties in NLP – Evaluating Language understanding Systems – The different levels of language representations – Organization of NLP systems – Types of NLP Systems.

UNIT II

Grammars and Parsing: Grammars and sentence structures – Top down parser – Bottom up chart parser – Top down chart parsing – Augmented grammars – A simple grammar with features – Parsing with features – Augmented Transition Networks (ATN) – Efficient parsers – Shift reduce parsers – deterministic parsers .

UNIT III

Semantics: Types of Semantics and logical forms – Basic operations for semantic interpretation – Strategies for semantic interpretation.

UNIT IV

Knowledge Based System: Introduction - Definition-Architecture – Knowledge Representation and Formal Logic: Knowledge components –Levels of representation – Knowledge representation schemes –formal logic – Knowledge engineering and inference – Process – Semantic networks-frames – Scripts – Production systems.

UNIT V

Problem Solving Strategies : Exhaustive search – Large search spaces – Planning – Least commitment – Principle and constraint propagation- Classification and black board models.

TEXT BOOK:

1. Ralston, D.W., “*Principles of Artificial and Expert Systems Development*”, McGraw Hill Book Company International.
2. James Allen, “*Natural Language Understanding*”. Pearson Education Inc., 2003.

REFERENCE BOOKS:

1. A. Gonzalez and D. Dankel, “*The Engineering of Knowledge-Based Systems*”, Second Edition, Prentice Hall, 2004.

UCS 804E4 : IMAGE PROCESSING

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 – DFT – FFT – cosine, sine, hadamard, haar, slant and KL 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 Multiresolution processing:** background – Multiresolution expansions – wavelet transforms in one dimension and two dimensions – fast wavelet transform – wavelet packets.

UNIT IV

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

Image Segmentation: detection of discontinuities – edge linking and boundary detection – thresholding – region based segmentation. Representation and Description: representation – boundary descriptors – regional descriptors – relational descriptors.

TEXT BOOK

Rafael C. Gonzalez and Richard E. Woods, “*Digital Image Processing*”, 2nd edition, Pearson Education Pvt. Ltd, 2002.

REFERENCE BOOKS

1. Anil K. Jain, “*Fundamentals of Digital Image Processing*”, Prentice Hall of India, 2001.
2. Rafael C. Gonzalez and Richard E. Woods, “*Digital Image Processing*”, Addison Wesley, 2000.

UCS 804E5 / UIT 808E5 : NETWORK ADMINISTRATION AND MANAGEMENT

UNIT I

Network Management goals, organization, and functions- Network monitoring-Network control-Network management tools-network statistics measurement systems-Network management systems-Commercial network management systems-System management-Enterprise management solutions.

UNIT II

SNMPv1 Network management organization and communication function models-structure of SNMP management information-standards-SNMPv2 system architecture-protocol-protocol specification-SNMPv3 architecture.

UNIT III

Remote network monitoring concepts-Group management-RMON alarms-practical issues-ARM network management-Telecommunication network management-TMN conceptual model-architecture-Network management applications.

UNIT IV

Administering windows NT systems- startup-shutdown and server configuration-user accounts-managing process-risk and file system-backups-Network configuration-Print services-Security-

UNIT V

Linux Administration- Routing-Network hardware-Domains Name Systems-Sharing system files-E-mail-Network management and debugging-Security

TEXT BOOKS

1. Evi Nemeth, Garth Snyder, Trent R. Hein, “*Linux Administration Handbook*”, Prentice Hall 2002 .
2. Aeleen Frisch, “*Essential Windows NT system Administration*”, O’Reilly & Associates Inc., first edition,Jan 1998.
3. Mani Subramanian, “*Network Management,Principles and Practice*”, Addison Wesley, 2000.

REFERENCE BOOKS

1. William Stallings, “*Network Security essentials, Applications and Standards*”, Pearson Education Asia, 2001
2. Ulyess Black, “*Network management standards*”, McGraw Hill 1995.
3. William Stallings, “*SNMP, SNMP v2, SNMP v3 and RMON1*” , 2 and 3rd Edition, Pearson Education Asia 1999.

UCS 804E6 / UIT 708E1 : INDUSTRIAL PSYCHOLOGY AND SAFETY MEASURES

UNIT I

INTRODUCTION : Definition of Industrial Psychology – Methods and scopes of Industrial Psychology – Individual and situational differences in job performance – Concept of performance appraisal – Purpose of performance appraisal.

UNIT II

MOTIVATION AND MORALE : Definition of motivation – Motivational theories – Motivation Hierarely of needs – Employees service programme – Employees morale – Planning a morale development programme.

UNIT III

RECRUITMENT, SELECTION, PLACEMENT TRAINING AND DEVELOPMENT : Recruitment policy – Recruitment from within and outside – Selection – A negative process – Personal qualities for selection – Selection procedure – Purpose and importance of training and development – Training and education – Executive development – Evaluation of training and development programme.

UNIT IV

LEADERSHIP AND ORGANIZATIONAL COMMUNICATION : The concept of leadership – Approaches to the study of leadership – Various styles of leadership – Organizational communication system – Information theory – Communication rate – Media of communication.

UNIT V

INDUSTRIAL SAFETY AND WELFARE : Introduction – Losses due to accidents – Measures of accidents – Cruces, causes and preventive measure for accidents – Injury distribution – Accident proneness – An effective safety programme – Supervisor’s role in accident prevention – Health and welfare programme.

REFERENCE BOOKS

1. M.C. Connell. J V, "*Psychology*", New York Rinehart and Wiation, 1996.
2. Morgan, C.T., King, R.A., Weiss. J.R., and Schopler.J, "*Introduction to Psychology*", (VII edn), New York Mc Graw Hill., 1986
3. Aseh, S.E, "*Social Psychology*", OUP, Oxford, 1987
4. Asit K.Ghosh and Premkumar, "Industrial Psychology Management", Anmol publications, Darya Ganj Road, New Delhi, 1991
5. Surinder Kumar and Prasantha Padhy, "Personal Management and Industrial Relations", Sathya Prakashan, New Delhi., 1995.

UCS 804E7 : GRID COMPUTING

UNIT I

IT Infrastructure Evolution - Productivity Paradox and Information Technology - Business Value of Grid Computing - Grid Computing Technology— An Overview - Grids in Other Industries

UNIT II

Grid-Enabling Network Services - Managing Grid Environments - Grid-Enabling Software Applications - Grid Computing Adoption in Research and Industry

UNIT III

Data Grids - Desktop Supercomputing: Native Programming for Grids - Grids in Life Sciences – Desktop grids

UNIT IV

Grids in the Telecommunications Sector- Cluster Grids - HPC Grids - The Open Grid Services Architecture.

UNIT V

Hive Computing for Transaction Processing Grids - Creating and Managing Grid Services - Application Integration.

TEXT BOOK

- 1.Ahmar Abbas , '*Grid Computing : A Practical Guide to Technology and Applications*', Charles River Media, 2004.

UCS 804E8 / UIT 808E10 : •NET FRAMEWORK AND APPLICATIONS

UNIT I

Introduction: The Microsoft .NET Initiative - The Microsoft .NET Framework - First .NET Framework Application - **Types and Exceptions:** .NET Framework Data Types - Dynamic Linking - Exception Handling - The .NET Framework Class Library - **The .NET Framework Class Library:** File and Stream I/O - Collections - Regular Expressions - Internet Classes - Data Access - Reflection - **Windows Forms:** The Windows Forms Programming Model - Controls - Dialog Boxes - Windows Forms and Visual Studio .NET .

