ACHARYA NAGARJUNA UNIVERSITY
NAGARJUNA NAGAR-522 510

Scheme of Instruction and Examination
and Detailed Syllabi of

4-year B.Tech Degree Course
(Semester System)
in

COMPUTER SCIENCE & ENGINEERING

W.E.F. 2007 – 2008
(from the batch admitted in the year 2007)

ACHARYA NAGARJUNA UNIVERSITY: NAGARJUNA NAGAR

REVISED REGULATIONS FOR

FOUR - YEAR B.TECH. DEGREE COURSE
(SEMESTER SYSTEM)

Effective for the batch of students admitted into first year B.Tech. from the academic year 2007-2008.

1.0. MINIMUM QUALIFICATIONS FOR ADMISSION:

A candidate seeking admission into First Year of B.Tech. Degree Course should have passed either Intermediate examination conducted by the Board of Intermediate Education, Andhra Pradesh with Mathematics, Physics, and Chemistry as optional subjects (or any equivalent examination recognized by the Acharya Nagarjuna University) or Diploma in Engineering in the relevant branch conducted by the State Board of Technical Education & Training of Andhra Pradesh (or equivalent Diploma recognized by Acharya Nagarjuna University).

The selection is based on the rank secured by the candidate at the EAMCET / ECET (FDH) examination conducted by A.P. State Council of Higher Education.

The candidate shall also satisfy any other eligibility requirements stipulated by the University and / or the Government of Andhra Pradesh from time to time.

2.0. BRANCHES OF STUDY:

2.1. The B.Tech. Course is offered in the following branches of study at one or more of the affiliated colleges:

1 Biotechnology
2 Chemical Engineering
3 Civil Engineering
4 Computer Science & Engineering
5 Electrical & Electronics Engineering
6 Electronics & Communication Engineering
7 Electronics & Instrumentation Engineering
8 Information Technology
9 Mechanical Engineering

2.2 The first year of study is common to all branches of Engineering except for Chemical Engineering and Biotechnology.

3.0. DURATION OF THE COURSE AND MEDIUM OF INSTRUCTION:

The duration of the Course is four academic years consisting of two semesters in each academic year where as annual pattern is followed for first year. The medium of instruction and examination is English.

4.0. MINIMUM INSTRUCTION DAYS:

The first year shall consist of a minimum number of 180 instruction days and each semester of 2nd, 3rd and 4th years shall consist of 90 days of instruction excluding the days allotted for tests, examinations and preparation holidays.

5.0 EVALUATION:

5.1. The performance of the students in each year or semester shall be evaluated subject wise.

5.2. The distribution of marks between sessional work (based on internal assessment) and University Examination will be as follows:

Nature of the subject	Sessional Marks	University Exam. Marks
Theory subjects	30	70
Design and / or Drawing	30	70
Practicals	25	50
Project work	50	100 (Viva voce)

5.2.1. In the First Year, there shall be three Mid Term Examinations and three Assignment Tests in theory subjects, conducted at approximate equal intervals in the academic year. Assignment questions shall be given at least one week in advance and the students shall answer the question(s) specified by the concerned teacher just before the commencement of the Assignment Test. A maximum of 18 Sessional marks shall be awarded based on the best two performances out of the three Mid Term Exams and a maximum of 7 marks for the best two Assignment Tests out of the three Assignment Tests conducted.

For Drawing subject (Engineering Graphics), 7 marks shall be awarded based on day-to-day class work and the remaining 18 marks based on the best two performances in the three Mid Term Exams. No separate Assignment Tests will be held for this subject.

The remaining 5 marks out of the 30 marks earmarked for the internal sessional marks are allotted for attendance in the respective theory and drawing subjects in a graded manner as indicated in 7.1 (a) from I year to IV year.

In each of the Semesters of 2^{nd}, 3^{rd} and 4^{th} years, there shall be two Mid Term examinations and two Assignment Tests in every theory subject. The Sessional marks for the midterm examinations shall be awarded giving a weightage of 14 marks out of 18 marks (75% approx) to that midterm examination in which the student scores more marks and the remaining 4 marks (25% approx.) for other midterm examination in which the student scores less marks. Similarly a weightage of 5 marks (75% approx) out of 7 marks earmarked for assignment tests shall be given for the assignment in

which the student scores more marks and remaining 2 marks (25% approx) shall be given for the assignment test in which the student scores less marks.

For Drawing subjects, there shall be only two Mid Term examinations in each semester with no Assignment Tests. In the case of such subjects a maximum of seven marks shall be given for day-to-day class work and the remaining maximum 18 marks shall be awarded to the Mid Term examinations taking into account the performance of both the Mid Term examinations giving weightage of 14 marks for the Mid Term Examination in which the student scores more marks and the remaining 4 marks for the other midterm examination. A weightage of 5 marks will be given in the total sessional marks of 30 for attendance in all theory and drawing subjects as indicated in 7.1(a).

5.2.2. The evaluation for Laboratory class work consists of weightage of 15 marks for day to day laboratory work including record work and 10 marks for internal laboratory examination including Viva-voce examination.

In the case of Project work, the sessional marks shall be awarded based on the weekly progress and based on the performance in a minimum of two Seminars and the Project Report submitted at the end of the semester. The allotment of sessional marks for Seminars and for day-to-day class work shall be 25 and 25.

NOTE : A student who is absent for any Assignment / Mid Term Exam, for any reason whatsoever, shall be deemed to have scored zero marks in that Test / Exam and no make-up test / Exam shall be conducted.

5.2.3. A student who could not secure a minimum of 50% aggregate sessional marks is not eligible to appear for the year-end / semester-end University examination and shall have to repeat that year/ semester.

6.0. LABORATORY / PRACTICAL CLASSES:

In any year/semester, a minimum of 90 percent experiments / exercises specified in the syllabi for laboratory course shall be conducted by the students, who shall complete these in all respects and get the Record certified by the concerned Head of the Department for the student to be eligible to face the University Examination in that Practical subject.

7.0. ATTENDANCE REGULATIONS:

7.1. Regular course of study means a minimum average attendance of 75% in all the subjects computed by totaling the number of hours / periods of lectures, design and / or drawing, practicals and project work as the case may be, held in every subject as the denominator and the total number of hours / periods actually attended by the student in all the subjects, as the numerator.

7.1(a). A Weightage in sessional marks up to a maximum of 5 marks out of 30 marks in each theory subject shall be given for those students who put in a minimum of 75% attendance in the respective theory in a graded manner as indicated below:

Attendance of 75% and above but less than 80%	- 1 mark
Attendance of 80% and above but less than 85%	- 2 marks
Attendance of 85% and above but less than 90%	- 3 marks
Attendance of 90% and above	- 5 marks

7.2. Condonation of shortage in attendance may be recommended on genuine medical grounds, up to a maximum of 10% provided the student puts in at least 65% attendance as calculated in 7.1 above and provided the principal is satisfied with the genuineness of the reasons and the conduct of the student.

7.3. A student who could not satisfy the minimum attendance requirements, as given above, in any year / semester, is not eligible to appear for the year end or semester end examinations and shall have to repeat that year/semester.

8.0 DETENTION:

A student, who fails to satisfy either the minimum attendance requirements as stipulated in *Clause-7*, or the requirement of minimum aggregate sessional marks as stipulated in *Clause 5,* shall be detained. Such a student shall have to repeat the same year / semester as the case may be subsequently and satisfy the above requirements afresh to become eligible to appear for the year-end / semester-end University examination.

9.0. UNIVERSITY EXAMINATION:

9.1. For each theory, design and/or drawing subject, there shall be a comprehensive University Examination of three hours duration at the end of First year / each Semester of 2nd, 3rd and 4th years, except where stated otherwise in the detailed Scheme of Instruction.

Question paper setting shall be entrusted to external examiners from the panels approved by the respective Boards of Studies.

9.2. For each Practical subject, the University examination shall be conducted by one internal and one external examiner appointed by the Principal of the concerned college and the University respectively, the duration being that approved in the detailed Schemes of Instruction & Examination.

9.3.1 Viva-voce Examination in Project Work shall be conducted by one internal examiner and one external examiner to be appointed by the University.

10.0 CONDITIONS FOR PASS:

A candidate shall be declared to have passed the University Examination in individual subjects if he / she secures a minimum of 40% marks in theory and drawing subjects, and 50% marks in Practical subjects (including Project Viva-voce).

11.0 CONDITIONS FOR PROMOTION

11.1. A student shall be eligible for promotion to II B.Tech. Course if he / she satisfies the minimum requirements of attendance and sessional marks as stipulated in Clauses 5 and 7, irrespective of the number of backlog subjects in I B.Tech.

11.2. A student shall be eligible for promotion to III B.Tech. Course if he / she has passed all but three subjects of I B.Tech., (including practical subject) in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in II B.Tech.

11.3. A student shall be eligible for promotion to IV B.Tech. Course if he/she has passed all but three subjects of II B.Tech. and all but one subject of I B.Tech. in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in III B.Tech.

12.0 ELIGIBILITY FOR AWARD OF B.TECH. DEGREE

The B.Tech. Degree shall be conferred on a candidate who has satisfied the following requirements.

12.1. The candidate must have, after admission to B.Tech. Degree Course of the University pursued the course of study for not less than four academic years in any one of the affiliated Engineering Colleges.

12.2. The candidate must have satisfied the conditions for pass in all the subjects of all the years as stipulated in *clause 10.*

12.3. Maximum Time Limit for completion of B.Tech Degree

A Maximum time limit of 8 (eight) years for Four Year B.Tech is prescribed for a candidate to complete B.Tech Degree beyond which the candidate shall not be permitted to appear for the B.Tech Degree examinations.

13.0 AWARD OF CLASS

A candidate who becomes eligible for the award of B.Tech. Degree as stipulated in *Clause 12* shall be placed in one of the following Classes.

First Class with Distinction	:	70% aggregate* or more.
First Class	:	60% aggregate or more but less than 70%.
Second Class	:	50% aggregate or more but less than 60%

Pass Class : All other candidates eligible for the award of the Degree.

"Aggregate," for this purpose, shall mean aggregate of the marks obtained in the University Examinations and Sessional marks put together in all the four years.

14.0. IMPROVEMENT OF CLASS

14.1. A candidate, after becoming eligible for the award of the Degree, may reappear for the University Examination in any of the theory subjects as and when conducted, for the purpose of improving the aggregate and the class. But this reappearance shall be within a period of two academic years after becoming eligible for the award of the Degree.

However, this facility shall not be availed of by a candidate who has taken the Original Degree Certificate. Candidates shall not be permitted to reappear either for Sessional Examination or for University Examinations in Practical subjects (including Project Viva-voce) for the purpose of improvement.

14.2. The Sessional marks and the University Examination marks shall be shown separately on the Marks Sheet.

14.3. A single Marks Statement shall be issued to the candidate after incorporating the marks secured in subsequent improvements.

14.4. A consolidated Marks Statement shall be issued to the candidate indicating the aggregate percentage of marks of all the four years along with the Provisional Certificate.

15.0. AWARD OF RANK

The rank shall be awarded based on the following:

15.1. Ranks shall be awarded in each branch of study for the top ten percent of the students appearing for the Regular University Examinations or the top ten students whichever is lower.

15.2. Only such candidates who pass the Final year examination at the end of the fourth academic year after admission as regular final year students along with the others in their batch and become eligible for the award of the Degree shall be eligible for the award of rank. The University Rank will be awarded only to those candidates who complete their degree within four academic years.

15.3. For the purpose of awarding rank in each branch, the aggregate of marks - University Examination and Sessional marks put together - in all the four years, secured at the first attempt only shall be considered.

15.3. Award of prizes, scholarships, or any other Honors shall be based on the rank secured by a candidate, consistent with the desire of the Donor, wherever applicable.

16.0. SUPPLEMENTARY EXAMINATIONS

In addition to the Regular University Examinations held at the end of each academic year / each semester, Supplementary University Examinations will be conducted during the academic year. Such of the candidates taking the Regular / Supplementary University examinations as Supplementary candidates may have to take more than one University Examination per day.

17.0. TRANSITORY REGULATIONS

17.1. Candidates who studied the four-year B.Tech. Degree Course under New Regulations (NR) / Revised Regulations (RR) but who got detained in any year for want of attendance / minimum aggregate sessional marks may join the appropriate year / semester in the Semester system applicable for the batch and be governed by the Regulations of that batch from then on.

17.2. University Examinations according to NR / RR shall be conducted in subjects of each year five times after the conduct of the last set of regular examinations under those Regulations.

17.3. Candidates who have gone through the entire course of four academic years and have satisfied the attendance and minimum aggregate sessional marks in each year under NR / RR, but who are yet to pass some subjects even after the five chances stated in *Clause 17.2*, shall appear for the equivalent subjects in the Semester system, specified by the University / Board of Studies concerned.

18.0. AMENDMENTS TO REGULATIONS

The University may, from time to time, revise, amend, or change the Regulations, Schemes of Examinations, and / or Syllabi.

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ACHARYA NAGARJUNA UNIVERSITY : NAGARJUNA NAGAR

SCHEME OF EXAMINATION AND INSTRUCTION FOR 1/4 B.TECH.
w.e.f 2007-2008 (Semester System)

I/IV B.TECH (ALL BRANCHES) - ANNUAL PATTERN (For I B.Tech. only)
(except Chemical Engg. and Biotechnology)

Code No	Subject	Periods per week		Maximum Marks		Total Marks
		L/T	D/P	Sessional	University	
BT/CE/Ch.E/CSE/ECE /EEE/EI/IT/ME - 101	Mathematics – I	3	-	30	70	100
BT/CE/Ch.E/CSE/ECE /EEE/EI/IT/ME - 102	Mathematics – II	3	-	30	70	100
BT/CE/Ch.E/CSE/ECE /EEE/EI/IT/ME - 103	Physics	3	-	30	70	100
CE/CSE/ECE/EEE/ EI/IT/ME - 104	Chemistry	3	-	30	70	100
BT/CE/Ch.E/CSE/ECE /EEE/EI/IT/ME - 105	Technical English Communication Skills	3	-	30	70	100
BT/CE/Ch.E/CSE/ECE /EEE/EI/IT/ME - 106	Computer Programming with C	3	-	30	70	100
CE/CSE/ECE/EEE/ EI/IT/ME - 107	Engineering Mechanics	3+1	-	30	70	100
BT/CE/Ch.E/CSE/ECE /EEE/EI/IT/ME - 108	Engineering Graphics**	2+4	-	30	70	100
BT/CE/Ch.E/CSE/ECE /EEE/EI/IT/ME - 151	Physics Lab	-	3	25	50	75
BT/CE/Ch.E/CSE/ECE /EEE/EI/IT/ME - 152	Chemistry Lab*	-	3	25	50	75
BT/CE/Ch.E/CSE/ECE /EEE/EI/IT/ME - 153	Workshop Practice*	-	3	25	50	75
BT/CE/Ch.E/CSE/ECE /EEE/EI/IT/ME - 154	Computer Programming with C Lab	-	3	25	50	75
	TOTAL	**23+5**	**9**	**340**	**760**	**1100**

* Common slot

** Two different question papers will be set for the University Examination. One question paper for CE, ME, EEE, Ch.E and BT branches and the University Examination will be conducted from 9.00 A.M. to 12.00 Noon. The second question paper will be set for ECE, EI, CSE & IT branches and the University exam will be conducted from 2 P.M. to 5 PM.

ACHARYA NAGARJUNA UNIVERSITY : NAGARJUNA NAGAR

SCHEME FOR COMPUTER SCIENCE & ENGINEERING
w.e.f 2007-2008 (Semester System)

II / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)
(SEMESTER – I)

Code No.	Subject	Periods per week		Maximum Marks		Total Marks
		L/T	D/P	Sessional	University	
CS/IT 211	Mathematics – III	4	-	30	70	100
CS/IT 212	Circuit Theory	4+1	-	30	70	100
CS/IT 213	Digital Logic Design	4	-	30	70	100
CS/IT 214	Object Oriented Programming	4	-	30	70	100
CS/IT 215	Discrete Mathematical Structures	4+1	-	30	70	100
CS/IT 216	Data Structures	4+1	-	30	70	100
CS/IT 251	OOPS Lab	-	3	25	50	75
CS/IT 252	Data Structures Lab (C)	-	3	25	50	75
CS/IT 253	Communication Skills Lab	-	3	25	50	75
	TOTAL	24+3	9	255	570	825

ACHARYA NAGARJUNA UNIVERSITY : NAGARJUNA NAGAR

SCHEME FOR COMPUTER SCIENCE & ENGINEERING
w.e.f 2007-2008 (Semester System)

II / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)
(SEMESTER – II)

Code No.	Subject	Periods per week		Maximum Marks		Total Marks
		L/T	D/P	Sessional	University	
CS/IT 221	Probability & Statistics	4+1	-	30	70	100
CS/IT 222	Environmental Studies	4	-	30	70	100
CS/IT 223	Electronic Devices & Circuits	4	-	30	70	100
CS/IT 224	Computer Organization	4+1	-	30	70	100
CS/IT 225	Microprocessors & Microcontrollers	4+1	-	30	70	100
CS/IT 226	Operating Systems	4	-	30	70	100
CS/IT 261	EDC Lab	-	3	25	50	75
CS/IT 262	Microprocessors & Microcontrollers Lab	-	3	25	50	75
CS/IT 263	Soft Skills Lab	-	3	25	50	75
	TOTAL	24+3	9	255	570	825

ACHARYA NAGARJUNA UNIVERSITY : NAGARJUNA NAGAR

SCHEME FOR COMPUTER SCIENCE & ENGINEERING
w.e.f 2007-2008 (Semester System)

III / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)
(SEMESTER – I)

Code No.	Subject	Periods per week		Maximum Marks		Total Marks
		L/T	D/P	Sessional	University	
CS/IT 311	Professional Ethics & Human Values	4	-	30	70	100
CS/IT 312	Data Communications	4	-	30	70	100
CS/IT 313	Automata Theory & Formal Languages	4	-	30	70	100
CS/IT 314	Java Programming	4+1	-	30	70	100
CS/IT 315	Database Management Systems	4+1	-	30	70	100
CS 316	Advanced Unix Programming	4+1	-	30	70	100
CS/IT 351	Java Programming Lab	-	3	25	50	75
CS/IT 352	RDBMS Lab	-	3	25	50	75
CS 353	Advanced UNIX Lab	-	3	25	50	75
	TOTAL	24+3	9	255	570	825

ACHARYA NAGARJUNA UNIVERSITY : NAGARJUNA NAGAR

SCHEME FOR COMPUTER SCIENCE & ENGINEERING
w.e.f 2007-2008 (Semester System)

III / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)
(SEMESTER – II)

Code No.	Subject	Periods per week		Maximum Marks		Total Marks
		L/T	D/P	Sessional	University	
CS/IT 321	Computer Networks	4	-	30	70	100
CS/IT 322	Compiler Design	4	-	30	70	100
CS/IT 323	Web Technologies	4+1	-	30	70	100
CS/IT 324	Software Engineering	4+1	-	30	70	100
CS 325	Design & Analysis of Algorithms	4+1	-	30	70	100
CS 326	Elective-I	4	-	30	70	100
CS 361	Term Paper	-	3	50	--	50
CS/IT 362	Web Technologies Lab	-	3	25	50	75
CS 363	Algorithms Lab	-	3	25	50	75
	TOTAL	24+3	9	280	520	800

ELECTIVE-I:

CS 326(A) – Artificial Intelligence
CS 326(B) – Advanced DBMS
CS 326(C) – Operations Research
CS 326(D) – Real-time Systems
CS 326(E) – Neural Networks
CS 326(F) – Principles of Programming Languages

ACHARYA NAGARJUNA UNIVERSITY : NAGARJUNA NAGAR

SCHEME FOR COMPUTER SCIENCE & ENGINEERING
w.e.f 2007-2008 (Semester System)

IV / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)
(SEMESTER – I)

Code No.	Subject	Periods per week		Maximum Marks		Total Marks
		L/T	D/P	Sessional	University	
CS 411	Wireless Networks	4	-	30	70	100
CS 412	Distributed Systems	4	-	30	70	100
CS/IT 413	Object Oriented Analysis & Design	4+1	-	30	70	100
CS/IT 414	Enterprise Programming	4+1	-	30	70	100
CS 415	Elective – II*	4+1	-	30	70	100
CS 416	Elective – III	4	-	30	70	100
CS/IT 451	SE Lab/Mini Project	-	3	25	50	75
CS/IT 452	Enterprise Programming Lab	-	3	25	50	75
CS 453	Elective-II Lab*	-	3	25	50	75
	TOTAL	24+3	9	255	570	825

One Elective is to be offered from each of these Pools.

Elective – II (* For the elective offered, the associated Lab is compulsory under CS 453)

CS 415 (A) Open Source Systems
CS 415 (B) Interactive CG
CS 415 (C) .NET Technologies
CS 415 (D) Digital Signal Processing
CS 415 (E) Multimedia Systems
CS 415 (F) Software Testing Methodologies

Elective – III

CS 416 (A) Total Quality Management
CS 416 (B) E-Commerce & ERP
CS 416 (C) Embedded Systems
CS 416 (D) Bio-informatics
CS 416 (E) VLSI Design
CS 416 (F) Quantum Computing

ACHARYA NAGARJUNA UNIVERSITY : NAGARJUNA NAGAR

SCHEME FOR COMPUTER SCIENCE & ENGINEERING
w.e.f 2007-2008 (Semester System)

IV / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)
(SEMESTER – II)

Code No.	Subject	Periods per week		Maximum Marks		Total Marks
		L/T	D/P	Sessional	University	
CS 421	Cryptography & Network Security	4+1	-	30	70	100
CS 422	Advanced Computer Architecture	4+1	-	30	70	100
CS/IT 423	Data Engineering	4+1	-	30	70	100
CS/IT 424	Industrial Engineering & Management	4	-	30	70	100
CS 425	Elective – IV	4	-	30	70	100
CS/IT 461	Data Engineering Lab	-	3	25	50	75
CS 462	Project Work	-	9	50	100	150
	TOTAL	20+3	12	225	500	725

One Elective is to be offered from this Pool.

Elective IV

CS 425 (A) Digital & Image Processing
CS 425 (B) Advanced Software Engineering
CS 425 (C) Grid Computing
CS 425 (D) Pervasive Computing
CS 425 (E) Natural Language Processing
CS 425 (F) Mobile Adhoc Networks

BT/CE/Ch.E/CSE/ECE/EEE/EI/IT/ME - 101: MATHEMATICS - I

(Common to all Branches)

Lectures	:	3 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Unit-I

Ordinary differential equations-Introduction, Linear and Bernoulli's equations, Exact equations, equations reducible to exact equations, Orthogonal trajectories, Linear Differential equations: Definition, Theorem, Operator D, Rules for finding the complementary function, Inverse operator, Rules for finding the particular integral, Working procedure to solve the equation, Newton's law of cooling, Heat flow, Rate of Decay of Radio-Active Materials.

Unit-II

Linear dependence of solutions, Method of variation of parameters, Equations reducible to linear equations, Cauchy's homogeneous linear equation, Legendre's linear equation Simultaneous linear equations with constant coefficients, Statistics: Method of least squares, Correlation, co-efficient of correlation (direct method only), lines of regression.

Unit-III

Laplace Transforms : Introduction, Transforms of elementary functions, Properties of Laplace Transforms, existence conditions, Transforms of derivatives, Integrals, multiplication by t^n, division by t, Evaluation of integrals by Laplace Transforms, Inverse transforms, convolution theorem, Application to Differential equations with constant coefficients, transforms of unit step function, unit impulse function, periodic function. Convolution Theorem, Application to ordinary differential equations

Unit-IV

Introduction and Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Even and Odd functions, Half range series Typical wave forms and Parseval's formulae, Complex form of the Fourier series Practical harmonic analysis

Text Books: 1). Higher Engineering Mathematics by B.S. Grewal, Khanna publishers, 39th edition.

Reference Books: 1]. Advanced Engineering Mathematics by kreyszig.

2]. A textbook of Engineering Mathematics by N.P. Bali

BT/CE/Ch.E/CSE/ECE/EEE/EI/IT/ME - 102: MATHEMATICS - II
(Common to all Branches)

Lectures	:	3 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Unit-I

Matrices:

Rank of a matrix, vectors, Elementary transformations, Solution of linear system of equations, Consistency of linear system of equations, System of linear homogeneous equations, Linear transformations, Characteristic equations, Properties of eigen values, Cayley- Hamilton theorem (without proof), Reduction to diagonal form reduction of Quadratic forms to canonical form, Nature of a quadratic form, Complex matrices.

Unit-II

Differential Calculus:

Rolle's Theorem(without proof), Lagrange's Mean value theorem (without proof), Taylor's theorem (without proof), Maclaurin's series, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

Unit-III

Multiple Integrals and Vector Calculus:

Double integrals, Change of order of integration , Double integrals in polar coordinates, Area enclosed by plane curves, Evaluation of triple integrals, Volume of solids, Change of variables.
Vector Calculus:
Scalar and vector point functions, Del applied to scalar point functions. Gradient

Unit-IV

Vector Calculus:

Del applied to vector point functions, Physical interpretation of divergence, Del applied twice to point functions, Del applied to products of point functions, Integration of vectors, Line integral, Surfaces, Green's theorem in the plane (without proof), Stoke' s theorem (without proof) , Volume integral, Gauss divergence Theorem (without proof), Cylindrical Coordinates, Spherical polar coordinates.

Text Books: [1] Higher Engineering Mathematics by B.S.Grewal Khanna publishers,39th edition.

Reference Books: 1] A textbook of Engineering Mathematics by N.P. Bali
2] Advanced Engineering Mathematics by Erwin Keyszing John willy and sons.
3] Differential Calculus by Shanti Nayaran

BT/CE/Ch.E/CSE/ECE/EEE/EI/IT/ME - 103: *PHYSICS*

(Common to all Branches)

Lectures	:	3 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – 1 Ultrasonics & Optics : **(**20 Periods)

Ultrasonics- Production of Ultrasonics by Magnetostriction & Piezoelectric oscillator methods, Detection of Ultrasonics by Kundt's tube and acoustic grating method, applications of Ultrasonics in engineering & medicine. Lissajous' figures for time periods with Ratios 1:1 and 1:2, applications of Lissajous' figures.

Optics: Superposition principle, Stokes principle (Phase change on reflection) - Interference in thin films due to reflected light(cosine law) -Michelson's interferometer principle, construction, working and applications (Determination of wave length of monochromatic source & for resolution of two closely lying wavelengths).

Diffraction: Fraunhoffer diffraction due to a single slit, Plane diffraction grating, resolving power of a grating using Rayleigh's criterion. *Polarization*: double refraction, Nicol prism, quarter wave plate, Production and detection of circular and elliptical polarizations (qualitative), Optical activity, Electro-optic and Magneto-optic effects (Kerr & Faraday effects) .

UNIT –II Electicity & Electromagnetism: **(**20 Periods)

Gauss's law in electricity (statement and proof) and its applications: Coulomb's law from Gauss law, line of charge, non-conducting infinite sheet, Charged non-conducting sphere.

Circulating charges and Cyclotron principle& working, Hall effect, Biot-Savart's law- B for a long wire and circular loop, Faraday's law of induction- Lenz's law- induced electric fields ,Gauss' law for magnetism ,Inductance, Energy storage in a magnetic field, Electromagnetic oscillations(quantitative),Displacement current, Maxwell's equations (Qualitative treatment),Electromagnetic waves equation and velocity, A.C. Circuit containing series LCR circuit (Resonance condition).

UNIT –III Modern Physics **(**18 Periods)

Planck's theory of black body radiation, Dual nature of light, Compton effect, Matter waves - de Broglie's concept of matter waves - Davisson and Germer experiment - Heisenberg's uncertainty principle and applications(non existence of electron in nucleus, finite width of spectral lines). One dimensional time independent Schrodinger's wave equation - Physical significance of wave function - Particle in a box(one dimension)- Radio Isotopes-applications in medicine and industry, Qualitative treatment (without derivation) of Fermi -Dirac distribution function and Fermi-energy level concept in semiconductors.

UNIT – IV Advanced Physics **(**17Periods)

Lasers: -Spontaneous emission -stimulated emission – Population inversion – Solid State (Ruby) laser – Gas (He-Ne) laser – Semiconductor(Ga-As) laser – Applications of lasers. Holography Principle, Recording , reproduction and applications.

Optical fibers : Structure of optical fiber, types of optical fibers, Numerical aperture – fiber optics in communication and its advantages

Super conductivity: First experiment, critical parameters(T_C,H_C,I_C) Meissner effect, types of superconductors, Applications of Superconductors.

Optoelectronic devices: Qualitative treatments of -- Photo diode, LED , LCD and Solar cell and its applications.

Nano Technology (Basic concepts only) and its applications.

Text Books

1. Physics Part I and II – Halliday and Resinick.
2. Engineering physics – Gaur & Gupta

Reference Books

1 Physics for engineers – M.R.Srinivasan.
2 Engineering physics – M.Arumugam.
3 Modern Engineering Physics - A.S Vasudeva

CE/CSE/ECE/EEE/EI/IT/ME – 104 : CHEMISTRY
(Common to all branches except Chemical Engineering and Bio-Tech)

Lectures	:	3 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I (19 Periods)

WATER TECHNOLOGY: Drinking Water quality parameter, WHO guidelines, Hardness units and determination by EDTA method, water treatment for drinking purpose, sedimentation, coagulation, filtration, various methods of chlorination, breakpoint chlorination.

Water treatment for industrial purpose: Boiler troubles, scales, sludges, caustic embrittlement and boiler corrosion- causes and prevention, Lime Soda process, softening by ion exchange process (related problems), Desalination of brackish water by electro dialysis and reverse osmosis.

COMPOSITES: Classification and Properties of composite materials, Mechanism of reinforcement in composites.

UNIT-II (18 Periods)

POLYMERS:
Monomer functionality, degree of polymerization, classification of polymerization- addition, condensation and co polymerization, mechanism of free radical polymerization.

Classification of plastics- Thermoplastic and thermosetting resins, chemistry of synthesis of Bakelite, urea formaldehyde and polyesters. Compounding of plastics. Conducting polymers, polytiophene, mechanism of conduction, examples and applications, polymers as optical fibers- Application of polymers in biomedical devices and electronics.

Natural Rubber- drawbacks of natural rubber- vulcanization.

Synthetic rubbers- Buna-S and Buna-N and polyurethane rubber

Materials used in information Technology: Liquid crystals, cellulose acetate, ZnO, CdS, Silicon, Germanium

UNIT-III (19 Periods)

Phase Rule: Statement and explanation of the terms involved, one component water system, condensed phase rule- construction of phase diagram by thermal analysis, simple eutectic system (Pb-Ag system only).

Electrochemical Energy Systems: Types of electrochemical energy systems, electrochemistry of primary batteries (Weston Cadmium Standard cell), Secondary cells(Lead Acid cell, Ni-Cd cell), Lithium batteries and their advantages.

Fuels: Classification of fuels, calorific value- determination. Coal- Ranking and analysis, carbonization of coal, coal-tar products, metallurgical coke, classification of petroleum- fractional distillations, cracking, reforming, composition and uses of petrol- diesel, coal gas, natural gas, producer gas, LPG- Bio gas.

UNIT-IV (19 Periods)

Corrosion and its control: Introduction, electrochemical theory of corrosion, corrosion due to dissimilar metals, galvanic series, corrosion due to differential aeration cells, Types of corrosion: Pitting, Stress corrosion, cracking and microbiological corrosion, Factors affecting corrosion: oxidizers, pH, over voltage and temperature.
Protection methods: Cathodic protection, (Impressed current and sacrificial anode) anodic protection, corrosion inhibitors- types and mechanism of inhibition, metallic coatings by electroplating.

Lubricants:

Role of lubricants in reducing wear and friction, Mechanism and types of lubrication. Classification, properties and selection of lubricants, Additives

Text Books recommended:

1. Engineering Chemistry, P.C. Jain, Dhanpat Rai and Sons, New Delhi
2. A Text Book of Engineering Chemistry, S.S. Dara, 10th Edition, S.Chand and Co.
3. Essentials of Physical Chemistry, B.S.Bahl and G.D. Tuli
4. Principles of Polymer Science, P.Bahadur and N.V. Sastry, Narora Publishing House

BT/CE/Ch.E/CSE/ECE/EEE/EI/IT/ME: - 105
TECHNICAL ENGLISH COMMUNICATION SKILLS

Lectures	:	3 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Course objectives: The areas of technical communication assay to make learners linguistically aware and communicatively competent. Special attention has been paid to the contemporary tests on language and industrial needs keeping in mind the current societal demands.

UNIT-I

General Communication Skills: This area exposes the learners to some standard varieties of linguistic communication.

1. Guided composition
    a) Paragraph writing
    b) Essay writing
    c) Confusable words
2. Reading comprehension
3. Letter writing

UNIT-II

Technical Communication Skills: This area falls under English for specific purposes (ESP) which trains the learners in basic technical communication.

1. Report writing
2. Corporate information
3. Technical words

UNIT-III

Vocabulary and Basic Language Skills: This unit offers the learners some basic aspects of language like vocabulary, structure and usage which are common to many contemporary tests.

1. Basic word list – A list of 500 words.
2. Idioms and phrases and their use.
3. Correction of sentences.
4. Analogies
5. One word substitutes
6. Antonyms & Synonyms

Textbooks:

1. Developing Language Skills: 1. (Foundation Books)
2. Objective English for Competitive Examinations (Third edition)
    - Hari Mohan Prasad
    Uma Rani Sinha
    (Tata McGraw Hill)

REFERENCE BOOKS

01. Effective Technical Communication
- M.Ashraf Rizvi (Tata McGraw Hill)
02. English for Engineers
Prepared by Regional Institute of English,
South India, Bangalore (Foundation Books)
03. Cambridge Preparation Guide for TOEFL.
04. Dictionary of Technical Terms
F.S.Cripsin (Oxford IBH)
05. Cambridge Advanced Learner's Dictionary
06. Cambridge Idioms Dictionary
07. Basic Correspondence & Report writing
-Sharma (Tata McGraw Hill)
08. Business Correspondence and Report Writing
- R.C.Sharma
Krishna Mohan
(Tata McGraw Hill)
09. Dictionary of Misspelled and Easily Confused Words
-David Downing
Deborah K.Williams
(Tata McGraw Hill)

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BT/CE/Ch.E/CSE/ECE/EEE/EI/IT/ME : - 106

COMPUTER PROGRAMMING WITH C

(Common to all Branches)

Lectures	:	3 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Unit – I (18 Periods)

Introduction:

ComputerFundamentals:Computer&it'sComponents,Hardware/Software,Algorithm,Characterstics of algorithm, Flowchart ,Symbols are used in flowchart, history of C,Basic structure of C ,C language features.