UNIT II

Web Forms: Web Application Primer - The Web Forms Programming Model - Code-Behind Programming - Web Forms and Visual Studio .NET - **Web Controls:** Simple Controls - Button Controls - List Controls - Data-Bound Controls - Validation Controls - Odds, Ends, and the WebControl Base Class - **User Controls:** User Control Fundamentals - The XmlNavBar Control - Dynamic Loading (and Cookies) - Fragment Caching - **Custom Controls:** Custom Control Basics - Postbacks and Postback Data - Composite Controls - Server Controls and Client-Side Scripting - Graphical Controls.

UNIT III

Web Applications: Structure of an ASP.NET Application - The Web.config File - The Global.asax File - Application State - The Application Cache - Session State - **ASP.NET Security:** Understanding Web Security - Windows Authentication - Forms Authentication - **Web Services:** Web Services - Web Service Clients - The CityView Application .

UNIT IV

ADO.NET: A Tale of Two Providers - Connections, Commands, and DataReaders - DataSets and DataAdapters – **XML:** XML Primer - Reading and Writing XML - XPath - XSL Transformations (XSLT).

UNIT V

Multithreading: Threads - Thread Synchronization - Thread Pooling – **Remoting:** Remoting Basics - Advanced Remoting.

TEXT BOOK

1. Jeff Prosise (Wintellect), “*Programming Microsoft® .NET*”, Microsoft Press, 2002.

REFERENCE BOOKS

1. Jeffrey Richter (Wintellect), “*Applied Microsoft® .NET Framework Programming*”, Microsoft Press, 2002.
2. Alexei Fedorov, “*Programmer’s Guide to .NET*”, Addison Wesley, 2002.

3. Nell Dale, Michael McMillan, Chip Weems and Mark Headington, '*Programming and Problem Solving with Visual Basic.Net*', Narosa Publications, 2004

UCS 804E9 / UIT 808E3 : OPTICAL COMMUNICATION NETWORKS

UNIT I

Introduction, First generation and second generation optical networks, Optical Layer, All-Optical Networks, Transmission Basics, Fibers and Amplifiers.

Wavelength Division Multiplexing (WDM) Network Elements: Optical Line Terminals, Optical Line Amplifiers, Optical Add/drop Multiplexers. Optical Cross Connects - Enabling Technologies - WDM Optical Network Architectures: Broadcast and Select Networks, Wavelength Routed Networks – MAC protocols for Broadcast and select networks.

UNIT II

Wavelength routing algorithms: Classification, RWA algorithms, Fairness and Admission control, Distributed Protocols – Wavelength Convertible Networks: Need and Structure, Routing in Convertible Networks – Rerouting Algorithms: Benefits, Issues, Lightpath Migration, Rerouting Schemes, AG and MWPG methods.

UNIT III

Virtual Topology Design: Sub-problems, Problem formulation, Design Heuristics, Regular Topology Design, Graph coloring – Virtual topology reconfiguration: Need, Reconfiguration due to traffic changes.

UNIT IV

Control and Management: Network Management Functions, Optical Layer Services, Layers, Fault Management, Configuration Management, Connection Management – Network Survivability: Basic concepts, Protection in SONET and IP Networks, Optical Layer Protection Schemes, Multiplexing Techniques, Provisioning.

UNIT V

Optical Internets: Optical Circuit Switching, Burst Switching, Packet Switching, Access Networks: FTTC, Optical Multicast Routing: Node Architecture, Source based and Steiner Tree based Multicast tree generation.

TEXT BOOKS:

1. Rajiv Ramaswami and Kumar N. Sivarajan, *Optical Networks – A Practical Perspective*, Morgan Kauffmann Publishers, 2002.

2. C. Siva Ram Murthy and G. Mohan, *WDM Optical Networks – Concepts, Design, and Algorithms*, Printice Hall India, 2002.

UCS 804E10 / UIT 708E9 : MOBILE COMMUNICATION NETWORKS

UNIT I

Antennas and Propagation: Antennas, Propagation models, Line-of-sight communications, Fading in the mobile environment - Signal Encoding Techniques: Digital data and Analog signals, Analog data and Analog signals, Analog data digital signals, Modulation techniques - Spread Spectrum: Concept, Frequency hopping, Direct Sequence, CDMA – Coding and Error Control.

UNIT II

Satellite Communications: Parameters, FDM, TDM, GEO139, LEO 139, MEO 140, Routing, Localization – Cellular Networks: Principles, First generation Analog, Second Generation TDMA, Second generation CDMA, Third generation systems.

UNIT III

Telecommunication Systems: GSM, Architecture, Radio Interface, Protocols, Handover, Security – Cordless systems and WLL: IEEE 802.16, DECT – TETRA - UMTS and MIT 2000.

UNIT IV

Wireless LAN technology: Over view, Infrared LANs, Spread spectrum LANs, Narrow band microwave LANs – 802.11 protocol: Architecture, Services, Medium access control, Physical layer – Bluetooth technology: Overview, Radio Specification, Baseband Specification, Link Manager Specification, Logical Link Control and Adaptation Protocol.

UNIT V

Mobile IP: Goals, Assumptions, requirements, IP packet delivery, Agent advertisement and discovery, registration, Tunnelling and encapsulation, Optimization, Reverse tunneling, IPv6, Dynamic host configuration protocol – Ad hoc networking: Routing, destination sequence distance vector, dynamic source routing, hierarchical routing, Alternative metrics – Mobile TCP: Traditional TCP, Indirect TCP, Snooping TCP, Fast retransmit, selective retransmission, Transaction oriented TCP – WAP: Architecture, Protocol description.

TEXT BOOKS

1. W. Stallings, "*Wireless Communications and Networks*", Prentice Hall, 2002.
2. J. Schiller, "*Mobile Communications*", Pearson education, 2000.

UCS 804E11: CLIENT SERVER COMPUTING

UNIT I

Basic concepts of client/server-Logical components of C/S Architecture-Front end and Back end component-Database logical components-upsizing-downsizing-right sizing-characteristics-file servers-database servers-transaction servers-groupware servers-object servers-middleware. C/S building blocks-operating system services-basic services-external services-server scalability-remote procedure calls-multiservers

UNIT II

SQL database servers-server architecture-multithreaded architecture-hybrid architecture-stored procedures-triggers-rules-C/S transaction processing-transaction models-chained and nested transactions-transaction processing monitors-transaction management standards.

UNIT III

Database connectivity solutions-ODBC-the need for database connectivity-design overview of ODBC-architecture-components-applications-drive managers-drivers-data sources-ODBC 2.5 & ODBC 3.0

UNIT IV

Visual C++: windows programming model-GDI-resource based programming-DLL and OLE applications-Visual C++ components-framework/MFC library-basic event handling.

UNIT V

SDI-APPwizard-Class wizard-modal modless dialogues-other controls-examples-MDI-data management with Microsoft DBC-OLE-OLE Client-OLE servers-C/S data exchange format-dynamic data exchange.

Case studies on Thin Client Server Computing Model: Thin-client/server on the web, Human resources management applications, Health care services.

TEXT BOOKS

1. Robert Orfali, Dan Harkey and Jerri Edwards, "*Essential Client/Server survival Guide*", John Wiley & Sons Inc., 1994

2. .David J.Kruglinski,"*Inside Visual C++* ",Microsoft Press,1992

REFERENCE BOOKS

1. Eric J.Johnson, Susan " *The Complete Guide to C/S Computing*", McDermott Prentice hall Trade Jan 2001.
2. Joel.P.Kanter, "*Understanding client/server computing (strategic technology series)*", Microsoft Press-Jan 1998.

**LIST OF INTERDEPARTMENTAL ELECTIVES
(UID 5005 & UID 6005)**

UID : 011 - EXPERIMENT STRESS ANALYSIS
(Offered by Civil Engineering)

Unit –I

Experimental stress analysis – its scope and importance characteristics of ideal strain gauge – Mechanical- optical – acoustical – inductance – capacitance strain gauges.