C Tokens: Character set, Variables, Keywords, Data types and sizes, Type qualifiers, Numeric Constants and their forms of representation, Character Constants, String Constants, Declarations and Initialization of variables.

Operators & Expressions: Arithmetic operators, and expressions, Type-conversion rules, Coercion, Assignment operators and expressions, Increment and decrement operator, Conditional operator, Statements, Preprocessor directives, Input/ Output functions and other library functions. Relational operators and expressions. Boolean operators and expressions.

Programming Exercises for Unit I :

C-Expressions for algebraic expressions, Evaluation of arithmetic and boolean expressions. Syntactic errors in a given program, Output of a given program, Values of variables at the end of execution of a program fragment, Filling the blanks in a given program, Computation of values using scientific and Engineering formulae, Finding the largest of three given numbers.

Unit – II (20 Periods)

Conditional Statements: Blocks, If-Else statement, Else-lf statement and Switch statement.

Iterative Statements: While loop, For loop, Do-While loop, Break, and continue.

Arrays: One - dimensional and character arrays, Two-dimensional numeric arrays.

Programming Exercises for Unit - II:

Computation of discount on different types of products with different ranges of discount Finding the type of triangle formed by the given sides, Computation of income-tax, Computation of Electricity bill, Conversion of lower case character to its upper case, Finding the class of an input character; Sum of the digits of a given number, Image of a given number, To find whether a given number is-prime; Fibonacci; abundant; perfect,Strong,Amstrong; deficient, Prime factors of a given number, Merging of lists, Transpose of a matrix, Product and sum of matrices, String processing-length of a string; comparison of strings; reversing a string; copying a string, Sorting of names using arrays, Graphics patterns, To print prime numbers and Fibonacci numbers in a given range, and Amicable numbers.

Unit – III (19 Periods)

Functions: Function Definition, types of User Defined Functions, Parameter passing mechanisms, and simple recursion.

Scope & extent: Scope rules, Storage Classes, Multi-file compilation.

Pointers: Pointers Arithmetic, Character array of pointers, Dynamic memory allocation, array of Pointer, Pointer to arrays.

Programming Exercises for Unit - III:

Recursive Functions: factorial, GCD(Greatest Common Divisior),Fibonacci; To evaluate the pointer arithmetic expressions; An interactive program to perform Pointers & Functions - Insertion sort, Bubble sort, Linear search Binary search, Computation of Statistical parameters of a given list of numbers, Counting the number of characters, words and lines in a given text, Table of values of f (x,y) varying x and y; Using Storage Classes to implement the multifile compilation; implement the string operations using Dynamic memory allocation functions;

Unit – IV (18 Periods)

Structures: Structures, Array of structures, structures within structures, Pointer to structures, self referential structures, Unions.

Files: File Handling functions, File error handling functions, Command-line arguments.

Programming Exercises for Unit - IV:

Operations on complex numbers, operations on rational number (p/q form), Matrix operations with size of the matrix as a structure; Frequency count of keywords in an input program, Sorting a list of birth records on name and date of birth using File handling functions, Student marks processing, Library records processing - sorting on name, author, Copy one file to another.

Text Book:

1. Programming with C (Schaum's Outlines) by Byron Gottfried, Tata Mcgraw-Hill.

Reference Books:

1. The C programming language by Kernighan B W and Ritchie O M,Prentice Hall.
2. Programming with C by K R Venugopal & Sudeep R Prasad, TMH.
3. 'C' Programming by K.Balaguruswamy, BPB
4. C Complete Reference, Herbert Sheildt, TMH

CE/CSE/ECE/EEE/EI/IT/ME – 107 ENGINEERING MECHANICS

(Common to all branches except Chemical Engg. & Biotechnology branches)

Lectures	:	3 periods/week, 1 Tutorial	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I

CONCURRENT FORCES IN A PLANE:

Principles of statics – composition and resolution of forces – equilibrium of concurrent forces in a plane – method of projections – Method of moments.

PARALLEL FORCES IN A PLANE:

Couple – general case of parallel forces in a plane – center of parallel forces and centre of gravity – Centroids of composite plane figures and curves.

UNIT – II

GENERAL CASE OF FORCES IN A PLANE:

Composition of forces in a plane – Equilibrium of forces in a plane – Plane trusses: methods of joints.

FRICTION: Static, kinetic, and limiting friction – angle of friction: Applications of static friction.

PRINCIPLE OF VIRTUAL WORK: Equilibrium of Ideal systems

UNIT – III

RECTILINEAR TRANSLATION:

Kinematics of rectilinear motion – principles of dynamics – differential equation of rectilinear motion – motion of a particle acted upon by a constant force – D'Alemberts principle – momentum and impulse – work and energy – ideal systems: conservation of energy – direct central impact

MOMENTS OF INERTIA OF PLANE FIGURES:

Moment of inertia of a plane figure with respect to an axis in its plane – Moment of Inertia with respect to an axis perpendicular to the plane of the figure – Parallel axis theorem.

UNIT – IV

CURVILINEAR TRANSLATION:

Kinematics of curvilinear motion – Differential equations of curvilinear motion – D'Alembert's principle in curvilinear motion – Work and Energy.

MOMENTS OF INERTIA OF MATERIAL BODIES:

Moment of inertia of a rigid body – Moment of inertia of a lamina – Moments of inertia of three – dimensional bodies.

ROTATION OF A RIGID BODY ABOUT A FIXED AXIS:

Kinematics of rotation – Equation of motion for a rigid body rotating about a fixed axis

TEXT BOOKS:

1. Engineering mechanics by S. Timoshenko and D. H. Young – Mc Graw-Hill International edition (For concepts and symbolic problems)
2. Engineering mechanics statics and dynamics by A. K. Tayal – Umesh publication, Delhi (For numerical problems using S.I. system of units)

REFERENCE BOOKS:

1. Vector mechanics for engineers statics and dynamics by Beer and Johnston, Tata Mc Graw-Hill publishing company, New Delhi
2. Engineering mechanics statics and dynamics by J. L. Meriam and L. Kraige

BT/CE/Ch.E/CSE/ECE/EEE/EI/IT/ME -108

ENGINEERING GRAPHICS

(Common to all branches)

Lectures	:	2+4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

NOTE : 1) Unit VI shall not be included in the university theory examination. This unit is only for internal assessment.

2) University Examination Question paper consists of FIVE questions, TWO questions from each unit with internal choice. (To be taught & examined in First angle projection)

UNIT I

GENERAL: Use of Drawing instruments, Lettering .-Single stroke letters, Dimensioning-Representation of various type lines. Geometrical Constructions. Representative fraction. (3+9)

CURVES : Curves used in Engineering practice - conic sections - general construction methods for ellipse, parabola and hyperbola. cycloidal curves - cycloid, epicycloid and hypocycloid; involute of circle and Archemedian spiral. (9+15)

UNIT II

METHOD OF PROJECTIONS: Principles of projection - First angle and third angle projection of points. Projection of straight lines. Traces of lines. (6+12)

PROJECTIONS OF PLANES : Projections of planes, projections on auxiliary planes. (4+8)

UNIT III

PROJECTIONS OF SOLIDS : Projections of Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions. (4+8)

SECTIONS OF SOLIDS: Sections of Cubes, Prisms, Pyramids, cylinders and Cones, true shapes of sections. (Limited to the Section Planes perpendicular to one of the Principal Planes). (6+12)

UNIT IV

DEVELOPMENT OF SURFACES: Lateral development of cut sections of Cubes, Prisms, Pyramids, Cylinders and Cones. (4+8)

ISOMETRIC PROJECTIONS: Isometric Projection and conversion of Orthographic Projections into isometric views. (Treatment is limited to simple objects only). (4+8)

UNIT V

ORTHOGRAPHIC PROJECTIONS: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings). (6+12)

UNIT VI (Demonstration only)

COMPUTER AIDED DRAFTING(Using any standard package): Setting up a drawing: starting, main menu (New, Open, Save, Save As etc.), Opening screen, error correction on screen, units, co-ordinate system, limits, grid, snap, ortho.

Tool bars: Draw tool bar, object snap tool bar, modify tool bar, dimension tool Bar

PRACTICE OF 2D DRAWINGS: Exercises of Orthographic views for simple solids using all commands in various tool bars. (4+8)

TEXT BOOK:

1. Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand).
2. AutoCAD 14 for Engineering Drawing Made Easy(Features AutoCAD 200) by P.Nageswara Rao

REFERENCE BOOK:

1. Engineering Drawing by Prof.K.L.Narayana & Prof. R.K.Kannaiah.
2. Engineering Graphics with AutoCAD 2002 by James D. Bethune

BT/CE/Ch.E/CSE/ECE/EEE/EI/IT/ME - 151 : PHYSICS LAB
(Common to all Branches)

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. **Compound Pendulum** - Measurement of g-value.
2. **Sonometer** - Determination of unknown frequency of tuning fork and verification of laws of transverse vibrations of a stretched string
3. **C.R.O** - Measurement of voltage, frequency and phase difference of an A.C. signal.
4. **Torsional Pendulum** - Determination of Rigidity modulus/damping coefficient.
5. **Newton's Rings** - Measurement of wavelength/Radius of curvature.
6. **Dispersive Power** - Determination of Dispersive power of prism.
7. **Diffraction Grating -** Determination of wavelength.
8. **Air Wedge** - Measurement of thickness of given wire.
9. **Field along the axis of a current carrying circular coil.** - Variation of intensity of magnetic field along the axis of circular coil.
10. **L.C.R** - Resonance Characteristics.
11. **Sensitive Galvanometer** - Figure of Merit.
12. **Hall Effect** - Measurement of Hall potential and Carrier concentration
13. **Carey Foster's bridge** - Measurement of temperature coefficient of resistance.
14. **Platinum resistance thermometer** - Measurement of room temperature.
15. **GM Counter** - Characteristics.
16. **Photo Tube** - Characteristics of photo tube/determination of planks constant.
17. Determination of **band gap of semiconductors**.
18. Optical Measurements with **laser**.
19. **Solar Cell** - Characteristics and Fill Factor determinations.
20. **Fiber Optics** - Numerical Aperture Calculations.

BT/CE/Ch.E/CSE/ECE/EEE/EI/IT/ME - 152 : CHEMISTRY LABORATORY

(Common to all Branches)

Lectures	:	3 periods/ alternate week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

LIST OF EXPERIMENTS

Note: Minimum of twelve experiments have to be conducted out of the list of experiments given below.

1. Estimation of total alkalinity of water sample
   a. Standardization of HCl solution b. Estimation of alkalinity
2. Determination of purity of washing soda
3. Estimation of Chlorides in water sample:
   a. Standardization of $AgNO_3$ solution b. Estimation of Chlorides
4. Determination of Total Hardness of water sample:
   a. Standardization of EDTA solution b. Determination of Total Hardness
5. Estimation of Mohr's salt-permanganometry
   a. Standardization of $KMnO_4$ solution b. Estimation of Mohr's salt
6. Estimation of Mohr's salt –Dichrometry
   a. Standardization of $K_2Cr_2O_7$ solution b. Estimation of Mohr's salt
7. Analysis of soil sample:
   a. Estimation of Ca and Mg b. Estimation of Organic matter
8. Determination of available chlorine in bleaching powder-Iodometry
   a. Standardization of Hypo solution b. Determination of Available chlorine
9. Determination of Iodine in Iodized salt
10. Determination of Iron (Ferrous and Ferric) in an iron ore by Permanganometry
11. Determination of Zn using Potassium ferrocyanide
12. Preparation of Phenol-formaldehyde resign
13. Conductometric titration of an acid vs. base
14. pH metric tritrations of an acid vs base

Demonstration Experiments:

15. Potentiometric titrations: Ferrous vs Dichromate
16. Spectrophotometry: Estimation of Mn/Fe

BT/CE/Ch.E/CSE/ECE/EEE/EI/IT/ME – 153 : WORKSHOP PRACTICE
(Common to all branches)

Lectures	:	3 periods/ alternate week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Carpentry

To make the following jobs with hand tools

a) Lap joint
b) Lap Tee joint
c) Dove tail joint
d) Mortise & Tenon joint
e) Gross-Lap joint

2. Welding *using electric arc welding process / gas welding.*

The following joints to be welded.

a) Lap joint
b) Tee joint
c) Edge joint
d) Butt joint
e) Corner joint

3. Sheet metal operations with hand tools.

a) Saw edge
b) wired edge
c) lap seam
d) grooved seam
f) funnel

4. House wiring

a) To control one lamp by aspt switch
b) To control two lamps by aspt switch
c) To assemble a fluorescent lamp fitting
d) Stair case wiring
f) Go down wiring

BT/CE/Ch.E/CSE/ECE/EEE/EI/IT/ME – 154 :
COMPUTER PROGRAMMING WITH C LAB
(Common to all Branches)

Lectures	:	3 periods/ week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

List of programs (to be recorded)

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if else statement).

Domestic level Consumption As follows:	
Consumption Units	**Rate of Charges(Rs.)**
0 - 200	0.50 per unit
201 - 400	100 plus 0.65 per unit
401 - 600	230 plus 0.80 per unit
601 and above	390 plus 1.00 per unit
Street level Consumption As follows:	
Consumption Units	**Rate of Charges(Rs.)**
0 - 50	0.50 per unit
100 – 200	50 plus 0.6 per unit
201 - 300	100 plus 0.70 per unit
301 and above	200 plus 1.00 per unit

2. Write a C program to evaluate the fllowing(using loops):
   a. $1 + x^2/2! + x^4 / 4!+$ upto ten terms
   b. $x + x^3/3! + x^5/5!+$ upto 7 digit accuracy
   c. $1+x+x^2/2! + x^3/3!+$……upto n terms
   d. Sum of 1 + 2+ 3 +……..+n

3. A menu driven program to check the number is:
   i) Prime or not
   ii) Perfect or Abundant or deficient
   iii) Armstrong or not
   iv) Strong or not
   v) Fibonacci or not

4. A menu driven program to display statistical parameters (using one –dimensional array)
   i) Mean ii) Mode iii) Median iv) Variance v) Standard deviation

5. A menu driven program with options (**using one -Dimensional array)**
   (i) To insert an element into array
   (ii) To delete an element
   (iii) To print elements
   (iv) To print elements in reverse order
   (v) To remove duplicates
6. A menu driven program with options (using two dimensional array)
   (i) To compute A+B
   (ii) To compute A x B
   (iii) To find transpose of matrix A
   (iv) To Check A=B

Where A and B are matrices. Conditions related to size to be tested

7. A menu driven program with options (using Two-dimensional Character arrays)
   (i) To insert a student name
   (ii) To delete a name
   (iii) To sort names in alphabetical order
   (iv) To print list of names
   (v) To print names having maximum length, min. length

8. A menu driven program (using pointers)
   a. Linear search b. Binary search c. Fibonacci search

9. A menu driven program with options (**using Dynamic memory allocation**)
   a. Bubble sort b. Insertion sort c. Selection sort

10. A menu driven program with options (**using Character array of pointers**)
   (i) To insert a student name
   (ii) To delete a name
   (iii) To sort names in alphabetical order
   (iv) To print list of names
   (v) To print names having maximum length, min. length

11. Write a program to perform the following operations on Rational numbers (**using Structures & pointers):**
   i) Read a Rational number
   ii) Addition of two Rational numbers
   iii) Subtraction of two Rational numbers
   iv) Multiplication of two Rational numbers
   v) Division of two Rational numbers
   vi) Display a Rational number

12. A Bookshop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price,publisher and stock position. Whenever a customer wants a book the sales person inputs the title and the author and the system searches the list and displays whether it is available or not. If it is not an appropriate message is displayed, if it is then the system displays the book details and request for the number of copies are required ,if the requested copies are available the total cost of the requested copies is displayed otherwise the message "required copies not in stock" is displayed. **Write a program for the above in structures with suitable functions.**

13. Create a student data file (roll no., name, date of birth, rank) and code a program with options (**use pointers & structures**)
   (i) Listing names, dob sorted on names
   (ii) Listing names, dob sorted on dob
   (iii) Listing names, dob sorted on names, dob

14. a) Write a C program To copy the one file contents to the another file (**using commandline arguments)**

   b) Write a C Program to count the frequencies of words in a given file.

CS/IT 211 - MATHEMATICS – III
(CE /CS/EC/EEE/EI/IT/ME …211)

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Unit-I

Partial Differential Equations :

Partial Differential Equations - Introduction, Formation of Partial Differential Equations, Solutions of a Partial Differential Equation, Equations solvable by direct Integration, Linear Equations of the first Order, Non-Linear Equations of the first Order, Charpit's Method, Homogeneous Linear Equations with Constant Coefficients, Rules for finding The Complementary Function, Rules for finding The Particular Integral, Non-Homogeneous Linear Equations.

Unit-II

Beta Gamma Functions , Error Function.

Integral Transforms:

Introduction, Definition, Fourier Integrals-Fourier sine and cosine integrals, Complex form of the Fourier Integral, Fourier Transforms, Properties of Fourier Transforms, Finite Fourier sine and cosine transforms, Convolution theorem(without proof), Parseval's Identity for Fourier Transforms(without proof), Fourier Transforms of the derivatives of a function.

Unit-III

Solution of Algebraic and Transcendental Equations : Introduction, Newton- Raphson Method, Solutions of Simultaneous Linear Equations: Direct Methods of Solution-factorization method (LU – decomposition method), Iterative Methods of Solution - Gauss-Seidel Iteration Method.

Finite Differences and Difference Equations: Introduction, Finite Difference operators, Symbolic relations, Differences of a polynomial, Newton's forward and backward difference interpolation Formulae, Central Difference Interpolation Formulae-Gauss's Forward and Stirling's formulae, Interpolation with Unequal- Intervals-Lagrange's Interpolation , inverse interpolation. Difference Equations: Introduction, Formation, Linear difference equations - Rules for Finding the Complementary Function, Rules for Finding the Particular Integral.

Unit-IV

Numerical Differentiation: Finding First and Second order Differentials using Newton's formulae , Numerical Integration : Trapezoidal rule , Simpson's one-third rule, Numerical Solution of Ordinary and Partial Differential Equations - Euler's Method, Picard's Method, Runge- Kutta Method of fourth order (for first order equations , Simultaneous equations) Classification of Partial Differential Equation of second order, Solutions of Laplace's and Poisson's Equations by iteration methods.

Text Book :

[1] Higher Engineering Mathematics by B.S.Grewal Khanna publishers, 39th edition.

Reference Books:

[1] A textbook of Engineering Mathematics by N.P. Bali

[2] Advanced Engineering Mathematics by Erwin Keyszig, John Wiley and sons.

CS/IT 212 – CIRCUIT THEORY

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I **(17 periods)**

INTRODUCTION OF CIRCUIT ELEMENTS :

The unit of Charge, Voltage, Current, Power and Energy, Circuit Elements, Circuit concepts, Resistance, Inductance and capacitance, KVL and KCL, Series and Parallel combination of network elements types of sources, energy stored indicators and capacitors.

METHODS OF ANALYSING CIRCUITS: Mesh analysis, Source transformations.

UNIT – II **(20 periods)**

NETWORK THEOREMS:

Star – Delta transformation, Superposition, Thevenin, Norton, Reciprocity, compensation, Maximum power, Tellagan and Application of theorems to DC & AC circuits.

ASLTERNATIVE PERIODIC WAVEFORMS:

Instantaneous current, voltage and power, peak, effective and average voltage and current, crest factor and form factor, pohase difference.

SINUSODIAL STEADY STATE ANALYSIS:

'J' notation and phasor representation. Response of RLC, series, parallel and series parallel circuits to sinusoidal excitation, computation of active, reactive and complex power, power factor.

UNIT – III **(18 periods)**

TWO-PORT NETWORK:

Two-port Network, Open circuit impedance (Z), short circuit admittance (Y), Hybrid parameters.

RESONANCE:

Series and Parallel resonance, selectivity, bandwidth and Q of tuned circuits. Tme constant.

UNIT – IV **(15 periods)**

LAPLACE TRANSFORMS AND TRANSIENTS:

Laplace Transforms of typical Signals, Initial value and final values theorems; Response of simple R-L, R-C and R-L-C series and parallel circuits subjected to DC and sinusoidal excitations using differential equation approach and Laplace Transform method with initial conditions; DC transients of R-L, R-C Series and Parallel R-L-C circuits, Time Constants.

Text Books:

1. Engineering Circuit Analysis – William H.Hayt, Jack E.Kemmerly and Steven M.Durbin, TMH, 6th Edition, 2002
2. Networks Analysis – M.E.Vanvalkenburg, PHI,2003
3. Circuits & Networks: Analysis and Synthesis, A.Sudhakar & Shyammohan. TMH, 3rd Edition 2006

CS/IT 213 **DIGITAL LOGIC DESIGN**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(17 periods)**

Review of Number systems & codes, Representation of integers and Floating point numbers, Accuracy. Introduction to integer arithmetic operations.

BOOLEAN ALGEBRA AND LOGIC GATES: Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and Properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms, Other operations, Digital Logic Gates.

SIMPLIFICATION OF BOOLEAN FUNCTIONS: The Map Method, Two and three variable Maps, Four-variable Map, Five and six-variable Maps, Product of Sums Simplification, NAND and NOR implementation, other two-level implementations, Don't-Care conditions, The Tabulation Method, Determination of Prime Implicants, Selection of Prime-Implicants.

UNIT – II **(15 periods)**

COMBINATIONAL LOGIC: Design Procedure, Adders, Subtractors, Code conversion, Analysis procedure.

COMBINATIONAL LOGIC WITH MSI AND LSI: Binary parallel adder, Decimal adder, Magnitude comparator, Decoders, Multiplexers.

UNIT –III **(15 periods)**

SEQUENTIAL LOGIC: Flip Flops, Triggering of Flip-Flops, Synthesis and Analysis of Clocked Sequential Circuits, State tables and State diagrams. State Reduction and assignment, Flip-Flop Excitation tables, Design Procedure, Design of counters, Design with state equations.

UNIT –IV **(18 periods)**

REGISTERS, COUNTERS: Registers, Shift registers, Ripple counters, Synchronous counters, Timing sequences.

MEMORIES: Classification of ROMs, EPROMs, EEPROMs, RAMs,

PROGRAMMABLE LOGIC: Read only memory (ROM), Programmable logic device (PLD), Programmable logic array (PLA), Programmable array logic (PAL).

Text Book: Donald e Givone, Digital Principles and Design, TMH.

Reference Books:

1. Morris Mano: Computer Engineering Hardware Design, PHI.
2. R.P.Jain: Modern digital electronics, 3rd edition, TMH.
3. A.Anand kumar: Fundamentals of digital circuits, 4th edition, PHI.

CS/IT 214 OBJECT ORIENTED PROGRAMMING

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Unit – I (17 periods)

An Overview of C++: The Origins of C++, What is Object Oriented Programming, some C++ fundamentals, Old-Style Vs Modern C++, Introducing C++ Classes, Function Overloading, Operator Overloading, Inheritance, Constructors and Destructors, The C++ Keywords, The General Form of a C++ Program

Classes and Objects: Classes, Structures and Classes, Unions and Classes are Related, Friend Functions, Friend Classes, Inline Functions, Parameterized Constructors, Static Class Members, When Constructors and Destructors are Executed, Scope Resolution Operator, Nested Classes, Local Classes, Passing and Returning Objects, Object Assignment

Arrays, Pointers, References and the Dynamic Allocation: Arrays of Objects, Pointers, References, Dynamic Allocation Operators, The Placement Forms of new and delete.

Unit-II (18 periods)

Function Overloading, Copy Constructors and Default Arguments: Function Overloading, Overloading Constructor Functions, Copy Constructors, Finding the Address of an Overloaded Function, Overload Anachronism, Default Arguments, Function Overloading and Ambiguity.

Operator Overloading: Creating Member Operator Function, Overloading Using a Friend Function, Overloading new delete, Overloading Special Operators & Comma Operator

Inheritance: Base-Class Access Control, Inheritance and protected members, Inheriting Multiple Base Classes, Constructors, Destructors and Inheritance, Granting Access, Virtual Base Classes.

Unit-III (15 periods)

Virtual Functions & Polymorphism: Virtual Functions, The Virtual Attribute is inherited, Virtual Functions are Hierarchical, Pure Virtual Functions, Using Virtual Functions, Early Vs Late Binding.

Templates: Generic Functions, Applying Generic Functions, Generic Classes, Typename and export Keywords, Power of Templates.

Exception Handling: Fundamentals, Derived-Class Exceptions, Options, Terminate() and unexpected(), uncaught_exception(), exception and bad_exception Classes, Applying Exception Handling.

Unit – IV (15 periods)

The C++ I/O System Basics: Old Vs. Modern C++ I/O, Streams, Stream Classes, Formatted I/O, Overloading << and >>, Creating Manipulators.

C++ File I/O: File Classes, Opening and Closing a File, Text Files, Unformatted Binary I/O, get(), Getline() functions, Detecting EOF ignore() peak() putback() flush(), Random Access, I/O Status, Customized I/O and Files.

Runtime Type ID and the Casting Operators: RTTI, Casting Operators, Dynamic_cast, Reinterpret_cast.

Namespaces, Conversion Functions and other Advanced Topics: Namespaces, The std Namespace, Creating Conversion Functions, const Member Functions and mutable, Volatile Member Functions, Explicit Constructors, asm Keyword, Linkage Specification, Array-Based I/O, Dynamic Arrays, Binary I/O with Array-Based Streams, Differences between C and C++.

Introducing Standard Template Library: An Overview of STL

Text Book:

1. The Complete Reference - C++ - Herbert Schieldt, 4/e, Tata McGraw Hill.

Reference Books:

1. Bjarne Stroustrup, "The C++ Programming Language", Special Edition, Pearson Education.
2. C++ - How to Program – Dietel & Dietel
3. Programming in C++ - Barkakati
4. Mastering C++ by Venugopal

CS/IT 215 DISCRETE MATHEMATICAL STRUCTURES

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I **(18 periods)**

Foundations: Sets, Relations and Functions, Methods of Proof and Problem Solving Strategies, Fundamentals of Logic, Logical Inferences, Methods of Proof of an implication, First order Logic & Other methods of proof, Rules of Inference for Quantified propositions, Mathematical Induction.

UNIT – II **(17 periods)**

Elementary Combinatorics, Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with repetitions, Enumerating Permutation with Constrained repetitions.
Recurrence relations, Generating functions of sequences, Calculating Coefficients of Generating Functions.

UNIT – III **(18 periods)**

Recurrence relations, Solving recurrence relations by Substitution and generating functions. The methods of characteristic roots, solutions of inhomogeneous recurrence relations.
Relations and digraphs, Special properties of binary relations, Equivalence relations. Operations on relation.

UNIT – IV **(17 periods)**

Ordering relations, Lattices and Enumerations, Paths and Closures, Directed Graphs and Adjacency Matrices, Application : Topological Sorting.

Graphs: Basic Concepts, Isomorphisms and Subgraphs, Planar Graphs, Euler's Formula; Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four Color Problem.

TEXT BOOK:

1. Toe L.Mott, Abraham Kandel & Theodore P.Baker, Discrete Mathematics for Computer Scientists & Mathematicians, PHI 2nd edition.

REFERENCE BOOKS:

1. C.L. Liu, "Elements of Discrete Mathematics'.

2. Rosen, 'Discrete Mathematics'.

CS/IT 216 **DATA STRUCTURES**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I: **(18 periods)**

Algorithm Analysis: Mathematical Back Ground, Model, What to Analyze, Running Time Calculations.
Lists: Abstract Data Types, The List ADT, Singly Linked List ADT, Doubly Linked List ADT, Circular Linked List ADT, Polynomial ADT.

UNIT – II: **(17 periods)**
Stacks and Queues: The Stack ADT and its applications such as Infix to Postfix expression conversions, Evaluation of Postfix expressions, Delimiter Matching. The Queue ADT, The Circular Queue ADT.
Sorting Preliminaries – Shellsort – Mergesort – Quicksort

UNIT – III: **(15 periods)**
Preliminaries – Binary Trees – Implementation, Expression trees. The Search Tree ADT – Binary Search Trees, Implementation. AVL Trees – Single Rotations, Double rotations.

UNIT – IV: **(15 periods)**
Hashing – General Idea – Hash Function – Separate Chaining – Open Addressing – Linear Probing – Priority Queues (Heaps) – Model – Simple implementations – Binary Heap – Heap Sort.
Graphs: Definitions, representations, graph traversals.

TEXT BOOK:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education.

REFERENCE BOOKS:

1. Y.Langsam, M.J.Augeustein and A.M.Tenenbaum, "Data Structures Using C", Pearson Education Asia, 2004.

2. Richard F.Gilberg, Behrouz A. Forouzan, "Data Structures – A Pseudocode Approach with C", Thomson Brooks / COLE, 1998.

3. Aho, J.E. Hopcroft and J.D. Ullman, "Data Structures and Algorithms", Pearson Education Asia, 1983.

CS/IT 251 **OOPS LAB**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Create a class HUGEINT by which we would be able to use much wider range of integers. Perform addition operation on two HUGEINTs.

2. Create a class TIME with appropriate data members to represent TIME. Construct a class implementation section to compare two TIMEs, to increment TIME by one second, to decrement TIME by one second and appropriate constructors to create TIME objects.

3. Write a class declaration for DATE and allow the operations to find nextday(), previousday(), leapyear(), comp()- which returns later DATE with appropriate constructors and destructors.

4. Create a user defined datatype STRING, allow possible operations by overloading (Relational operators,[], ( ), <<,>>, =).

5. Define RATIONAL class. Allow possible operations on RATIONALs by overloading operators(Arithmetic, Unary operators,<<,>>).

6. a. A program to implement Single inheritance
   b. A program to implement Multiple inheritance
   c. A program to implement Hierarchical inheritance
   d. A program to implement Multipath inheritance

7. a. A program to implement runtime polymorphism
   b. A program to implement abstract base class concept.

8. Develop a program to sort elements using function template

9. A program on class template

10. A program to implement Exception Handling

11. Write a program to read STUDENT records and write into file "STUDENT" by defining STUDENT class. Display STUDENTs data in a tabular format by defining appropriate manipulators.

12. a. A program on FILEs.
    b. A program on command line arguments.

CS/IT 252 **DATA STRUCTURES LAB**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Code the following list ADT operations using array, single linked list, double linked list.
   (a) void is_emptyList(List 1) (b) List makeNullList(size n)
   (c) Position firstPost(List 1) (d) Position endPost(List 1)
   (e) Position nextPost(List 1, Position p) (f) Position prevPos(List 1, position p)
   (g) Position find)List 1, Element x) (h) Position findKth(List 1, int k)
   (i) void insert(List 1, Position p) (j) void delete(List 1, Position p)
   (k) void append(List 1, Element x) (l) int cmp(List 1, Position p1, Position p2)
   (m) int cmp2(List11, List12, Position p1, Position p2)
   (n) void swap(List 1, Position p1, Position p2)
   (o) Element retrieveElement(List 1, Position p)
   (p) void print element(List 1, Position p)
2. Using the above List ADT operations, Write a menu driven program to support following higher level list operations:
   (a) Create null list
   (b) Read a list of elements into the list.
   (c) Insert an element in the K^{th} position of the list
   (d) Delete an element in the K^{th} position of the list
   (e) Delete a given element from the list
   (f) Find whether given element is present in the list
   (g) Display the elements of the list
3. Write a program that reads two lists of elements, prints them, reverses them, prints the reverse list, sort the lists, print the sorted lists, merges the list, prints merge list.
4. Implement a polynomial ADT and write a program to read two polynomials and print them, adds the polynomials, prints the sum, multiply the polynomials and print the product.
5. Implement stack ADT and write a program that reads an infix arithmetic expression of variables, constants, operators (+, -, *, /) and converts it into the corresponding postfix form. Extend the program to handle parenthesized expression also.
6. Implement Queue ADT and write a program that performs Radix sort on a given set of elements.
7. Implement the following sorting operations:-
   (a) Shell Sort, (b) Heap Sort (c) Merge Sort (d) Quick Sort
8. Implement Binary Tree ADT and write a program that reads postfix Arithmetic expression form, builds the expression tree and performs tree Traversal on it.
9. Implement Binary search ADT and write a program that interactively allows
   (a) Insertion (b) Deletion (c) Find_min (d) Find_max (e) Find operations
10. Implement AVL Tree ADT and Write a program that interactively allows
    (a) Insertion (b) Deletion (c) Find_min (d) Find_max
11. Implement Hashing and Write a program to find a element using Open Addressing.

CS/IT 253 **COMMUNICATION SKILLS LAB**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

The course is divided into four modules. The first module focuses on language skills, the second on writing skills, the third on personality and interaction skills and the fourth on Vocabulary.

MODULE-1: Computer aided instruction:

1. Phonetics: Study of speech sounds
   (a) Vowels
   (b) Consonants
   (c) Accent Training
   (d) Pronunciation
   (e) Intonation
2. Reading Comprehension:
   (a) Reading for main idea
   (b) Scanning and Skimming the text
   (c) Inference of Lexical and Contextual meaning

MODULE-2: Presentation/Reporting Skills:

1. Paper Presentation:
   (a) Identification of source material
   (b) Arrangement of collected data
2. Resume Preparation:
   (a) Identification of information
   (b) Format arrangement
3. Technical Reporting:
   (a) Types of formats & styles
   (b) Data collection
   (c) Organization and clarity

MODULE-3: Personality and Interaction Skills:

1. Fundamentals of Interpersonal skills:
   (a) Body language
   (b) Listening skills
   (c) Role play
2. Situational Rounds:
   (a) Critical thinking
   (b) Analytical thinking
   (c) Creative thinking
   (d) Observation Activity
3. Interview Skills:
   (a) Dress code
   (b) Behavioral attitude
   (c) Frequently asked questions
4. Group Discussion:
   (a) Modulation of Voice, body language and fluency
   (b) Summarizing
   (c) Team spirit

5. Telephonic Interaction:
   (a) Formal/Informal Interaction
   (b) Receiving Messages/Complaints
   (c) Tone Modulation

MODULE-4: Vocabulary:

(a) Synonyms
(b) Antonyms
(c) Analogies
(d) Idioms
(e) One word substitute

SUGGESTED SOFTWARE:

- Cambridge Advanced Learners' Dictionary with exercises
- The Rosetta Stone English Library
- Clarity Pronunciation Power
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Language in Use, Foundation Books Pvt Ltd
- Learning to Speak English - 4 CDs
- Microsoft Encarta
- Murphy's English Grammar, Cambridge

SUGGESTED READING:

1. Developing Language Skills: 1. (Foundation Books)
2. Objective English for Competitive Examinations (Third edition) - Hari Mohan Prasad, Uma Rani Sinha (Tata McGraw Hill)
3. Better English Pronunciation – JD O'Connor (CUP)
4. English Pronouncing Dictionary – Daniel Jones.
5. Effective Technical Communication - M.Ashraf Rizvi (Tata McGraw Hill)
6. English for Engineers
   i. Prepared by Regional Institute of English,
   ii. South India, Bangalore (Foundation Books)
7. Cambridge Preparation Guide for TOEFL.
8. Dictionary of Technical Terms - F.S.Cripsin (Oxford IBH)
9. Cambridge Advanced Learner's Dictionary
10. Cambridge Idioms Dictionary
    a. Basic Correspondence & Report writing -Sharma (Tata McGraw Hill)
11. Business Correspondence and Report Writing - R.C.Sharma, Krishna Mohan, (Tata McGraw Hill)
12. Dictionary of Misspelled and Easily Confused Words - David Downing, Deborah K.Williams (Tata McGraw Hill)
13. Wings of Fire – Dr.A.P.J.Abdul Kalam.
14. My Experiments with Truth – M.K.Gandhi.