UNIT –II

Electrical resistance strain gauges – gauge characteristic and types – selection of gauges – gauge factor – gauge materials – transverse sensitivity - rosettes – analysis of stress and strain using rosettes – circuiting – equipment for recording static and dynamic strains - load , pressure and displacement transducers.

UNIT –III

Model analysis – direct and indirect models – law of structural similitude – choice of scales – model materials – limitations of model studies – Buckingham Pi theorem - design of direct and indirect models – begg’s deformer and its application

UNIT –IV

Two dimensional photo- elasticity - optical principles stress optical law – methods of producing isoclinics and isochromatics – methods measuring fractional fringe orders model materials – methods for separating principle stresses.

UNIT –V

Photo elastic coatings
Moire fringe and brittle lacquer techniques
Introduction to stress freezing techniques

Test Books

1. V.M. Vazirani, S.P Chandola, “Experimental stress Analysis”, Khanna publishers, 1988
2. L.S Srinath “Experimental stress Analysis” Tata McGrand Hill, New Delhi , 1984
3. Experimental stress Analysis, Dr. Sadhu Singh, Khanna Publishers , 1982

Reference

James W Dalley and William F Riley “ Experimental Stress Analysis” Tata McGrand Hill, 1965.

UID 012 - COMPUTER AIDED PLANNING AND DRAFTING (Offered by Civil Engineering)

UNIT –I

Introduction - Creating New drawing – Opening existing drawings – working with tool bars – using short cut menus – pointing devices- setting drawing units- modifying AutoCAD environment – viewing and updating drawing properties – modifying tool bars

UNIT –II

Using commands and systems variables – creating objects – Hatching drawing with previsions – controlling the drawing display – Editing method - using layers and object properties – auditing text to drawing – creating dimensions .

UNIT –III

Using blocks and external reference – management content with auto cad design centre – creating a layout to plot – plotting drawings batch plotting – using scripts files – working three – dimensional space – interactive veering in 3D – creating three – dimensional object

UNIT –IV

Rendering and imaging – using 3D images- drawing 3D models creating hidden –line images – using render with related applications. Working with raster image –managing raster images- accessing raster image using internet- modifying images and image boundaries

UNIT –V

Creating compound documents with OLD – linking and embedding information –using information from other application in AutoCAD. Accessory external database-working with table data- creating labels – accessing the internet visual Lisp and auto Lisp – VBA and active X automation

Text Books

Curriculum & Syllabi (B.Tech. CSE)

1. Introduction to AutoCAD 2002 by J.T Roberts
2. Introduction to AutoCAD 2002 by George Omura
3. Introduction to AutoCAD 2002 by A. Yarwood

Reference

1. 3D Modelling in AutoCad by John EL Wilson Arnie Willians - 2002

UID 021 – MECHATRONICS

(Offered by Mechanical Engineering)

Unit – I : Introduction

Introduction to Mechatronics – Mechatronics in Products – Mechatronics in Engineering Design – Measurement Systems – Electronics for Mechanical – Mechanical System for Electronics. System Response – Dynamic Characteristics of Systems – zero order - First order – Second order – System Modeling and analogies.

(9 hours)

Unit – II : Amplifying and Digital Circuits

Amplifier – Operational amplifier – Instrumentation amplifier – comparator. Digital Representations – Boolean algebra – Design of logic Network – Flip flops – Application of flip flops – Special purpose Digital integrated circuits.

(9 hours)

Unit – III : Microprocessor and Data Acquisition

Microprocessors and micro Computers – Micro Controllers – Numeric key board – LCD Display – Method to Design a Micro controller based system. Data acquisition – quantizing theory – Analog to Digital conversion – Digital to Analog conversion.

(9 hours)

Unit – IV : Sensors and PLC

Performance Terminology – Semi conductor Sensors and micro electro mechanical Devices - Actuators – Hydraulics Actuators – pneumatic Actuators. Programmable Logic Controllers (PLC) – basic structure – input / output processing – programming – Mnemonics Timers – relays and counters – data handling – selection of PLC.

(9 hours)

Unit – V : Control Architecture and Mechatronic Systems

Control architecture – Analog – Digital – Micro Controller – Single Board Computer – personal Computer designing. Case studies of Mechatronic system. Introduction to design of Mechatronic systems - Coin counter - Robotics - Magnetic Bearings etc..

(9 hours)

Text Books :

Curriculum & Syllabi (B.Tech. CSE)

1. David G.Alciatore and McGraw Mecheal.B.Histand - Introduction of Mechatronics and Measurement Systems, Hill InternationalEditio, 1999.
2. HMT - Mechatronics, Tata McGraw Hill Publishing Company Ltd., 1998.
3. Lawrence J.Kamm - Understanding Electro – Mechanical Engineering, An Introduction to Mechatronics”, Prentice Hall, 2000.

UID 022 - TOTAL QUALITY MANAGEMENT (Offered by Mechanical Engineering)

Unit – I

Introduction to TWM – Strategies concepts and objectives – Total quality model – TQM as applied to Indian Industries – Quality circle concepts – concepts, objectives and functions of quality circles – Benefits of the organization – Training of quality Circle members – Implementation.
(9 hours)

Unit – II

Tools and Techniques – The seven management tools =- Technique for analyzing a quality process – Statistical process Control – Introduction to S-S concepts
(9 hours)

Unit – III

Cost of quality – Taquchi’s quality loss function – House keeping concepts for industries, tool room, production shop – processing industries.
(9 hours)

Unit – IV

Quality based product and process Design – Design for reliability – Design for maintainability – Quality Function Deployment (QFD) – QFD and Quality Assurance – QFD Principles, Concepts and applications – case studies.
(9 hours)

Unit – V

KAIZEN Concepts – Kaizen by TQC – POKA YOKE ISO 9000 certification system – 9001 to 9004 systems – procedures, audits and reviews – case studies.
(9 hours)

TEXT / REFERENCE BOOKS

1. S.M.Sundara Raja : Total Quality Management Tata Mc Graw Hill, 1998.
2. Patrick.J.Sweeney(editor) : TQM for Engineering, Quality Resources, Newyork, 1993.
3. John Bank : The Essence of Total Quality Management, Prentice Hall of India, 1998.

4. James I Bossert, : Quality Function Deployment, ASQC quality press, Wisconsin, 1994.

UID 031 - COMMUNICATION ENGINEERING
(Offered by Electronics & Communication Engineering)

UNIT – I

Modulation – Need for modulation – Amplitude modulation – frequency spectrum – Power relation – different types of modulators – SSB and VSB generation. AM transmitters – Block diagram – functions of each block – high level transmitters.

UNIT – II

Angle modulation – principle of Frequency and Phase modulation – Relation between FM and PM waves – Bandwidth of FM – Narrow band wide band FM – Generation of FM wave – Direct and Indirect methods – FM transmitters – Block diagram – functions of each block.

UNIT – III

Detection and Receivers – Detection – Diode detectors – Synchronous detection – FM detectors – slope detectors – Phase discriminators – Ratio detectors.

Receiver – different types – super-heterodyne receivers – Block diagram – Choice of IF and Oscillator frequencies – Tracking – alignment – AVC, AFC – Receiver characteristics.

UNIT – IV

Pulse modulation systems – Sampling theorem – Pulse amplitude modulation – Channel bandwidth for PAM – detection of PAM signals – Pulse time modulation – generation of PDM and PPM – conversion of PDM and PPM – conversion of PDM to PPM – detection of PTM signals – Pulse code modulation – quantization – PCM systems – Encoder – decoder – Time division multiplexing – Frequency division multiplexing.