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CS/IT/ME 221 PROBABILITY & STATTISTICS

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Unit-I **(18 periods)**

Probability Densities: Continuous Random Variables, Normal Distribution, Normal Approximation to the Binomial Distribution, other Probability Densities, Uniform Distribution, Log-Normal Distribution, Gamma Distribution, Beta Distribution, Weibull Distribution, Joint Distributions – Discrete and Continuous, Checking if the Data Are Normal, Transforming Observations to Near Normality, Simulation.
Sampling Distribution: Populations and Samples, Sampling Distribution of the Mean (SD known), Sampling Distribution of the Mean (SD Unknown), Sampling Distribution of the Variance.

Unit-II **(17 periods)**

Inferences Concerning Means: Point Estimation, Interval Estimation, Tests of Hypotheses, Null Hypotheses and Tests of hypotheses, Hypotheses Concerning One Mean, Relation between Tests and Confidence Intervals, Operating Characteristic Curves, Inferences Concerning Two Means, Design Issues – Randomization and Pairing.
Inferences Concerning Variances: Estimation of Variances, Hypotheses Concerning One Variance, Hypotheses Concerning Two Variances.
Inferences Concerning Proportions: Estimation of Proportions, Hypotheses Concerning One Proportion, Hypotheses Concerning Several Proportions, Analysis of r × c Tables, Goodness of Fit.

Unit-III **(15 periods)**

Curve Fitting: Method of Least Squares, Inferences based on the Least Squares Estimators, Curvilinear Regression, Multiple Regression, Checking the Adequacy of the Model, Correlation, Multiple Linear Regression.
Analysis of Variance: General Principles, Completely Randomized Designs, Randomized-Block Designs, Multiple Comparisons, Further Experimental Designs, Analysis of Covariance.

Unit -IV **(15 periods)**

Statistical Content of Quality-Improvement Programs: Quality-Improvement Programs, Starting a Quality Improvement Program, Experimental Designs of Quality-Improvement, Quality Control, Control Charts for Measurements, Control Charts for Attributes, Tolerance Limits, Acceptance Sampling.
Applications to Reliability and Life Testing: Reliability, Failure-Time Distributions, Exponential Model in Reliability, Exponential Model in Life Testing, Weibull Model in Life Testing.

Text Book:
Miller & Freund's: "Probability and Statistics for Engineers", 6/e, PHI by Richard A.Johnson.

Reference Book:
1. S.C.Gupta & V.K.Kapoor, "Fundamentals of Mathematical Statistics", S.Chand & Co,.

CS/IT 222 **ENVIRONMENTAL STUDIES**

(Common for all branches)

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I

Introduction: Definition, Scope and Importance

Ecosystems: Introduction, types, characteristic features, structure and functions of Ecosystems- Forest, Greenland, Desert, Aquatic (lakes, rivers, and estuaries)

Natural Resources:

Land resources - Land as a resource, Common property resources, land degradation, soil erosion and desertification and Effects of modern agriculture, fertilizer- pesticide problems

Forest Resources- Use and over-exploitation, Mining and dams; their effects on forests and tribal people.

Water Resources - Use and over-utilization of surface and ground water, floods and drought, Water logging and salinity, Dams – benefits and costs, Conflicts over water.

Energy resources: Energy needs, Renewable and non-renewable energy sources, Use of alternate energy sources.

UNIT – II

Biodiversity and its Conservation: Value of biodiversity- consumptive and productive use, social, ethical, aesthetic and option values. Bio-geographical classification of India-India as a mega-diversity habitat. Threats to bio-diversity – Hot spots, habitat loss, poaching of wildlife, loss of species, seeds, etc. Conservation of biodiversity - In-situ and Ex-situ conservation.

Environmental Pollution: Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Solid waste management, composting and vermiculture, Urban and industrial wastes, recycling and re-use.

UNIT –III

Sustainability: Theory and practice, equitable use of resources for sustainable life styles.

Rain water harvesting, cloud seeding and watershed management, Water scarcity and ground water depletion.

Controversies on major dams – Resettlement and rehabilitation of people, problems and concerns.

Nature of thermal pollution and nuclear hazards, Global warming, Acid rain, Ozone depletion. Green revolution.

Population growth and environment.

Environmental Impact Assessment.

UNIT – IV

Environmental acts: Water (Prevention and Control of pollution) act, Air (Prevention and Control of pollution) act, Environmental protection act, Wild life protection act, Forest Conservation act.
International Conventions: Stockholm Conference 1972, Earth Summit 1992
Case Studies: Chipko movement, Narmada Bachao Andolan, Silent Valley Project, Madhura Refinery and Taj Mahal, Chernobyl Nuclear Disaster, Tehri Dam, Ralegaon Siddhi (Anne Hazare), Florosis and Bhopal Tragedy.
Field work
Visit to a local area to document environmental assets – river/ forest/ grassland / hill /mountain.
Study of local environment-common plants, insects, birds.
Study of simple ecosystems – pond, river, hill, slopes etc.,
Visits to industries, water treatment plants, effluent treatment plants

Text Book
1) Benny Joseph, Environmental Studies**,** the Tata McGraw-Hill Publishing Company Limited, New Delhi.
Reference Books:

1) Text Book of environmental studies, Erach Bharucha, UGC.
2) Environmental studies by Anubha Kaushik and C.P.Kaushik.
3) A basic course of environmental studies by S.Deswal and A.Deswal, Dhanapath Rai & Co,.
4) Essentials of environmental studies, Kurian Joseph and R.Nagendram, Pearson Education Pte.Ltd., Delhi.
5) Environmental studies, R.Rajagopalan, Oxford university press.
6) Environmental Pollution Control Engineering, C. S. Rao, Wiley Eastern Ltd., New Age International Ltd.,
7) Introduction to Environmental Science, Anjaneyulu Y, B S Publications
8) Principles of Environmental Studies, Manoharachary C and Jayarama Reddy P, B.S. Publications

CS/IT 223 ELECTRONIC DEVICES & CIRCUITS

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I (17 periods)

SEMICONDUCTOR DIODES: Semiconductor diode, Zener diode, Load line analysis, Half-Wave Rectifier, Full-Wave rectification, Clippers and Clampers.

BIPOLAR JUNCTION TRANSISTOR: Transistor operation, Common base configuration, Transistor amplifying action, Common emitter configuration, Common collector configuration, Operating point, Fixed bias circuit, Emitter stabilized bias circuit, Voltage divider bias, Transistor h-parameter model, Analysis of transistor amplifier using h-parameters.

UNIT – II (18 periods)

UNIPOLAR DEVICES: Characteristics of JFETs, Transfer characteristics, Depletion type MOSFET, Enhancement type MOSFET, fixed bias configuration, Self-bias configuration, FET small signal model, Source follower circuit, Common gate circuit, Unijunction Transistor.

UNIT –III (17 periods)

FEEDBACK AND OSCILLATOR CIRCUITS: Feedback concepts, feed back connection types, Barkhausen criteria, Phase-Shift oscillator, Wien bridge oscillator, Hartley oscillator, Colpitts oscillator.

UNIT –IV (18 periods)

OPERATIONAL AMPLIFIERS: Differential and common mode operation, OP-Amp basics, Op-Amp specifications, Voltage summing, Voltage buffer, Differentiator and Integrator.

LINEAR ICS: Timer IC unit operation, Voltage controlled oscillator.

Text Books:

1. Robert Boylestad & Louis Nashelsky, 'Electronic Devices and Circuit Theory', 6th Edition, PHI.
2. N.N.Bhargava & Kulasresta, 'Basic Electronics', Tata McGrawHill Publishers.

Reference Books:

1. Milliman & Halkias, 'Integrated Electronics', Tata McGrawHill Publishers.
2. S.Salivahanan & Vallavaraj, 'Electronic Devices and Circuits', Tata McGrawHill Publishers.

CS/IT 224 **COMPUTER ORGANIZATION**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT I: **(20 periods)**

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers.
MACHINE INSTRUCTIONS AND PROGRAMS: Numbers, Arithmetic Operations and Characters, Memory locations and addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/Output Operations, Stacks and Queues, Subroutines, Additional Instructions, Encoding of Machine Instructions

UNIT II: **(15 periods)**

BASIC PROCESSING UNIT:
Some fundamental concepts, Execution of a complete instruction, Multiple –Bus Organization, Hardwired control, Micro programmed control
ARITHMETIC:
Addition and Subtraction of Signed Numbers, Design of fast adders, Multiplication of Positive numbers, Signed operand multiplication, Fast multiplication, Integer Division, Floating point numbers and operations.

UNIT III: **(20 periods)**

THE MEMORY SYSTEM: Some Basic Concepts, Semiconductor RAM Memories, Read-Only memories, Speed, Size and Cost, Cache Memories, performance Considerations, Virtual memories, Memory management Requirements, Secondary Storage
PIPELINING: Basic Concepts, Data Hazards, Instruction hazards, Influence on Instruction Sets, Data path and Control Considerations, Superscalar Operation, performance Considerations.

UNIT IV: **(15 periods)**

INPUT/OUTPUT ORGANIZATION: Accessing I/O Devices, Interrupts, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces: PCI Bus, SCSI Bus, USB Bus

TEXT BOOKS:
Computer Organization – Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Fifth Edition, McGraw Hill.

REFERENCE BOOKS :
1. Computer Architecture and Organization-John P. Hayes, Third Edition, McGraw Hill
2. Computer Organization and Architecture – William Stallings, Sixth Edition, Pearson/PHI
3. Computer Systems Architecture – M. Morris Mano, Third Edition, Pearson/PHI.

CS/IT 225 MICROPROCESSORS AND MICROCONTROLLERS

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I: (20 periods)

The 8086 Microprocessor Family, the 8086 Internal Architecture: Introduction to Programming the 8086.

8086 Family Assembly Language Programming, Implementing standard Program Structures in 8086 Assembly language, Strings ,Procedures and Macros,8086 Instruction descriptions and Assembler directives.

UNIT-II: (15 periods)

8086 System Connections, Timing: The Basic8086 Microcomputer System, 8086 Bus activities during the Read and Write Machine Cycles, 8086 pin Diagram; 8086 Interrupts and Interrupt Applications: 8086 Interrupts and Interrupts Responses.

Unit-III: (20 periods)

Interfacing Peripherals and Applications: Interfacing the Microprocessor to the Keyboard, Alphanumeric displays; 8259 Priority Interrupt Controller, 8237 DMA Controller.

The 8051 Microcontrollers – Assembly language Programming- JUMP, LOOP, CALL instructions.

UNIT-IV: MICROCONTROLLERS: (15 periods)

I/O port Programming- addressing Modes, Arithmetic, Logic, Single –bit instructions and Programming-Timer Counter programming in the 8051, 8051 Serial communication-Interrupts Programming.

TEXT BOOK:

1. Douglas V. Hall,"Microprocessors and Interfacing" Tata McGraw-Hill, Revised Second Edition.
2. "Muhammad Ali Mahadi and Janice Gillespie Mazidi ,'The 8051 Microcontroller and Embedded Systems" Pearson Education 2004

REFERENCE BOOKS:

1. Yu-cheng Liu, Glenn A. Gibson, "Microcomputer systems: The 8086 /8088 Family architecture, Programming and Design", Second edition, Prentice Hall of India, 2003.
2. Barry B. Brey, "The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, PentiumIV, Architecture, Programming & Interfacing", Sixth Edition, Pearson Education / Prentice Hall of India, 2002.
3. 8051 Micro Controller Architecture, Programming and Applications by Kenneth J.Ayala.

CS/IT 226 OPERATING SYSTEMS

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT I: (20 periods)

Computer System Overview: Basic Elements, Processor Registers, Instruction Execution, Interrupts, The Memory Hierarchy, Cache Memory, I/O Communication Techniques.

Operating System Overview: Objectives and Functions, Evolution, Major Achievements, Developments Leading to Modern OS, MS Windows Overview, Traditional UNIX Systems, Modern UNIX Systems, Linux.

Process Description & Control: Process, States, Description, Control, UNIX SVR Process Management.

UNIT II: (20 periods)

Threads, SMP and Microkernels: Processes and Threads, Symmetric Multiprocessing, Microkernels, Thread and SMP Management, Solaris Thread and SMP Management, Linux Process and Thread and SMP Management

Concurrency: Mutual exclusion and Synchronization: Principles of Concurrency, Mutual Exclusion, Semaphores, Monitors, Message Passing, Readers/Writers Problem.

Concurrency: Deadlock and Starvation: Principles of Deadlock, Prevention, Avoidance and Detention of Deadlocks, An integrated Deadlock strategy, Dining Philosophers Problem, UNIX Concurrency Mechanism, Linux Kernal Concurrency Mechanism, Solaris Thread Synchronization Primitives, Windows Concurrency Mechanisms.

UNIT III: (15 periods)

Memory Management: Requirements, Partitioning, Paging, Segmentation.

Virtual Memory: Hardware and Control Structures, OS Software, UNIX, Solaris, Linux & Windows Memory Management.

Uniprocessor Scheduling: Types of Processor Scheduling, Scheduling Algorithms, Traditional UNIX Scheduling.

UNIT IV: (15 periods)

Multiprocessor and Real-Time Scheduling: Multiprocessor Scheduling, Real-Time Scheduling, Linux Scheduling, UNIX SVR 4 Scheduling, Windows Scheduling.

I/O Management and Disk Scheduling: I/O Devices, Organization of the I/O Function, OS Design Issues, I/O Buffering, Disk Scheduling, RAID, Disk Cache, UNIX SVR 4 I/O, Linux I/O, Windows I/O.

File Management: Overview, Organization and Access, Directories, Sharing, Record Blocking, Secondary Storage Management, UNIX File Management, Linux Virtual File System, Windows File System.

TEXT BOOKS:

1. William Stallings, "Operating Systems – Internals and Design Principles", 5/e, Pearson.

REFERENCE BOOKS :

1. Silberschatz & Galvin, 'Operating System Concepts', 5th edition, John Wiley & Sons (Asia) Pvt.Ltd.,2001.
2. Charles Crowley, 'Operating Systems : A Design-Oriented Approach', Tata McGraw Hill Co.,1998 edition.
3. Andrew S.Tanenbaum, 'Modern Operating Systems', 2nd edition,1995, PHI.

CS/IT 261 **EDC LAB**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

LIST OF EXPERIMENTS

1. Characteristics of Silicon, Germanium diodes.
2. Characteristics of Zener diode.
3. Half Wave Rectifier.
4. Transistor Characteristics in CE configuration.
5. Self Bias circuit
6. Characteristics of F.E.T
7. Characteristics of U.J.T
8. Logic Gates using Discrete Components
9. Logic Gates using Universal Gates
10. Combinational Circuits
11. Code converter
12. Flip Flops
13. Counters
14. Ring Counter and Johnson Counter

CS/IT 262 MICROPROCESSORS AND MICROCONTROLLER LAB

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Write a 8086 assembly language program to arrange the given numbers in ascending order.

2. Write a 8086 assembly language program to count number of +ve elements, -ve elements, zeros in the given array.

3. Write a 8086 assembly language program to find the square of a number using look-up-table.

4. Write a 8086 assembly language program to move a sting byte from a memory location to another memory location.

5. Write a 8086 assembly language program to calculate the maximum and minimum in an array.

6. Write a8086 assembly language program to convert BCD to binary using near procedures.

7. Write a8086 assembly language program to calculate nCr by using near procedures.

8. Write a program to display a string of characters (use Keyboard/Display Interfacing)

9. Write a program to generate an interrupt using 8259 Interrupt Controller. Assume two sources are connected to the IR lines of the 8269. Of these key board has highest priority and printer has the lowest priority.

10. Assume that 5 BCD data items are stored in RAM locations starting at 40H. Write a program to find the sum of all the numbers. The result must be in BCD.

11. Write a program with three sub-routine to transfer the data from on-chip ROM to RAM location starting at 30H b)add them and save in 70Hc)find the average of the data and store it in R7.notice that data is stored in a code space of on-chip ROM.