UNIT – V

Broadband communication system (Block Diagram Approach) – Telegraph system – Tele printer and Facsimile system – Telephone system – crossbar and electronic exchanges – Television system – microwave communication and optical communication systems – Principle of satellite communication – computer communication – Electronic Mail.

Text Books:

1. G. Kennedy, “Electronic Communication Systems”, McGraw Hill, 1984.
2. Wayne Tomasi, “Electronic Communications Systems – Fundamentals Through advanced”, 4th Edition, Pearson Education, 2001.

References:

1. Taub and Schilling, “Principles of Communication Systems”, McGraw Hill, 1989.
2. Bruce Carlson, “Communication Systems”, McGraw Hill, 1985.

UID 032 - COMPUTER NETWORKS

(Offered by Electronics & Communication Engineering)

UNIT I

Data Communication Concepts: Transmission media – Data encoding – Interface and modems – Multiplexing – Error detection and correction – Digital subscriber line – Circuit switching – Packet switching – Message switching.

UNIT II

Wide Area Networks: ISO-OSI layered architecture – Function of the layers – Data link protocols – HDLC, LAPB, LAPD, Inter networking devices – Repeaters, bridges, routers, routing algorithms – Distance vector routing, link state routing, X.25 protocol, congestion control.

UNIT III

Frame Relay and ATM Networks: Frame relay operation – Layers and traffic control; ATM networks – Architecture switching, Layers service classes.

UNIT IV

Local Area Networks: LAN topology – Ethernet – Token bus – Token ring – FDDI – Wireless LAN, ATM LAN – IEEE 802 Medium access control layer standard – Random access protocols – ALOHA – Slotted ALOHA.

UNIT V

OSI Layers: Transport layer issues – Session layer – Synchronization – Presentation layer – Encryption, decryption, Application layer – Message handling system, file transfer, virtual terminal – E-mail.

Text Book:

Achyut S. Godbole, Atul Kahate, “Computer Communication Networks”, Tata McGraw Hill, New Delhi, 2004.

References:

1. Andrew. S. Tanenbaum, “Computer Networks”, PHI, 1956.
2. W. Stallings, “Data and Computer Communication”, Second Edition, New York, Mc Millan, 1988.

UID 041 - RELATIONAL DATABASE MANAGEMENT SYSTEMS
(Offered by Computer Science & Engineering)

UNIT I

Introduction to Database Systems-applications-Comparison with file systems-Data models-View of data-database languages-database users and administrators -Transaction management system structure-application architecture-constraints-keys-Design issues.

UNIT II

Entity_Relationship Diagrams-Relational model-structure of relational database: basic structure-Schema-Fundamentals of Normalization-1NF, 2NF, 3NF-Introduction to Query languages.

UNIT III

Introduction to Oracle-Introduction to PL/SQL: Why PLSQL-Features of PL/SQL-PL/SQL Block-lexical units-variable declaration-PL/SQL types-PL/SQL Control Structures-PL/SQL records and tables-SQL statement-DML-pseudo columns –grant and revoke privileges -transaction control. Built in SQL functions: character functions, numeric-date-conversions-group and other functions.

UNIT IV

Cursors: Introduction-fetch loops-variables-subprograms : creating procedures and functions, subprogram locations and dependencies-privileges-packages-Triggers-error handling.

UNIT V

Introduction to Microsoft SQL Server-MY SQL-MS ACCESS. Case Studies: Material Management-Library Information System.

TEXT BOOKS

1. "Database System Concepts" – Silberschatz And Korth, McGraw Hill-Fourth Edition,2002.
2. "Oracle 8: PL/SQL Programming" – Scott Urman, Oracle Press, Tata McGraw Hill, 1999.

UID 042 - VISUAL PROGRAMMING

(Offered by Computer Science & Engineering)

UNIT I

INTRODUCTION: Operating System fundamentals: DOS-WINDOWS. Features of Object Oriented Programming: Abstraction-Encapsulation-Inheritance-Classes-Derived classes-Virtual functions-Streams.

UNIT II

VB INTRODUCTION: Datatypes and Variables-Keywords-Statements-Controls and forms: types-properties-events-methods. Built-in: functions-procedures. User-defined: functions-procedures-properties.

UNIT III

DATA OBJECTS: Open Data Base Connectivity (ODBC)-Active Data Objects (ADO)-Data Access Objects (DAO)- Active X Data Objects and Data Connection (ADODC)-Data environment-Data report-ADODC based controls.

UNIT IV

APPLICATION DEVELOPMENT AND AUTOMATION: MDI-Menu-Toolbar-Active X-Mouse events- OLE based Automation-Class-Modules-DLL.

UNIT V

VC++ INTRODUCTION: Windows console application-AppWizard-MFC introduction-Windows MFC application.

TEXT BOOKS:

- 1.Gary Cornell, 'Visual Basic 6.0', Tata McGraw Hill, 1998.
- 2.C.H. Pappas, W.H. Murray, III 'Visual C++: The Complete Reference', Tata McGraw Hill, 1999.

**UID 051 - INTRODUCTION TO SOFT COMPUTING
(Offered by Electrical & Electronics Engineering)**

UNIT-I

Fuzzy systems: Crisp sets – Fuzzy sets – Operation and properties. Fuzzy relations – Equivalence and tolerance relations. Fuzzy membership function- types and definitions. Membership value assignments – Rule based systems. Type of fuzzy inference. Structure and parameters of a Fuzzy system- computer assignment.

UNIT-II

Neural Networks: Biological inspiration – Neuron model and Network architectures perception – architecture, learning rule. Limitations of multiplayer perception- Back propagation algorithm – learning rule – computer assignments.

UNIT-III

Genetic Algorithm: Goals of optimization – Introduction to GA – terminologies. Simple GA- Data structure. Genetic operation – crossover, mutation, fitness scaling, Inversion- A Multi parameter mapped fixed point coding – computer assignments.

UNIT-IV

Evolutionary programming: Single and multi objective optimization-general algorithm-Binary GA, Real parameter GA, constraint handling in GA Evolution strategies general programming – computer assignments.

UNIT-V

Applications to various branches of Engineering and science- Application of fuzzy, neural, GA and EP in computer science, electrical, communication, instrumentation and control, mechanical and civil engineering.

TEXT BOOKS

1. Timothy J. Ross ‘Fuzzy logic with Engineer application’ McGraw Hill.
2. Martin T. Hagan Howard B.Deruth, Mark Beale ‘Neural Network Design’ Thompson Learning 1996
3. David E. Gold Berg ‘Genetic Algorithm’ Pearson Education 2002.
Multi objective optimization using Evolutionary Algorithm – by Kalyanmoy Deb. John Wiley and sons 2002

UID 052 - INDUSTRIAL ELECTRONICS
(Offered by Electrical & Electronics Engineering)

UNIT – I: THYRISTERS

SCR – SCR behaviour and rating – phase control of SCR – turn-off of SCR – SCR with resistive load and inductive load – rectifiers with back emf load – TRIAC – TRIAC circuits – phase control of SCR

UNIT – II: REGULATORS OF VOLTAGE AND MOTOR SPEED

Voltage compensator – solid state DC voltage regulation – DC shunt motor – armature control and field control of motor speed – electronic control of DC motor – speed regulator action – full wave motor speed regulation by one SCR

UNIT – III: INDUSTRIAL HEATING

Induction heating – principles- theory – merits – applications – high frequency power source for induction heating

Dielectric heating – theory – electrodes used in dielectric heating – method of coupling of electrodes to RF generator – thermal losses in dielectric heating

UNIT – IV: INDUSTRIAL TIMING CIRCUITS

Constituents of industrial timing circuits – timers – classification of timers – thermal timers – electromechanical timers – electronic timers – classification of electronic timers – digital timing element – digital counters – SCR delay timer – IC electronic timer

UNIT – V: PROGRAMMABLE LOGIC CONTROLLERS

Number system and codes – basics of PLC programming – timer and counter instructions – data manipulation instructions – shaft register and sequence instructions

TEXT BOOKS

1. Frank D. Petruzella, Industrial Electronics, McGraw Hill International Editions, 1996
2. G.K. Mithal, Ravi Mithal, Industrial Electronics, Khanna Publishers, Delhi, 1995
3. George M. Chute, Robert D Chute, Electronics in Industry, McGraw Hill International Editions

**UID 061 - ELEMENTS OF BIOTECHNOLOGY
(Offered by Chemical Engineering)**

UNIT-I

What is Biotechnology, Biotechnology -an interdisciplinary pursuit, public perception of Biotechnology, Biotechnology and the developing world? Classification of micro-organisms, The cell, its organelles and their respective functions, Basic metabolism of cells, DNA – Structure and function, RNA-Structure and function.

UNIT-II

Enzyme Technology: Proteins, Protein Structure & Function, Protein –Protein interactions, The nature of enzymes, application of enzymes, Technology of enzyme production, immobilized enzymes.

UNIT-III

Biotechnology and Medicine: Introduction, Pharmaceuticals and bio-pharmaceuticals, Antibiotics, vaccines and monoclonal antibodies, gene therapy. Biotechnology and Environment: Introduction, Microbial ecology / environmental biotechnology, waste water and sewage treatment, landfill technologies, composting, bioremediation, microbes and the geological environment, sustainability.

UNIT – IV

Genetics And Biotechnology: Introduction, industrial genetics, protoplast and cell fusion technologies, genetic engineering, Introduction to Bio-informatics, potential lab biohazards of genetic engineering, Bioethics.

UNIT V

Biotechnology in Agricultural, food and Beverage industries: Introduction, plant biotechnology, diagnostics in agriculture, food and beverage fermentation, speciality fermentation products e.g.: biopolymers, bio-pesticides, miscellaneous microbial derived food products.

Text Books/ Reference Books:

1. Shuler, M.L. and F. Kargi. 1992. *Bioprocess Engineering*, Prentice-Hall, Englewood Cliffs, NJ.
2. Bailey, J.E. and D.F. Ollis. 1986. *Biochemical Engineering Fundamentals*, 2nd Ed. McGraw-Hill, New York.
3. Biotechnology by Smith, Cambridge Press.
4. Modern Concepts of Biotechnology by H.D. Kumar, Vikas Publishing House Pvt. Ltd.
5. Elements of Biotechnology by P.K. Gupta, Rastogi Publications.

UID 062 - INDUSTRIAL POLLUTION ABATEMENT

(Offered by Chemical Engineering)

UNIT I

Man and environment, types of pollution, pollution controls aspects, industrial pollution, pollution monitoring and analysis of pollutants, Indian pollution regulations.

UNIT II

Water pollution- source of water pollution- measurement of quality- BOD- COD- colour and odor-PH- heavy metals-treatments etc (qualitatively). Industrial waste water treatment (qualitatively) and recycle.

UNIT III

Solid wastes- quantities and characterizations – industrial –hazardous waste- radio active waste- simple treatments and disposal techniques (qualitatively treatment).

UNIT IV

Air pollution-types and sources of gaseous pollutants-particulate matter-hazardous air pollutants-global and atmospheric climatic change (Green house effect)-acid rain. Industrial exhaust – characterization and Methods of decreasing the pollutants content in exhaust gasses (qualitatively)

UNIT V

Noise pollution –sound level-measuring transient noise-acoustic environment-health effects of noise –noise control.

Text books / Reference books:

- 1.'Environmental pollution and control' J.Jeffrey peirce etl, Butterworth-Heinemann; 4th edition , 1997.
- 2.'Pollution control in Process Industries', S.P.Mahajan, Tata Mc.Graw Hill, 1990.
- 3.'Environmental Pollution Control Engineering', C.S.Rao, New Age International Ltd., 1992.
- 4.'Industrial Air Pollution Engineering', V.Cavaseno, Mc.Graw Hill, 1980.
- 5.'Pollution Control Theory', Martin Crawford, Mc.Graw Hill, 1976.
- 6.'Solid Wastes', Martell, John Wiley, 1975.

UID 071 - INDUSTRIAL CONTROL SYSTEMS
(Offered by Electronics & Instrumentation Engineering)

UNIT – I

INTRODUCTION: Need for control – block diagram representation of a Control System- mathematical modelling-transfer function and state space modelling-examples in mechanical, electrical, level, pressure and thermal processes –time response analysis of first order and second order processes- stability-self-regulation – servo and regulator operation.

UNIT – II

CONTROL ACTIONS AND CONTROLLERS: Basic control actions characteristics of on-off, proportional, integral and derivative control modes – P+I, P+D and P+I+D control modes – Tuning of controllers-Finite control elements-valves and actuators-characteristics of control valves – inherent and installed characteristics.

UNIT-III

COMPUTER CONTROL: Basic building blocks of computer control system – SCADA – Direct Digital Control – AI and expert control systems – Case studies on computer control for Industrial process.

UNIT-IV

PROGRAMMABLE LOGIC CONTROLLERS: Evolution of PLC's – Sequential and programmable controllers – Programming of PLC – Relay logic – Ladder logic – Functional blocks connecting PLC to computer – Case study of bottle filling system.

UNIT-V

DISTRIBUTED CONTROL SYSTEMS: Evolution – Different architecture – local control unit – Operator interface – Displays – Engineering interface-DCS applications.

References:

1. Stephanopoulos, G., Chemical Process Control, Prentice Hall of India, New Delhi, 1990.
2. Michal P.Lucas, Distributed control systems, Van nostrand Reinhold Co.,1986.
3. Petrezeulla, Programmable Controllers, McGraw Hill, 1989.

UID 072 - TRANSDUCERS AND INSTRUMENTATION

(Offered by Electronics & Instrumentation Engineering)

UNIT – I

Generalised scheme of measurement-Statistical analysis of measurement data- Mean, Standard deviation-Probability of errors-Gaussian Distribution- Probable error and limiting error Static characteristics of instruments – Accuracy, Precision, Sensitivity, Linearity, Resolution. Hysteresis, Threshold, Input impedance, Loading effects- generalised mathematical model of measurement systems-Dynamic characteristics.

UNIT-II

Electronic analog meters-DC and AC Voltmeters, AC and DC bridges- Digital method of measuring frequency, period, velocity. Displacement and speed Display Devices- CRO's - LED'S ,LCD's.

UNIT – III

Transducers-Characteristics-Strain gauges-LVDT, Eddy current transducers, Hall effect transducers, Magnetostrictive transducers, capacitive Transducers –Piezoelectric transducers- photoelectric Transducers-Thermo electric transducers.

UNIT – IV

Measurement of temperature and Pressure: Manometers ,Bourdon Gauges -Diaphragm, Bellows-Vacuum Gauges- Mcloid Gauge-Knudsen Gauge, Pirani gauge

Temperature scales –resistance thermometers-Thermistors-Thermocouples-Radiation Pyrometer- Types and characteristics

UNIT-V

Flow measurement: Differential Flow meters-Operating principle-Different types-Orifice-Rotameter-Mass flow meter-positive displacement meter-Electromagnetic and Ultrasonic Flow meters

Level Measurements: Slight glass flow gauge, Displacer torque tubes ,Bubbler tube, Diaphragm box, D/p methods, resistance <capacitance and Ultrasonic level Gauging Measurement of PH, humidity ,Moisture and Viscosity

Textbooks:

1. A course in Electronic measurements and Instrumentation , A.K.Sawhney, Dhanpat Rai & sons,1998
2. Measurement Systems , Application and design, E.O.Doeblin, McGraw Hill,1990. Mechanical and Industrial Measurement, R.K.Jain, Khanna Publishers,1996

UID 081 : INFORMATION TECHNOLOGY FOR ENGINEERS

(Offered by Information Technology)

UNIT I

INTRODUCTION:Information Age; Responses – Information system; Infrastructure and Architecture – IT support for organizations; Types of information systems – Managing IT – Basic of computer hardware and software for IT infrastructure- input devices, output devices, memory devices.