12. Program the 8051 timers to generate time delay.

CS/IT 263 **SOFT SKILLS LAB**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

Soft Skills are emotion based competencies that define an individual. The objective is to develop the intellectual, emotional and social understanding of every student and to make students become productively engaged citizens with knowledge, skills, dispositions and confidence to participate fully in life. It guides the students toward competency in Thinking and Reasoning Skills, Social and Civic Responsibility, character, communication and Employability.

The Methodology includes Interactive Sessions, Role Play, Sell-out, Team Work / Group Work / Pair work, Group Discussion, Peer Evaluation and Written examination. The emphasis is on learning by doing.

MODULE-1: Non-Verbal Communication:

1. Voluntary body language.
2. Involuntary body language.
3. Facial expressions.
4. Proxemics.
5. Kinesics.
6. Oculesics.
7. Haptics.
8. Chronemics.
9. Para linguistics.

MODULE-2: Written Communication:

1. Situational Analysis.
2. Critical Thinking.
3. Lateral Thinking.
4. Creative Thinking.

MODULE-3: Emotional Intelligence and Self Esteem:

Emotional Intelligence:

1. Self awareness
2. Self control
3. Self motivation
4. Empathy
5. Relationship Skills.
6. Exercises on Johari Window.

Self Esteem:

1. Competence
2. Confidence
3. Mastery
4. Achievement
5. Independence
6. Self-regard

MODULE-4: Employability:

1. Selection Procedure: Methods of selection followed by different companies.
2. Interview techniques: Mock Interviews, Stress Interviews
3. Group Discussion:
   (a) Participates as an effective member of a team.
   (b) Exhibits leadership abilities and Team building.
   (c) Possesses flexibility and adaptability.
   (d) Group dynamics.
   (e) Intra group dynamics.
   (f) Inter group dynamics.
   (g) Evolution of a group into a team.
4. Psychological test: Aptitude, Logic and Reasoning.

MODULE-5: Life Skills:

Behavior and Attitude:

1. Social behavior
2. Social norms.
3. Ethics.
4. Values.
5. Positive work ethics.
6. Desire to learn.
7. Responsibility.
8. Integrity / honesty.
9. Good attitude.
10. Motivation.

MODULE-6: People Skills:

Interpersonal Relationships

1. Effective listening.
2. Managing stress.
3. Probing skills.
4. Work place creativity.
5. Persuading techniques.
6. Questioning techniques – close end, open end Questions & Answers.
7. Role perception.

REFERENCES:

BOOKS:

1. Body Language Gordon R.Wainwright, Rupa & Co.,
2. Personality development – Rajeev K Mishra (Rupa & Co.,)
3. Making Presentations – Hindie T (DK Publishing, London)
4. Technical Writing and Professional Communication –Huckin T, Oslen L (McGraw Hill)
5. Lateral Thinking by Debono
6. How to prepare for Group Discussions and Interview, Hari Mohan Prasad & Rajnish Mohan, 2nd Edition, TMH
7. Barrons How to prepare for the GRE, 13th Edition.
8. Emotional Intelligence by Daniel Goleman

9. Working with Emotional Intelligence by Daniel Goleman, Santam Books Publishers.
10. The 7 Habits of Highly Effective people by Stephen R.Covey.
11. Awaken the Giant within: How to take immediate control of your mental, emotional, physical and financial destiny by Anthony Robbins.
12. Get better or get beaten, Jack Welch, TMH.
13. Principle – Centered Leadership by Stephen R.Covey.
14. You can Vin, Shiv khera – MacMillan India Limited.
15. I am OK, You are OK ( )
16. Born to Win by _____
17. Unlimited Power by Anthony Robbins.
18. Count the Chickens before Hatched, Arindam Chowdary,
19. Dale Karnegie, Pocket Book Series (5 Nos.)
20. Kogan Page, Creating Success Series (27 Nos.)
21. The complete Idiots guide to ……, Alpha Books Series, PHI Publication (20 Nos.)

WEB SITES:

http://users3.evl.net/~pamthompson/bodylanguage.htm.
http://www.owlnet.rice.edu/~cainproj
http://zzyx.ucsc.edu/~archer/intro.html
http://www.colostate.edu/depts/speech
http://www1.chapman.edu/comm/comm/faculty/thobbs/com401/nonverb.html

COMPUTER AIDED MATERIAL:

Train 2 success – CD Series (Zenith Global Consultancy)

CS/IT/ECE 311 PROFESSIONAL ETHICS AND HUMAN VALUES

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I (18 periods)

Human Values: Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality.

UNIT – II (12 periods)

Engineering Ethics: Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

UNIT – III (18 periods)

Engineering as Social Experimentation: Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

Safety, Responsibility and Rights: Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and reducing risk.

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) - Discrimination

UNIT – IV (12 periods)

Global Issues: Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Sample Code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (ISTE), India, etc.

Text Books:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill. New York 1996.
2. Govindarajan. M, Natarajan. S, Senthilkumar. V.S, "Engineering Ethics", Prentice Hall of India, 2004.

References:

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Jersey, 2004 (Indian Reprint).
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics Concepts and Cases", Thompson Learning, United States, 2000 (Indian Reprint now available).
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

CS/IT 312 DATA COMMUNICATIONS

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I (16 periods)

Data Communications & Networking Overview: A Communications Model, Data Communications, Data Communication Networking.
Protocol Architecture: The Need for a Protocol Architecture, A Simple Protocol Architecture, OSI, The TCP/IP Protocol Architecture.
Data Transmission: Concepts & Terminology, Analog & Digital Data Transmission, Transmission Impairments, Channel Capacity.
Guided and Wireless Transmission: Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-Of-Sight Transmission.

UNIT-II (16 periods)

Signal Encoding Techniques: Digital Data, Digital Signals; Digital Data, Analog Signals; Analog Data & Digital Signals; Analog Data & Analog Signals.
Digital Data Communication Techniques: Asynchronous & Synchronous Transmission, Types of Errors, Error Detection, Error Correction, Line Configuration, Interfacing.

UNIT-III (13 periods)

Data Link Control: Flow Control, Error Control, High-Level Data link Control (HDLC).
Multiplexing: Frequency Division Multiplexing, Synchronous Time Division Multiplexing, Statistical Time Division Multiplexing, Asymmetric Digital Subscriber Line, XDSL.

UNIT-IV (15 periods)

Circuit Switching & Packet Switching: Circuit-Switching Networks, Circuit-Switching Concepts, Control Signaling, Packet-Switching Principles, X.25.
Local Area Network Overview: Topologies & Transmission Media, LAN Protocol Architecture, Bridges, Layer2 & Layer3 Switches.
High-speed LANs: The Emergence Of High –Speed LANs, Ethernet , Token Ring, Fibre Channel.

TEXT BOOK:

1. William Stallings **"**Data and Computer Communications**",** 7/e Pearson Education / PHI.

REFERENCE BOOKS:

1. Wayne Tomasi "Introduction to Data Communications and Networking", PHI.
2. Behrouz A.Forouzan, "Data Communications and Networking", Fourth edition, TMH.
3. GodBole " Data Communications & Networking" TMH

CS/IT 313 AUTOMATA THEORY & FORMAL LANGUAGES

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I (18 periods)

Automata: Introduction to Automata, The central concepts of automata theory - Alphabets, Strings, Languages.

Finite Automata: An Informal picture of finite automata, Deterministic finite automata (DFA) - Definition of DFA, DFA processing strings, Notations for DFA, Extended transition function, the language of DFA, Non deterministic finite automata (NFA) – Definition of NFA, Extended transition function, the language of NFA,Equivalence of DFA and NFA Finite

Automata with $\in$ transitions: Use of $\in$ - transition, notation for an $\in$ - NFA, Epsilon closures, extended transitions and languages, Applications.

UNIT – II (15 periods)

Regular Expressions and Languages: Regular expressions, finite automata and regular expressions, Algebraic laws of regular expressions.

Properties of Regular Languages: Proving languages are not regular – Pumping lemma for regular languages, Applications of the pumping lemma, Closure Properties of Regular Languages, Equivalence and minimization of automata – Minimization of DFA

UNIT – III (18 periods)

(Construction based treatment & proofs are excluded)

Context Free Grammars: Context Free Grammars, Parse Trees, Constructing parse trees, derivations and parse trees, ambiguous grammars.

Pushdown Automata: Definition of the Pushdown automata, the languages of PDA, Equivalences of PDA's and CFG's.

Context free languages: Normal form's for context- Free grammars, the pumping lemma for context free languages.

UNIT – IV (15 periods)

Properties of Context free languages: closure properties for context free languages, Decision properties for CFL's.

Introduction to Turing Machines: The Turing Machine, programming techniques for Turing machines.

Undecidability: a language that is not recursively enumerable, an undecidable problem that is RE, Undecidability problems about TM, Post's Correspondence problem.

Textbook:

1. John.E.Hopcroft, R.Motwani, & Jeffery.D Ullman, "Introduction to Automata Theory,Languages and Computations", Second Edition, Pearson Education, 2003

Reference Books:

1. Cohen, 'Computer Theory',
2. KLP Mishra & N.Chandrasekharan, 'Theory of Computation', PHI.
3. H.R.Lewis, C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pearson Education, 2003.
4. J.Martin, "Introduction to Languages and the Theory of Computation", Third Edition, Tata McGraw Hill, 2003.
5. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.
6. Ragade, "Automata and Theoretical Computer Science", First Edition, Pearson Education, 2004.
7. John E Hopcroft & Jeffery D Ullman' 'Introduction to Automata Theory & Languages and Computation', Narosa Publishing House.

CS/IT 314 JAVA PROGRAMMING

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(17 periods)**

Introduction: Introduction to java, data types, dynamic initialization, scope and life time, operators, control statements, arrays, type conversion and casting, finals & blank finals.
Classes and Objects : Concepts, methods, constructors, usage of static, access control, this key word, garbage collection, overloading, parameter passing mechanisms, nested classes and inner classes.
Inheritance: Basic concepts, access specifiers, usage of super key word, method overriding, final methods and classes, abstract classes, dynamic method dispatch, Object class.
Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, variables in interface and extending interfaces.
Packages: Creating a Package, setting CLASSPATH, Access control protection, importing packages.
Strings: Exploring the String class, String buffer class, Command-line arguments.
Library: Date class, Collection, Enumerations and Wrapper classes.

UNIT-II **(18 periods)**

Exception Handling: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes.
Multithreading : Concepts of Multithreading, differences between process and thread, thread life cycle, Thread class, Runnable interface, creating multiple threads, Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks, thread groups.
I/O Streams: Streams, Byte streams, Character streams, File class, File streams.
Applets: Concepts of Applets, life cycle of an applet, creating applets, passing parameters to applets, accessing remote applet, Color class and Graphics

UNIT-III **(20 periods)**

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling events.
AWT: AWT Components, windows, canvas, panel, File Dialog boxes, Layout Managers, Event handling model of AWT, Adapter classes, Menu, Menu bar.
Swing-I – swings introduction, JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons.

UNIT-IV **(20 periods)**

Swing- II: Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

JDBC Conectivity : JDBC connectivity , types of Jdbc Drivers, connecting to the database, JDBC Statements, JDBC Exceptions, Manipulations on the database, Metadata .

Networking: Basics of Networking, InetAddress, URL, URL connection, TCP/IP sockets, Datagrams, java.net package.

TEXT BOOKS:

1. The Complete Reference Java J2SE 7th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi. (UNTI – I and UNIT – II)
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons,Pearson Edu.(UNIT–IV)

REFERENCES :

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
4. Beginning in Java 2, Iver Horton, Wrox Publications.
5. Java, Somasundaram, Jaico.
6. Introduction to Java programming, By Y.Daniel Liang,Pearson Publication

CS/IT 315 DATABASE MANAGEMENT SYSTEMS

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I (18 Periods)

Databases and Database Users: Introduction - An Example - Characteristics of the Database Approach - Actors on the Scene - Workers behind the Scene - Advantages of Using the DBMS Approach - A Brief History of Database Applications - When Not to Use a DBMS

Database System Concepts and Architecture : Data Models, Schemas, and Instances - Three-Schema Architecture and Data Independence - Database Languages and Interfaces - The Database System Environment - Centralized and Client/Server Architectures for DBMSs - Classification of Database Management Systems

Data Modeling Using the Entity-Relationship (ER) Model : Using High-Level Conceptual Data Models for Database Design - An Example Database Application - Entity Types, Entity Sets, Attributes, and Keys - Relationship Types, Relationship Sets, Roles, and Structural Constraints - Weak Entity Types - Refining the ER Design for the COMPANY Database - ER Diagrams, Naming Conventions, and Design Issues

UNIT – II (20 Periods)

The Relational Data Model and Relational Database Constraints : Relational Model Concepts - Relational Model Constraints and Relational Database Schemas - Update Operations, Transactions, and Dealing with Constraint Violations - Relational Database Design Using ER-to-Relational Mapping

The Relational Algebra and Relational Calculus : Unary Relational Operations: SELECT and PROJECT - Relational Algebra Operations from Set Theory - Binary Relational Operations: JOIN and DIVISION - Additional Relational Operations - The Tuple Relational Calculus - The Domain Relational Calculus

SQL-99: Schema Definition, Constraints, Queries, and Views : SQL Data Definition and Data Types - Specifying Constraints in SQL - Schema Change Statements in SQL - Basic Queries in SQL - More Complex SQL Queries - INSERT, DELETE, and UPDATE Statements in SQL - Views (Virtual Tables) in SQL

UNIT – III (18 Periods)

Disk Storage, Basic File Structures: Introduction - Secondary Storage Devices - Buffering of Blocks - Placing File Records on Disk - Operations on Files - Files of Unordered Records (Heap Files) - Files of Ordered Records (Sorted Files) - Types of Single-Level Ordered Indexes - Multilevel Indexes - Dynamic Multilevel Indexes Using B-Trees and B+-Trees - Indexes on Multiple Keys

Functional Dependencies and Normalization for Relational Databases : Informal Design Guidelines for Relation Schemas - Functional Dependencies - Normal Forms Based on Primary Keys - General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form

Relational Database Design Algorithms and Further Dependencies : Properties of Relational Decompositions - Algorithms for Relational Database Schema Design - Multivalued Dependencies and Fourth Normal Form - Join Dependencies and Fifth Normal Form.

UNIT – IV **(18 Periods)**

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing - Transaction and System Concepts - Desirable Properties of Transactions - Characterizing Schedules Based on Recoverability - Characterizing Schedules Based on Serializability

Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control - Concurrency Control Based on Timestamp Ordering – Multiversion Concurrency Control Techniques - Validation (Optimistic) Concurrency Control Techniques - Granularity of Data Items and Multiple Granularity Locking

Database Recovery Techniques : Recovery Concepts - Recovery Techniques Based on Deferred Update - Recovery Techniques Based on Immediate Update - Shadow Paging

Database Security : Introduction to Database Security Issues - Discretionary Access Control Based on Granting and Revoking Privileges - Mandatory Access Control

TEXT BOOKS:

1. Fundamentals of Database Systems, Ramez Elmasri and Navate Pearson Education, 5th edition.

REFERENCES:

1. Introduction to Database Systems, C.J.Date Pearson Education
2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
3. Data base System Concepts, Silberschatz, Korth, McGraw hill, 5th edition.

CS 316 **ADVANCED UNIX PROGRAMMING**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT I **(18 periods)**

Introduction to unix : Unix architecture , Features of Unix, Vi editor.

Directory Related utilities- pwd, mkdir, ls, cd , rmdir.

File Handling and Text Processing utilities- cp, mv, rm, ln, unlink, lp, cat, more, pg , head, tail, sort ,nl, grep, egrep, fgrep, cut, paste, join, tee, w ,chgrp, chmod, chown, find, cmp, diff, uniq, tr.

Disk utilities,Backup and other utilities- du, df, mount, unmount, umask, ulimit, tar, cpio, dump , who, mail, compress, uncompress, gzip, gunzip, crypt, sed, tty,

Networking utilities – finger, telnet, rlogin, ftp, rcp, write, talk, wall.

Programmable text processing: awk - awk programs, accessing individual fields, Begin and end, operators, variables, control structures, extended regular expressions, condition Ranges, field separators, Build – in functions.

UNIT-II **(20 periods)**

Bourne Shell programming: Shell, functions of the shell , Meta characters, Input redirection, Output redirection, pipes, shell as programming language, shell variables, predefined local variables, predefined environment variables, Arithmetic, conditional expressions, control structures, positional parameters, passing command line arguments, Built – in Shell commands and shell programs.

Unix Internals: Kernel Basics, File System, Process Management.

UNIT-III **(18 periods)**

File management system calls : Regular file management system calls – open( ), read( ), write( ), lseek( ), Close(),unlink( ),stat( ), getdents( ). Miscellaneous file management system calls – chown( ) and fchown( ), chmod( ) and fchmod( ), dup( ) and dup2( ), fcntl( ), ioctl( ), link( ), mknod( ), sync( ), truncate( ) and ftruncate( ).

Process Management: Creating a new process – fork( ),orphan processes, terminating a process – exit( ), zombie processes, waiting for child – wait( ), Differentiating a process – exec( ), changing directories – chdir( ), changing priorities- nice( ), Accessing user and Group ID's , file locking – deadlocks.

UNIT IV **(18 periods)**

Signals: The defined signals, A list f signals, terminal signals, Requesting on Alarm signal – alarm( ), handling signals – signal( ), protecting critical code and chaining interrupt handlers, sending signals – kill( ), Death of children, suspending and Resuming processes, process Group's and control terminals.

Inter process communication: Pipes, Sockets, shared memory, semaphores.

Text Book:

1 "Unix for programmers and users" 3rd edition by Graham Glass, King Ables, pearson education .

Reference Books:

1. "Advanced programming in the unix environment" w- Richard Stevens 2nd Edition Pearson education
2. "Unix programming environment", Kernighan and pike, Pearson education.
3. "Your unix the ultimate guide" Sumitabha Das, TMH 2nd edition.
4. "Advanced unix programming" by Marc J. Rochkind, 2nd edition Pearson Education.

CS/IT 351 **JAVA PROGRAMMING LAB**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Write a java program to demonstrate static member, static method and static block.
2. Write a java program to demonstrate method overloading and method overriding.
3. Write a java program to demonstrate finals, blank finals, final methods, and final classes.
4. Write a java program to demonstrate synchronous keyword.
5. Write a java program to implement multiple inheritance.
6. Write a program to demonstrate packages.
7. Write a java program to crate user defined exception class and test this class.
8. Write am applet program to demonstrate Graphics class.
9. Write GUI application which uses awt components like label, button, text filed, text area, choice, checkbox, checkbox group.
10. Write a program to demonstrate MouseListener, MouseMotionListener, KeyboardListener, ActionListener, ItemListener.
11. Develop swing application which uses JTree, Jtable, JComboBox.
12. Write a JDBC Application to implement DDL and DML commands.
13. Write a program to implement client/server applications using connection oriented & connection less mechanisms.

CS/IT 352 RDBMS LABORATORY (USING ORACLE: SQL*PLUS, FORMS & REPORT TOOLS)

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

I. Simple queries: selection, projection, sorting on a simple table
- i. Small-large number of attributes
- ii. Distinct output values
- iii. Renaming attributes
- iv. Computed attributes
- v. Simple-complex conditions (AND, OR, NOT)
- vi. Partial Matching operators (LIKE, %, _, *, ?)
- vii. ASC-DESC ordering combinations
- viii. Checking for Nulls

II. Multi-table queries(JOIN OPERATIONS)
- i. Simple joins (no INNER JOIN)
- ii. Aliasing tables – Full/Partial name qualification
- iii. Inner-joins (two and more (different) tables)
- iv. Inner-recursive-joins (joining to itself)
- v. Outer-joins (restrictions as part of the WHERE and ON clauses)
- vi. Using where & having clauses

III. Nested queries
- i. In, Not In
- ii. Exists, Not Exists
- iii. Dynamic relations (as part of SELECT, FROM, and WHERE clauses)

IV. Set Oriented Operations
- i. Union
- ii. Difference
- iii. Intersection
- iv. Division

V. DDL & TCL Commands.
- i. Creating objects: tables, views, users, sequences, Collections etc.
- ii. Privilege management through the Grant/Revoke commands
- iii. Transaction processing using Commit/Rollback
- iv. Save points.

VI. PL/SQL Programming I
- i. Programs using named and unnamed blocks
- ii. Programs using Cursors, Cursor loops and records

VII. PL/SQL Programming II
- i. Creating stored procedures, functions and packages
- ii. Error handling and Exception
- iii. Triggers and auditing triggers

VIII. User Defined Types
- i. Creating Objects
- ii. Creating User Defined Operators

IX. Forms designing

X. Generating Reports

XI. Data base creation using schema builder

XII. Query execution using query builder

TEXT BOOKS:

1. **Oracle Database 10g The Complete Reference by Kevin Loney, Tata McGraw-Hill Publishing Company Limited.**
2. **Oracle 9i PL/SQL Programming by Scott Urman, Tata McGraw-Hill Publishing Company Limited.**
3. **Simplified Approach to Oracle by Parteek Bhatia, Sanjiv Datta, Ranjit Singh, Kalyani Publishers.**

CS 353 **ADVANCED UNIX LAB**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

LABCYCLE I : (Working with Commands and Shell Programming)

1. Working with different Unix commands, Pipes, I/O redirection.
2. Write Shell Programs for the following
   a) Display all the words which are entered as command line arguments.
   b) Changes Permissions of files in PWD as rwx for users.
   c) To print the list of all sub directories in the current directory.
   d) Program which receives any year from the keyboard and determine whether the year is leap year or not. If no argument is supplied the current year should be assumed.
   e) Program which takes two file names as arguments, if their contents are same then delete the second file.
3. Write shell scripts for the following
   a) To print the given number in the reversed order.
   b) To print first 25 Fibbonacci numbers.
   c) To print the Prime numbers between the specified range.
   d) To print the first 50 Prime numbers.
4. Write shell scripts for the following
   a) To delete all lines containing the word 'unix' in the files supplied as arguments.
   b) Menu driven program which has the following options.
      i) contents of /etc/passwd
      ii) list of users who have currently logged in.
      iii) present working directory. iv) exit.
   c) For sorting, searching and insertion, deletion of elements in the list

LABCYCLE II : (Working with Programs using System Calls)

1. Program to transfer the data from one file to another file by using un-buffered I/O.
2. Program to create two processes to run a loop in which one process adds all even numbers and the other adds all the odd numbers (Hint: use fork ( )).
3. Program to create to process 'i' and sends data to process 'j', prints the same after receiving it. (Hint: use vfork( )).
4. Program to demonstrates orphan process .
5. Program which demonstrates how to avoid Zombie using wait( ) .
6. Program which demonstrates deadlock between two processes.
7. Programs on Inter process communication using pipes and shared memory.
8. Create a semaphore operation on a shared file for write but not read.
9. Client/Server Socket Programming.

CS/IT 321 **COMPUTER NETWORKS**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(16 periods)**

INTRODUCTION: **Uses of Computer Networks**: Business Applications, Home Applications, Mobile Users, Social Issues, **Network Hardware:** LANs, MANs, WANs. **Network Software:** Protocol Hierarchies, Design Issues for the Layers, Connection –Oriented and Connectionless Services, Service Primitives, The Relationship of Services to Protocols.
Reference Models: The OSI Reference Model, The TCP/IP Reference Model.
Example Networks: The Internet, Connection-Oriented Networks (X.25, Frame Relay & ATM), Ethernet.
Network Layer: **Network Layer Design Issues**: Store-and-Forward Packet Switching, Services Provided to the Transport Layer, Implementation of Connectionless Service, Implementation of Connection-Oriented Service, Comparison of Virtual-Circuit & Datagram Subnets.
Routing Algorithms: The Optimality Principle, Shortest Path, Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing for Mobile Hosts.

UNIT-II **(16 periods)**

Network Layer(Continued):Congestion Control Algorithms: General Principles of Congestion Control, Congestion Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram Subnets, Load Shedding, Jitter Control.
Quality of Service: Requirements, Techniques for Achieving Good Quality of Service, Integrated Services, Differentiated Services.
Internetworking: Networks Differences, Connecting Networks, Concatenated Virtual Circuits, Connection less Internetworking, Tunneling, Internetwork Routing, Fragmentation.
The Network Layer in the Internet: The IP Protocol, IP Addresses, Internet Control Protocols, OSPF-The Interior Gateway Routing Protocol, BGP-The Exterior Gateway Routing Protocol, Internet Multicasting, Mobile IP,IPv6.

UNIT-III **(15 periods)**

The Transport Layer: **The Transport Service**: Services Provided to the Upper Layers, Transport Service Primitives, Berkeley Sockets.
Elements of Transport Protocols: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery, **Simple transport Protocol.**
The Internet Transport Protocol (UDP): Introduction to UDP, Remote Procedure Call, The Real-Time Transport Protocol.
The Internet Transport Protocols (TCP): Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Transmission Policy, TCP Congestion Control, TCP Timer Management, Wireless TCP & UDP Transactional TCP.

UNIT-IV **(13 periods)**

Application Layer: **The Domain Name System(DNS):** The DNS Name Space, Resource Records, Name Servers. **Electronic Mail**: Architecture & Services, The User Agent, Message Formats, Message Transfer, Final Delivery.
The World Wide Web: Architectural Overview, Static Web Documents, Dynamic Web Documents, HTTP – Hyper Text Transfer Protocol, Performance Enhancements.
Multimedia: Introduction to Digital Audio, Audio Compression, Streaming Audio, Internet Radio, Voice over IP, Introduction to Video, Video Compression, Video on Demand, The MBone – The Multicast Backbone.

TEXT BOOK:

1. Tanenbaum, "Computer Networks", 4th Edition, (Pearson Education / PHI).

REFERENCE BOOKS:

1. Kurose & Ross, "Computer Networks" – A Top-down approach featuring the Internet", Pearson Education – Alberto Leon – Garciak.
2. Leon-Gartia, Indra Widjaja, "Communication Networks Fundamental Concepts and Key Architectures", TMH.
3. Nader F.Mir, "Computer and Communication Networks", PHI

CS/IT 322 **COMPILER DESIGN**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I **(17 periods)**

Introduction to compiling: Compilers, The Phases of a compiler.

Simple one-pass compiler: Overview, syntax definition, syntax direct translation, parsing, a translator for simple expressions.
Lexical Analysis: The role of the lexical analyzer, input buffering, simplification of tokens, Recognition of tokens, implementing transition diagrams, a language for specifying lexical analyzers.
Syntax analysis: Top down parsing - Recursive descent parsing, Predictive parsers.

UNIT – II **(15 periods)**

Syntax Analysis: Bottom up parsing - Shift Reduce parsing, LR Parsers – Construction of SLR, Canonical LR and LALR parsing techniques, Parser generators – Yacc Tool.
Syntax – Directed Translation: Syntax Directed definition, construction of syntax trees, Bottom-up evaluation of S – attributed definitions.

UNIT – III **(16 periods)**

Runtime Environment: Source language issues, Storage organization, Storage-allocation strategies, Access to nonlocal names, Parameter passing..
Symbol Tables: Symbol table entries, Data structures to symbol tables, representing scope information.

UNIT – VI **(18 periods)**

Intermediate code Generation: Intermediate languages, Declarations, Assignment statements, Boolean expressions, Backpatching.
Code Generation- Issues in the design of code generartor, the target machines, Basic blocks and flow graphs, Next use information, A simple code generator

Text Books:

1. Alfred V.Aho, Ravi Sethi, JD Ullman, 'Compilers Principles, Techniques and Tools', Pearson Education, 2007.

References:

1. Alfred V.Aho, Jeffrey D. Ullman, 'Principles of Compiler Design', Narosa publishing
2. Lex & Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
3. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.
4. Engineering a Compiler-Cooper & Linda, Elsevier.
5. Compiler Construction, Louden, Thomson..

CS/IT 323 **WEB TECHNOLOGIES**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Unit I **(16 periods)**

Introduction to XHTML
Cascading Style Sheets (CSS)
JavaScript: Introduction to Scripting
Control Statements, Part 1
Control Statements, Part 2
Functions
Arrays
Objects

Unit II **(18 periods)**

Dynamic HTML: Object Model and Collections
Dynamic HTML: Event Model
XML, RSS (Really Simple Syndication)

Unit III **(16 periods)**

Building Ajax-Enabled Web Applications
Web Servers (IIS and Apache)
Ruby and Ruby on Rails

Unit IV **(20 periods)**

JavaServer Faces Web Applications: Part 1
JavaServer Faces Web Applications: Part 2
Web Services

Text Books:

Harvey M. Deitel and Paul J. Deitel, "Internet & World Wide Web How to Program", 4/e, Pearson Education.

References:

1. Jason Cranford Teague "Visual Quick Start Guide CSS, DHTML & AJAX", 4e, "Pearson Education.
2. Tom Nerino Doli smith "JavaScript & AJAX for the web" Pearson Education 2007.
3. Joshua Elchorn "Understanding AJAX" Prentice Hall 2006.
4. Hal Fulton "The Ruby Way", 2e, Pearson Education 2007.
5. David A. Black "Ruby for rails" Dreamtech Press 2006.
6. Bill Dudney, Johathan lehr, Bill Willies, Lery Mattingly "Mastering Java Server Faces" Wiely India 2006.

CS/IT 324 **SOFTWARE ENGINEERING**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(15 periods)**

INTRODUCTION TO SOFTWARE ENGINEERING:
The Evolving Role of Software, Software, The Changing Nature of Software, Legacy Software, Software Myths.

A GENERIC VIEW OF PROCESS:
Software Engineering - A Layered Technology, A Process Framework, The CMMI, Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process.

PROCESS MODELS:
Prescriptive Models, The Waterfall Model, Incremental Process Models, Evolutionary Models, Specialized Process models, The Unified Process .

AN AGILE VIEW OF PROCESS:
What Is Agility? , What Is an Agile Process? , Agile Process Models.

UNIT-II (17 periods)

SOFTWARE ENGINEERING PRACTICE:
Software Engineering Practice, Communication Practices, Planning Practices, Modeling Practices, Construction Practice, Deployment.

SYSTEM ENGINEERING:
Computer-Based Systems, The System Engineering Hierarchy, Business Process Engineering: An Overview, Product Engineering: An Overview, System Modeling.

REQUIREMENTS ENGINEERING:
A Bridge To Design and Construction, Requirements Engineering Tasks, Initiating the Requirements Engineering Process, Eliciting Requirements, Developing Use-cases, Building the Analysis Model, Negotiating Requirements, Validating Requirements.

BUILDING THE ANALYSIS MODEL:
Requirements Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Flow-Oriented Modeling, Class Based Modeling Creating a Behavioral Model.

UNIT -III **(18 periods)**

DESIGN ENGINEERING:
Design within the Context of Software Engineering, Design Process and Design Quality, Design Concepts The Design Model, Pattern Based Software Design.

CREATING AN ARCHITECTURAL DESIGN:
Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design, Assessing Alternative Architectural Designs, Mapping Data Flow into Software Architecture.

MODELING COMPONENT-LEVEL DESIGN:
What Is a Component? , Designing Class-Based Components, Conducting Component-Level Design, Object Constraint Language, Designing Conventional Components.

PERFORMING USER INTERFACE DESIGN:
The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation

UNIT -IV **(20 periods)**

SOFTWARE PROCESS AND PROJECT METRICS:
Introduction: Metrics Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics with Process, Statistical Quality Control, Metrics for Small Organizations, Establishing a Software Metrics Programming.

SOFTWARE QUALITY ASSURANCE:
Quality Concepts, Quality Movement, SQA, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Software Reliability, ISO 9000 Quality Standards, SQA Plan.

SOFTWARE TESTING STRATEGIES:
Strategic Approach, Strategic Issues, Test strategies for Conventional Software, Test strategies for Object Oriented Software, Validation Testing, System Testing, The Art of Debugging.

TESTING TACTICS:
Software Testing Fundamentals, Black-Box and White-Box Testing, White-Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing, Object-Oriented Testing Methods, Testing for Specialized Environments, Architectures, and Applications, Testing patterns

PRODUCT METRICS:
Software Quality, A Framework for Product Metrics, Metrics for the Analysis Model, Metrics for the Design Model, Metrics for Source Code, Metrics for Testing, Metrics for Maintenance.

Textbooks:

1) Roger S.Pressman, 'Software Engineering- A Practitioner's Approach', Sixth Edition, McGraw- Hill International.

Reference Books:

1. Ian Sommerville, 'Software Engineering', Sixth Edition, Pearson Education.
2. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, 'Fundamentals of Software Engineering', Second Edition, PHI.
3. RajibMall, 'Fundamentals of Software Engineering', Second Edition, PHI.

CS 325 DESIGN AND ANALYSIS OF ALGORITHMS

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I (17 periods)

Introduction: Algorithm Design paradigms – motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptotic Notations.

Divide and Conquer: Structure of divide and conquer algorithms: examples, quick sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.

UNIT – II (20 periods)

Greedy Programming: Overview of the greedy paradigm examples of exact optimization solution, Approximate solution (Knapsack problem) Shortest-Path Algorithms – Unweighted Shortest Paths – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's and Kruskal's algorithms.

Dynamic Programming: Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, Matrix multiplication, Traveling Salesman Problem, longest Common sequence.

UNIT – III (15 periods)

Graph Searching and Traversal: Overview, Traversal methods (depth first and breadth first search), Applications of DFS – connected components, Bi-connected components.

Back tracking: Overview, 8-queen problem and Knapsack problem.

UNIT – IV (18 periods)

Branch and Bound: LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Travelling Salesman Problem.

Computational Complexity: Complexity measures, Polynomical Vs Non-polynomial time complexity; NP-hard and NP-complete classes, examples.

TEXT BOOK:

1. E. Horowitz, S. Sahni and S.Rajsekran, "Fundamentals of Computer Algorithms", Galgotia Publication.

REFERENCE BOOKS:

1. T. H. Cormen, Leiserson, Rivest and Stein, "Introduction of Computer Algorithm", PHI.
2. Sara Basse, A.V. Gelder, "Computer Algorithms", Addison Wesley.

CS/IT 326(A) ARTIFICIAL INTELLIGENCE

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(18 periods)**

PROBLEMS, PROBLEM SPACES AND SEARCH

Defining the Problem as a State Space Search - Production Systems - Problem Characteristics - Production System Characteristics - Issues in the Design of Search Programs.

HEURISTIC SEARCH TECHNIQUES

Generate-and-Test - Hill Climbing - Best-First Search - Problem Reduction - Constraint Satisfaction - Means-Ends Analysis.

UNIT-II **(14 periods)**

KNOWLEDGE REPRESENTATION USING PREDICATE LOGIC

Representing Simple Facts in Logic - Representing Instance and ISA Relationships - Computable Functions and Predicates - Resolution.