UNIT II

COMMUNICATION NETWORKS FOR IT:Telecommunication system: Networks: LAN, WAN, ETHERNET, Network server, Network software; Network processing strategy; Telecom applications; Network OS; Operation and services provided; ftp, Usenet, Remote login, Telnet.

UNIT III

INTERNET : Evolution - WWW, Websites, Homepages, Search Engines, URL, Name server, Proxy server, Gateways, Routers, Modem, Switches, Email server, Inter Service Providers, Internet connectivity (VSAT, Leased line, Dial-up line, Radio link) .

UNIT IV

E-COMMERCE AND IT SYSTEMS : E-commerce: Business applications: Market research and customer support Infrastructure, payments and other support - Planning and Management: Principles for IS planning: Role of IS and user departments; Resources; IT architecture; Centralized and no centralized; Client/server; End user computing architecture; Managing IS; Organizational structure; IS vulnerability; protection; Security; Network Protection and Firewalls Risk management and cost-Benefit analysis.

UNIT V

APPLICATIONS: Information system; GIS EDI and EFT; Extranets; Implementation; Data, Knowledge and decision support; Decision making- and support systems; Data visualization technologies; Knowledge Management- and Discovery and analysis - AI and Expert systems; Intelligent agents; Virtual reality; Ethical and global issues;

REFERENCE BOOKS :

1. E. Turban et al, *'Introduction to IF'* , John Wiley and sons, IC, 2000.
2. Turban et al, *'IT for management: Making connection for strategic Advantage'*, 2nd Edition, John Wiley and sons, Inc., 2001.
3. Dennis, P., Curtin et al, *'IT the breaking wave'* Tata McGraw-Hill, 1999.
4. Steven Alter, *IS, A management perspective*, 1999.
5. Gralla Preston, *'How the internet works'*, Techmedia Publication, 4th Edition, 2000.

UID 082 - BIO INFORMATICS
(Offered by Information Technology)

UNIT I

Coding -Common health care language - coding techniques – coded and quasi coded data Medical vocabulary – industry wide communication standards HL7 – unified medical language system – quality of care paradigms, risk management bioethics.

UNIT II

Information networks - Internet – facilities used in the internet web browsers STTP 5, HTTP, HTML, URL – European molecular biology network – national centre for bio-technology information.

UNIT III

Patient record maintenance - Electronic patient record – models or ERP – environmental services – metrics – telemedicine – community networks – telemedicine peripherals and equipment selection – anatomy of video conferencing technology.

UNIT IV

Basic Genetic Science : Study of cell, nucleus, chromosomes and their components Evaluation of chromosomes, Impact of chromosomes on genes, gene study. Protein information resources - Biological data basics – primary secondary data basics – Protein pattern data basics – DNA sequences data basics - DNA analysis - Genes structure and DNA sequences – interpretation of EST structures – different approach to EST analysis.

UNIT V

Alignment techniques - Data base searching - comparison of two sequences– identity and similarity – global and local similarity – global and local alignment- multiple sequence alignment – data basis of multiple alignment – secondary data base. Expert system- Principles of expert system – statistical decision trees – integration of decision support in clinical processors.

TEXT BOOK

1. T.K. Attwood , D.J. Parry-Smith, "*Introduction to Bioinformatics*", Pearson Education, 1999

REFERENCE BOOKS

1. Coiera E, "*Guide to medical informatics, The internet and telemedicine, Chajzman & Hall medical*", London 1997.
2. Bernser, E.S., "*Clinical decision support systems, Theory and practice, Springer-Verlag*", New York, 1999.
3. Dan E. Krane , Michael L., Raymer, "*Fundamental Concepts of Bioinformatics*", Pearson Education, 2002.

UID 201 - FINITE ELEMENT METHOD

(Offered by Mathematics)

UNIT – I (Weighted residual and Variational methods)

Introduction, Weighted residual methods: Least square, Partition, Galerkin, Moment and Collocation methods. Variational method: Ritz method. (10 Hours)

UNIT - II (Finite Element method)

Finite elements: Different types and their functions. Numerical integration over finite elements. Finite Element method: Ritz method, Least square method and Galerkin method. (10 Hours)

UNIT - III

Solution of initial value problems for ordinary differential equations and initial boundary value problems for partial differential equations by finite element method. (9 Hours)

UNIT - IV

Solution of boundary value problems for ordinary differential equations and partial differential equations by finite element method. (9 Hours)

UNIT - V

Solution of some nonlinear differential equations by finite element method. Solution of some practical application problems arising in various branches of engineering. (7 Hours)

Text Book:

1. M.K. Jain, Numerical solution of differential equations, Wiley Eastern Limited, New Delhi, 1987.
2. J. N. Reddy, An introduction to the Finite Element Method, McGraw Hill, Singapore, 1985.

Reference Book:

1. O.C. Zienkiewicz, The Finite Element Method, 3rd Edition, McGraw Hill, 1977.
2. C.S. Desai and J. F Abel, Introduction to the Finite Element Method, CBS Publishers and Distributors, New Delhi, 1987.
3. R. Wait and A.R. Mitchell, Finite Element Analysis and Applications, John Wiley & Sons, New York, 1986.
4. A. J. Davies, The Finite Element Method: A first approach, Clarendon Press, Oxford, 1980.
5. H. Grandin Jr., Fundamentals of the Finite Element Method, Mcmillan, New York, 1986.
6. K.W. Morton, Numerical solution of convection-diffusion problems, Chapman and Hall, 1996.

UIE 202 - COMPUTATIONAL FLUID DYNAMICS

(Offered by Mathematics)

1. Classification and finite difference formulations :

Classification: Elliptic, Parabolic, Hyperbolic, System of first order p.d.e and System of second order p.d.e. Initial and boundary conditions, Lax's equivalence theorem,

Finite difference formulations: central, forward, backward differences.

Uniform and non-uniform grids, numerical errors, grid independence test.

2. Numerical Solution of Ordinary and Partial differential equations

Runge-Kutta methods, Finite difference methods for O.D.E,

Elliptic: Laplace and Poisson equations. Parabolic: One- dimensional and Two-dimensional heat conduction equations. Hyperbolic: One- dimensional wave equation.

3. Incompressible flows:

Governing equations: Primitive variables formulation, Vorticity-Stream function formulation in Cartesian, spherical and cylindrical polar coordinates.

Determination of pressure-by-pressure Poisson equation,

Flow inside a lid-driven cavity, axis symmetric flow past a sphere and cylinder, application of upwind difference scheme.

4. Compressible flows:

Governing equations: Euler equations and Burgers equation

Lax-Friedrichs and Lax-Wendroff methods.

Flux splitting method, Riemann solvers, Kinetic schemes, Relaxation schemes.

FTCS, FTBCS, DUFORT-FRANKEL, Mac Cormack (explicit methods)

Mac Cormack, BTCS, BTBCS (implicit methods) for solving inviscid and viscous Burgers equation.

5. Heat flows:

Steady heat conduction in rectangular, spherical and cylindrical geometries, Transient heat conduction, steady one-dimensional convection-diffusion equation, Heat transfer in the boundary layer over a flat plate.

TEXTBOOKS

Muralidhar, K and Sundararajan, T., " Computational Fluid Flow and Heat Transfer"(2nd edition). Narosa Publishing house, New Delhi.
(units 3, 4 and 5)

Klaus A. Hoffmann and Steve T. Chiang, "Computational Fluid Dynamics for Engineers" Vol.1.A publication of Engineering Education system, Wichita, Kansas, 67208-1078, USA. ASIN: 0685272257
(units 1, 3 and 4)

Curriculum & Syllabi (B.Tech. CSE)

Grewal, B. S., " Numerical methods in Engineering and Science", Khanna Publishers (unit 2)

REFERENCES

Langtangen, Hans P.

Computational Partial Differential Equations
Numerical Methods and Diffpack Programming

Publisher: Springer verlag

Series: [Texts in Computational Science and Engineering](#), Vol. 1

2nd ed., 2003, XXVI, 855 p., Hardcover

ISBN: 3-540-43416-X (\$ 62.99)

Langtangen, Hans P.; Tveito, Aslak (Eds.)

Advanced Topics in Computational Partial Differential Equations

Publisher: Springer verlag

Series: [Lecture Notes in Computational Science and Engineering](#), Vol. 33

2003, XIX, 658 p., Softcover

ISBN: 3-540-01438-1 (\$99.00)

[M.O. Deville](#), [P.F. Fischer](#) and [E.H. Mund](#)

High-Order Methods for Incompressible Fluid Flow

ISBN: 0521453097, Publisher: Cambridge University Press 2002 (\$ 85.00)

[Pieter Wesseling](#) [Principles of Computational Fluid Dynamics](#)

Publisher: Springer-Verlag ISBN:3540678530 (\$ 135.59)

[John D., Jr. Anderson](#). Computational Fluid Dynamics

Publisher: Mc-Graw Hill Science/Engineering/Math,

ISBN:0070016852, (\$82.50)

[Joel H. Ferziger](#), [Milovan Peric](#). Computational Methods for Fluid Dynamics

Publisher: springer verlag, ISBN: 3540420746, (\$59.95)

Suhas V Patankar "Numerical Heat Transfer Fluid Flow",

Publisher: Hemisphere Publishing Corporation, 1980.

ISBN:0891165223 (\$94.95)

Anderson, D.A., Tannehill, I.I., and Pletcher, R.H., "Computational Fluid Mechanics and Heat Transfer (2nd edition)

Publisher: Taylor and Francis

ISBN:156032046X. (\$92.97)

Bose, T. K., "Numerical Fluid Dynamics"

Publisher: Narosa Publishing house Pvt.Ltd

ISBN: 8173191662 .(\$69.99)

UID 211 -INTRODUCTION TO NANO TECHNOLOGY

(offered by Department of Physics)

Unit-1: Introduction to Physics of Solid State

Intermolecular forces: thermodynamic aspects - Quantum Mechanical Treatment of the Many-Particle Problem - Potential Energy Surface - Pair Potential Approximation - Advantages and Limitations of the Pair Potential Approximation - Phenomenological Potentials - Pseudo-Potentials - Many-Body Potentials.

Unit - 2: Fundamentals of nanoscience

Size dependence of properties - Particle size determination - Bulk to nano transition - Semiconducting nanoparticles - Carbon nanostructures - Mechanical properties (hardness, ductility, elasticity) - Optical properties of nanotubes - Electrical properties of nanotubes.

Unit - 3: Preparation of nanosystems.

Introduction to nanolithography - Carbon nanotubes: preparation - Synthesis and preparation of nanomaterials (crystalline and thinfilm) - Physical and chemical methods - Control and stability (size, shape, composition).

Unit - 4: Characterization of nanosystems.

Thermal Stability - Basic Material Properties - Mean Values and Correlation Functions - X-ray diffraction - Scanning Electron Microscopy - Scanning Tunneling Microscopy - Electron Microscopy - X-ray absorption spectroscopy - Photoelectron emission spectroscopy.

Unit - 5 : Nano-Engineering: Applications

Nanotubes, nanowires, and nanodevices-introduction - Functional Nanostructures - Introduction to molecular electronics - Field emission and Shielding - Applications in Computers - Applications in fuel cells - Applications in chemical sensors - Applications in mechanical reinforcement - Microelectromechanical systems (MEMs) - Nanoelectromechanical systems (NEMs) - Molecular and Supramolecular Switches.

Text Books:

Unit-1 and 2:

(a) **Charles P. Poole and Frank J Owens.** *Introduction to nanotechnology.* Wiley Interscience, 2003. (US \$ 80.00).

(b) **Crandall, B. C. and Lewis, James (Eds.)** “*Nanotechnology: Research Perspectives*” MIT Press, 1992. and

Unit-3 and 4:

(a) **P E J Flewitt, R K Wild.** *Physical Methods for Materials Characterization. 2nd Edition.* Institute of Physics Publishing, UK. 2004.

(b) **Gottstein, Günter.** (2004) *Physical Foundations of Material Science.* Springer Verlag.

Unit-5:

Cleland, Andrew N. (2003). *Foundations of Nanomechanics: From Solid-State Theory to Device Applications.* Springer Verlag.

References for further study:

1. **J M Vail, Winnipeg.** [*Topics in the Theory of Solid Materials.*](#) Institute of Physics Publishing, UK. 2004.
2. **M W Barsoum.** [*Fundamentals of Ceramics.*](#) Institute of Physics Publishing, UK. 2004.
3. **A S Edelstein, R C Cammarata,** [*Nanomaterials: Synthesis, Properties and Applications.*](#) IOP Publishing, UK, 1998. (\$70.00)
4. **Bhushan, Bharat** (Ed.) (2004) *Springer Handbook of Nanotechnology* (With CD-ROM) ISBN: 3-540-01218-4 (EURO 200.00)
5. **Awschalom, D.D.; Loss, D.; Samarth, N.** (Eds.) (2002) *Semiconductor Spintronics and Quantum Computation.* Springer Verlag. ISBN: 3-540-42176-9 (EURO 70.00)
6. **Vincenzo Balzani.** *Molecular Devices and Machines : A Journey into the Nanoworld* Wiley VCH, 2003, (\$92.00).
7. **Peidong Yang.** [*Chemistry of Nanostructured Materials.*](#) World Scientific, 2004. (\$84.00)
8. **Andrzej W. Miziolek et. al.,** [*Defense Applications of Nanomaterials*](#) American Chemical Society, 2004. (\$150.00)
9. **Liming Dai.** [*Intelligent Macromolecules for Smart Devices: From Materials Synthesis to Device Applications \(Engineering Materials and Processes\).*](#) Springer Verlag 2004. (\$150.00)
10. **Michael Rieth.** *Nano-engineering in Science and Technology: An Introduction to the World of Nano-Design,* World Scientific, 2003. (\$26.00).
11. **Hari Singh Nalwa.** *Handbook of nanostructured materials and nanotechnology.* 5 volume set, 3583 pages; (US \$ 1500.00). Academic Press, 2000.

UID 212 - Novel and Intelligent Materials

(offered by Department of Physics)

Unit – 1: Introduction to functional materials.

10 hours

Introduction to functional materials - Phase transition and anomalies - Microscopic, mesoscopic, macroscopic phenomena and symmetry - Energy conversion - Examples of functional materials - Thermally responsive materials - Materials responsive to electric, magnetic and stress fields - Increased functionality through (i) Morphotropic phase boundary and (ii) Domain engineering.

Unit-2 Actuators and adaptronics

10 hours

Definition. of an actuator - Actuator as part of system - Intelligent actuators - Smart actuators - Piezoelectric actuators – Theory -Technical transducers - Comparison with other actuator types - Example applications - Magnetostrictive actuators - Theory of magnetostriction in magnetostrictive actuators - Properties of shape memory alloys - Electrical shape memory – actuators - Innovative applications.

Unit-3: Rheological fluid and Chemical actuators.

10 hours

Electrorheological fluid actuators - Limitations to the concept of electrorheological fluids - Summary of advantages of ER fluids - Magnetorheological (MR) fluid actuators - Description of MR fluids - Basic MR device design consideration - Linear MR fluid dampers.- Electrochemical actuators: fundamentals - Construction of reversible actuators.

Unit-4: Nanomaterials

10 hours

Size dependence of properties - Particle size determination - Bulk to nano transition - Semiconducting nanoparticles - Carbon nanostructures - Mechanical properties (hardness, ductility, elasticity) - Optical properties of nanotubes - Electrical properties of nanotubes.

Unit-5: Fiber optic sensors and Magnetoresistance

10 hours

Physical principle of fiber optic techniques - Types of fiber sensors and sensor selection - Integrating and Quasi-Distributed Long-Gauge-Length sensors-Short-Gauge-Length sensors. – Introduction to magneto-resistance – Giant magnetoresistance – Colossal magnetoresistance – Materials – Perovskite oxides – Applications in spintronics like spin transistor and spin valve.

Textbooks:

Unit-1 [Hartmut Janocha](#) (Editor), [Daniel J. Jendritza](#), [Hartmut Hanocha](#).

Adaptronics and Smart Structures: Basics, Materials, Designs and Applications.

Springer Verlag, 1999.

Unit-2: V. Srinivasan. *Smart Structures: Analysis and Design*. Cambridge university press, 2000. **Unit-3:** [Mukesh V. Gandhi](#), [Brian S. Thompson](#). *Smart Materials and Structures*.

Kluwer Academic Publishers, 1992.

Unit-4: Charles P. Poole and Frank J Owens. *Introduction to nanotechnology*. Wiley Interscience, 2003.

Unit-5: [Tapan Chatterji](#). *Colossal Magnetoresistive Manganites*. Kluwer Academic Publishers. 2004.

References for further study:

1. [Mel Schwartz](#). *Encyclopedia of Smart Materials Set. (1200 pages)* John Wiley & Sons 2001.
2. [Zhong Lin Wang](#), [Z. C. Kang](#). *Functional and Smart Materials: Structural Evolution and Structure Analysis* Plenum press. 1998.
3. [Ahsan Hariz](#) , [Vijay K. Varadan](#), [Olaf Reinhold](#). *Smart Materials, Structures, & Integrated Systems*. The International Society for Optical Engineering, 1997.
4. [Alan R. Wilson](#), [Hiroshi Asanuma](#). *Smart Materials*. The International Society for Optical Engineering, 2001.
5. [Janet M. Sater](#), [Manfred Wuttig](#). *Smart Materials Technologies*. The International Society for Optical Engineering; 1998.
6. [Malcolm E. Lines](#), [Alastair M. Glass](#). *Principles and Applications of Ferroelectrics and Related Materials*. Oxford university press; 2001.
7. [Elbio Dagotto](#), [G. Alvarez](#), [S. L. Cooper](#), [A. L. Cornelius](#), [A. Feiguin](#), [J. Fernandez-Baca](#), [D. Gibbs](#), [J. P. Hill](#), [T. Hotta](#). *Nanoscale Phase Separation and Colossal Magnetoresistance*. Springer Verlag. 2003.
8. G Manson; N Parkes; G R Tomlinson; K Worden; W A Bullough; W J Staszewski, (2002) *Smart Technology Demonstrators and Devices* IOP Publishing.
9. Inoue, A., Hashimoto, K. (Eds.) (2001). *Amorphous and Nanocrystalline Materials: Preparation, Properties, and Applications* Springer Verlag.
10. *Sensors and Their Applications XII* (2003). IOP Publishing, U.K.
11. C. M. Friend (Editor). *Smart Materials and Structures*. Chapman and Hall, 1998.

UID 221 - INSTRUMENTAL METHODS OF ANALYSIS
(Offered by Department of Chemistry)

UNIT I

Electromagnetic radiation – different regions, their wavelengths, frequencies and energies. interaction of electromagnetic radiations with matter – atomic, molecular, electronic interaction. Basic principles of spectroscopy – emission and absorption of radiation. Radiation sources, detectors.

UNIT II

Molecular spectra – UV-visible spectroscopy - principle – UV-visible spectrophotometers – instrumentation techniques. IR spectroscopy – principle, single and double beam IR spectrophotometers – instrumentation techniques.

UNIT III

Nuclear magnetic resonance spectroscopy – basic principles and instrumentation techniques. Principles of ion optics – ion sources, single focusing and double focusing mass spectrometers – principles and instrumentation techniques.

UNIT IV

X-ray fluorescence spectrometry - basic principles and instrumentation techniques. Flame emission and atomic absorption spectroscopy - basic principles and instrumentation techniques.

UNIT V

Electrochemical methods – conductometry, potentiometry, pH meter - principles and instrumentation. Principles of gas and liquid chromatography – gas chromatograph and HPLC - instrumentation.

Text book

1. H.H. Willard, L.L. Merit, J.A. Dean and F.A. Settle, Instrumental methods of analysis, 7 th edition, CBS Publishers and Distributers, New Delhi, 1986.

Reference books

1. D.A. Skoog and D.M. West, Principles of Instrumental Analysis, 2 nd edition, Holt-Saunders, 1980.
2. Brain S. Furniss, Antony J. Hannaford, Peter W.G. Smith and Austin R. Tatchel, Vogel's Text book of Practical Organic Chemistry, 5 th edition, ELBS-Longman, 1996.

UID 222 - CERAMIC TECHNOLOGY

(Offered by Department of Chemistry)

Unit I

Nature of ceramic materials-crystalline ceramic materials-silicates and clay minerals and spinal structures-polymorphic transformations-glass and non-crystalline phases-structure and composition of glass-surface and interface-wetting and phase distribution.

Unit II

Ceramic raw materials-clay materials-silicate and silicate minerals-synthetic raw materials-oxide (like Al_2O_3 , ZrO_2 , TiO_2 , MgO) and non-oxide (like Si_3N_4 , AlN , BN , SiC) raw materials. Synthetic techniques-sol-gel processing, liquid-phase reaction and hydrothermal synthesis.

Unit III

Processing of ceramics-powder pressing, extrusion, slip casting, firing-thermal treatment procedure-drying, sintering, annealing-viscosity based transition points in glass-glass forming methods, glass-ceramics.

Unit IV

An outline of ceramic equilibrium diagrams-one component (SiO_2) two component (Al_2O_3 , Cr_2O_3 , MgO-CaO , $\text{MgO-Al}_2\text{O}_3$, Al_2O_3 , SiO_2 , $\text{Al}_2\text{O}_3\text{-BeO}$) and qualitative ideas of methods of representation of three component diagrams-Nucleation-grain growth.

Unit V

Mechanical properties of ceramic materials-elastic properties and strength-Griffith's theory-plastic and viscous deformations-strengthening of glass. Thermal properties-thermal expansion, heat capacity and thermal conductivity-thermal stresses.

Text Books:

14. L.H. Van Vlack, Physical Ceramics for Engineers, Addison Wesley, 1964.
15. F.H. Norton, Elements of Ceramics, Addison Wesley, 1974.

Reference Books:

1. W.D. Kingery, H.K. Bowen, D.R. Uhlmann, Introduction to Ceramics, 2nd edition, John Wiley & Sons, 1991.
2. D. Ganguli and M. Chatterjee, Ceramic powder preparation: A handbook, Kluwer Academic Publishers, 1997.
3. David Segal, Chemical Synthesis of advanced ceramic materials, Cambridge University Press, 1989.
4. W. D. Kingery, Ceramic Fabrication Process, John Wiley 1960.