REPRESENTING KNOWLEDGE USING RULES

Procedural versus Declarative Knowledge - Logic Programming - Forward Versus Backward Reasoning – Matching - Control Knowledge.

UNIT-III **(15 periods)**

SLOT – AND – FILLER STRUCTURES

Semantic Nets - Conceptual Dependency – Scripts.

PLANNING

Overview - An Example Domain: The Blocks Word - Component of Planning Systems - Goal Stack Planning - Non-linear Planning using constraint posting – Hierarchical planning – Reactive systems.

UNIT-IV **(13 periods)**

LEARNING

What is learning? – Rote learning - Learning by taking advice – Learning in problem solving – Learning from example: Induction – Explanation Based Learning.

EXPERT SYSTEMS

Representing and using domain knowledge – Expert system shells – Explanation – Knowledge Acquisition.

Textbooks:

1. Elaine Rich & Kevin Knight, 'Artificial Intelligence', 2nd Edition, (Tata McGraw Hill Edition)

Reference Books:

1. Patrick Henry Winston, 'Artificial Intelligence', Pearson Education,
2. Russel and Norvig, 'Artificial Intelligence', Pearson Education/ PHI

CS/IT 326(B) ADVANCED DATABASE MANAGEMENT SYSTEMS

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I (14 Periods)

Algorithms for Query Processing and Optimization : Translating SQL queries into relational algebra-algorithms for external sorting-algorithms for select and join operations-algorithms for project and set operations-implementing aggregate operations and outer joins-combining operations using pipelining-using heuristics in query optimization

Data base systems architecture and the system Catalog : System architectures for DBMSs, Catalogs for Relational DBMSs, System catalog information in oracle.

Practical database design and tuning : Physical Database Design in Relational Databases-an overview of Database Tuning in Relational systems

UNIT-II (16 Periods)

Distributed DBMS Concepts and Design : Introduction-function and architecture of a Distributed DBMS-Distributed Relational Database Design-transparencies in a Distributed DBMS-Date's Twelve Rules for Distributed DBMS

Distributed DBMS-Advanced Concepts : Distributed Transaction Management-Distributed Concurrency Control-Distributed Deadlock Management-Distributed Database Recovery-The X/Open Distributed Transaction processing model-Replication Servers

UNIT-III (19 Periods)

Introduction to Object DBMSs : Advanced Database Applications-Weaknesses of RDBMSs-Object oriented Concepts-Storing objects in a Relational Database-Next generation Database systems

Object-Oriented DBMSs-Concepts and Design : Introduction to Object-Oriented Data Models and DBMSs-OODBMS perspectives-Persistence-Issues in OODBMSs-The object Oriented Database System Manifesto-Advantages and Disadvantages of OODBMSs-Object oriented Database Design

Object-Oriented DBMSs-Standards and Systems : Object management group-Object Database Standard ODMG3.0, 1999-Object store

Object relational DBMSs : Introduction to Object-relational Database systems-the third generation Database manifesto-Postgres-an early ORDBMS-SQL3

UNIT-IV (13 Periods)

Emerging database technologies and applications : Mobile databases-multimedia databases-geographic information systems-genome data management

XML and Internet Databases : Structured, semi structured, and unstructured data-XML Hierarchical (Tree) Data model-XML documents, DTD and XML Schema-XML Documents and Databases-XML querying

Enhanced data models for advanced applications : Active database concepts and triggers-temporal database concepts-multimedia databases-introduction to deductive databases

Text Books:

1. Database Systems: A practical approach to design, implementation and management-thomas m Connolly and Carolyn E.begg
2. Fundamentals of Database Systems, Elmasri Navrate, 5/e, Pearson Education.

References:

1. Principles of Distributed Database Systems, Ozsu, 2/e, PHI.

CS/IT 326 (C) **OPERATIONS RESEARCH**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT I (15 periods)

LINEAR PROGRAMMING :Definition and Scope of Operations Research, Mathematical formulation of the problem, graphical method, Simplex method, artificial basis technique, dual Simplex method. Degeneracy, alternative optima, unbounded solution, infeasible solution.

UNIT II (15 periods)

TRANSPORTATION PROBLEM: Introduction to the problem, LP formulation of a transportation problem. Basic feasible solution by north-west corner method, Vogel's approximation method, least cost method. Finding optimal solution by MODI method, degeneracy, unbalanced transportation matrix and Maximization in transportation model.

THEORY OF GAMES: Introduction, rectangular two person zero sum games, solution of rectangular games in terms of mixed strategies, solution of 2x2 games without saddle point, concept of dominance to reduce the given matrix, Graphical method for 2xn and mx2 games.

UNIT III (15 periods)

INVENTORY CONTROL: Introduction, EOQ with uniform rate of demand, Economic lot size with finite rate of replenishment, Quantity discounts, ABC analysis of inventory.
DYNAMIC PROGRAMMING: Introduction, Characteristics of D.P. model, the recursive equation approach, Computational Procedure in dynamic Programming, solution of an L.P. by D.P.

UNIT IV (15 periods)

PROJECT PLANNING THROUGH NETWORKS: Introduction, Basic steps in PERT/CPM techniques, Network diagram presentation, Rules of drawing network diagram, Fulkerson's rule, Time estimates and Critical path in network analysis, Project evaluation and review technique, Application areas of PERT/CPM techniques.

SIMULATION: Introduction, Monte-carlo Simulation, Application to Inventory Control, Application to Queuing Problems.

Textbooks :

1. SD Sharma, 'Operations Research (Units: I, IV) Kedarnath, Ramnath & Co.,Meerut.
2. BS Goel & S.K.Mithal, 'Operations Research (Units: II,III)' Pragati Prakasham, Meerut.

Reference Books :

1. Kanthi Swarup, PK Gupta & Manmohan, 'Operations Research' Sultanchand & Sons, New Delhi.
2. Operations Research – Gupta and Hira
3. Pert and CPM Principles and Applications – L.S. Srinath

CS/IT 326(D) **REAL-TIME SYSTEMS**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I **(17 periods)**

Typical Real-Time applications, Hard versus Soft Real-Time systems, A reference model of Real-Time Systems.

UNIT – II **(15 periods)**

Commonly used approaches to Real-Time scheduling, Clock-Driven scheduling, Pros and Cons of Clock-driven scheduling.

UNIT – III **(18 periods)**

Priority-Driven scheduling of Periodic tasks: static assumption, Fixed-Priority versus Dynamic-Priority algorithms, Optimality of the RM and DM algorithms, A schedulability test for Fixed-Priority tasks with short response times and arbitrary response times, sufficient schedulability conditions for the RM and DM algorithms;

Scheduling Aperiodic and Sporadic jobs in priority-Driven systems: Deferrable Servers, Sporadic Servers, Constant Utilization, Total Bandwidth and weighted Fair-Queuing Servers, Scheduling of sporadic Jobs.

UNIT – IV **(15 periods)**

Resources and Resources Access Control, Scheduling Flexible computations and tasks with temporal distance constraints.

Text book:

Jane W.S.Liu, 'Real-Time Systems', Pearson Education Asia.

Reference books:

C.M.Krishna and G.Shin, 'Real-Time Systems', Tata McGraw Hill Co. Inc., 1997.

CS 326 (E) NEURAL NETWORKS

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I **(16 periods)**

Introduction, Simple Neural Networks for Pattern Classification: General Discussion, Hebb Net, Perceptron, Adaline.

UNIT – II **(14 periods)**

Discrete Hopfield Net, Hamming Net, Kohonen Self-Organizing Maps, Linear Vector Quantization.

UNIT – III **(12 periods)**

Adaptive Resonance Theory: Introduction, ART1, ART2.

UNIT – IV **(18 periods)**

Standard Back Propagation Neural Net, Gaussian Machine, Cauchy Machine, Boltzmann Machine with Learning, Simple Recurrent Net.

TEXT BOOK:

1. Fundamentals of Neural Networks – Laurence Fausett, Pearson Education.

REFERENCE BOOKS:

1. Neural Networks – James A.Freeman/ David A.Skapura,Pearson Education.
2. Neural Networks – Simon Haykin – 2nd edition, Pearson Education.

CS/IT 326(F) **PRINCIPLES OF PROGRAMMING LANGUAGES**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(17 periods)**

Preliminaries : Reasons, Programming Domains, Language: Evolution Criteria, Categories, Design Trade-offs, Implementation, Programming Environments,
Evolution of Programming Languages.
Describing syntax and Semantics : General Problems, Describing Syntax, Recursive Descent Parsing, Attribute Grammar, Dynamic Semantics.
Primitive data types and variables : Names, variables, Concept of Binding, Type checking, Strong typing, Type compatibility, Named Constants, Variable Initialization.

UNIT-II **(18 periods)**

Scope and Extent : Scope, Scope and Life Time, Referencing Environments.
Data Types : Primitive, character string, User-defined, Array, Associative Arrays, Record, Union, Set, Pointer.
Expression and the Assignment Statement : Arithmetic Expressions, Overloading, Type Conventions, Relational and Boolean, Short Circuit, Assignment, Mixed mode Assignment.
Statement level Control Structures: Compound, Selection, Iterative Statements, Unconditional Branching, Guarded Commands.

UNIT-III **(15 periods)**

Subprograms : Fundamentals, Design Issue, Local Referencing Environment, Parameter Passing, Parameters that are sub-program names, Overloaded Sub-programs, Generic, Separate and Independent Compilation, Design Issues for functions, Non-local environments, User Defined Overloaded Operators, Co routines.
Implementing Subprograms : Fortran 77, Algol-like languages, Blocks, Dynamic Scoping, Implementing Parameters that are sub-program names.
Data Abstraction : Concepts, Encapsulation, Data, Introduction, Design Issues, Examples, Parameterized Abstract Data Types.

UNIT-IV **(15 periods)**

Symmetric and Concurrent Subprograms : Support for Object Oriented Programming, Design Issues, Smalltalk, Support for Object Oriented Programming in ; C++, Java, ADA 95, Implementation
Concurrency : Sub-program level, Semaphores, Monitors, Message Passing, Concurrency in ADA 95, Java Threads, Statement level concurrency.
Exception handling : Introduction, Exception Handling in : PL1, ADA, C++, Java.

Textbook:

1. Robert W.Sebesta, 'Concepts of Programming Languages', Addison Wesley Longman Inc.,199.

Reference Books:

1. Ellis Horowitz, 'Fundamentals of Programming Languages', Galgotia Publications (P) Ltd., 1994.
2. Pratt Terrence.W, 'Programming Languages, Design & Implemented' Prentice Hall of India, 1993.

CS/IT 361 **TERM PAPER**

Lectures	:	3 periods/week	Sessional Marks	:	50
University Exam	:	--	University Examination Marks	:	--

It is aimed as a precursor to the project work done in the second semester of the final year B.Tech. It should help the students to identify their Research area / topic and should form the groundwork and preliminary research required for the project work. The batches formed for pursuing the Project Work in the Final Year shall select some research article published in the latest journals of IEEE, ACM and other related journals. Each batch should refer to a minimum of FIVE reference sources outside their prescribed textbooks. The batch must gain an understanding of the research tools used and the related material, available both in printed and digital formats. Each project batch must make the presentation for two rounds on the same research article about their understanding, conclusion and if possible propose the extensions for the work. Each individual of the batch must give the presentation in both the rounds.

At the end of the Semester, the batch must submit a report in IEEE format, on the work they have pursued throughout the Semester containing

The aim and objective of the study.
The Rationale behind the study.
The work already done in the field and identified.
Hypothesis, experimentation and discussion.
Conclusion and further work possible.
Appendices consisting of Illustrations, Tables, Graphs etc.,

Evaluation is to be done for the two presentations made and the report submitted.

Method of Evolution:	1. Day to day work	-	10 marks
	2. Seminar – I	-	10 marks
	3. Term Paper Report	-	15 marks
	4. Seminar – II	-	15 marks

	TOTAL	-	50 marks

CS/IT 362 **WEB TECHNOLOGIES**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Write codes different types of styles in CSS.
2. Write java scripts covering Function, recursive functions, Arrays and Objects.
3. Demonstrate collection objects.
4. Demonstrate event model.
5. Write well-formed and valid XML documents.
6. Write code for displaying XML using XSL.
7. Demonstrate Document Object Model for an XML document.
8. Programs on Ruby & Ruby on Rail.
9. Develop a web application using JSF.
10. Application on Web Services.

CSE 363 **ALGORITHMS LAB**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Implement Strassen's Multiplication.
2. Implement Dijkstra's Algorithm.
3. Implement Prim's Algorithm.
4. Implement Kruskal's Algorithm.
5. To determine Shortest Path in Multi-stage graph using Forward & Backward approach.
6. Implement Traveling Salesman Problem using Dynamic Programming.
7. Implement longest common sequence algorithm.
8. Implement DFS traversal of a given graph.
9. Find the strongly connected components of a graph.
10. Find the articulation bi-connected components.
11. Implement FIFO branch and bound algorithm for 0/1 Kanpsack problem.
12. Implement LC branch and bound algorithm for Traveling Salesman problem.

CS 411 **WIRELESS NETWORKS**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I **(12 periods)**

Introduction – Applications – A Short History of Wireless Communications – A Market for Mobile Communications – A Simplified Reference Model.
Wireless Transmission – Frequencies – Signals – Antennas – Signal Propagation – Multiplexing – Modulation – Spread Spectrum.
Medium Access Control – Motivation for a Specialized MAC – SDMA – FDMA – TDMA – CDMA – Comparison.

UNIT – II **(18 periods)**

Telecommunication Systems – GSM, DECT, TETRA, UMTS and IMT-2000
Satellite Systems – History, Applications, Basics (GEO, LEO, MEO), Routing, Localization, Handover.
Broadcast Systems – Overview, Cyclic Repetition of Data, Digital Audio Broadcasting – Digital Video Broadcasting.

UNIT – III **(15 periods)**

Wireless LAN – Infrared Vs. Radio Transmission – Infrastructure and Ad Hoc Networks – IEEE 802.11 – HIPERLAN – Bluetooth.
Mobile Network Layer –Mobile IP – Dynamic Host Configuration – Ad Hoc Networks.

UNIT – IV **(15 periods)**

Mobile Transport Layer – Traditional TCP – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission / Time-Out Freezing – Selective Retransmission – Transaction Oriented TCP.
Wireless Application Protocol – Architecture – Wireless Datagram Protocol – Wireless Transport Layer Security – Wireless Transaction Protocol – Wireless Session protocol – Wireless Application Environment – Wireless Markup Language – WML Script – Wireless Telephony Application – Example Stacks with WAP.

Textbooks:

1. J.Schiller, "Mobile communications", Addison-Wesley, 2003

Reference Books:

1. William Stallings, "Wireless Communication Networks",
2. UWE Hansmann, Lother Merk, Martin S.Nicklous, Thomas Stober, "Principles of Mobile Computing", 2nd Edition.

CS 412 **DISRIBUTED SYSTEMS**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT- I **(12 periods)**

Introduction: Definition of a Distributed System, Goals, Hardware Concepts, Software Concepts, The Client-Server Model.
Communication: Remote Procedure Call- Basic RPC Operation, Parameter Passing, Extended RPC Models, Remote Object Invocation - Distributed Objects, Binding a Client to an Object, Static versus Dynamic Remote Method Invocations, Parameter Passing.
Message-Oriented Communication:-Persistence and Synchronicity in Communication, Message Oriented Transient and Persistent Communication.

UNIT- II **(18 periods)**

Processes:- Threads, Clients, Servers, Code Migration
Naming: Naming Entities -Names, Identifiers and Addresses, Name Resolution, The Implementation of a Name Space. Locating Mobile Entities, Removing Unreferenced Entities

UNIT- III **(18 periods)**

Synchronization: Clock Synchronization. Logical Clocks, Election Algorithms, Mutual Exclusion.
Consistency and Replication: Introduction, Data- Centric Consistency Models, Client – Centric Consistency Models, Distribution Protocols, Consistency Protocols.

UNIT- IV: **(12 periods)**

Fault tolerance:-Introduction to Fault Tolerance, Process Resilence, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, Recovery.

Distributed File Systems:-Sun Network File System, The Coda File System.

Text book:

1. Andrew S.Tanenbaum, Maarten Van Steen “Distributed Systems: Principles and Paradigms”, 2002, Pearson Education/PHI.

Reference books:

1. Coulouris, Dollimore,Kindberg,“Distributed Systems-Concepts and Design” 3rd edition, Pearson Education.
2. Mukesh, Singhal & Niranjan G.Shivarathri, “Advanced Concepts in Operating Systems”, TMH.
3. Sinha, “Distributed Operating System – Concepts and Design”, PHI.

CS/IT 413 OBJECT ORIENTED ANALYSIS AND DESIGN

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT - I (25 periods)

What is Object-Orientation: Basic Concepts, The Origins of ObjectOrientation, Object-Oriented Languages Today;
Agate Ltd Case Study – Introduction to Agate Ltd.
Modelling Concepts: Models and diagrams, Drawing Activity Diagrams, A Development Process;
Requirements Capture: User Requirements, Fact Finding Techniques, User Involvement, Documenting Requirements, Use Cases, Requirements Capture and Modelling;
Agate Ltd Case study - Requirements Model .
Requirements Analysis: What Must a Requirements Model Do?, Use Case Realization, The Class Diagram, Drawing a Class Diagram, CRC Cards, Assembling the Analysis Class Diagram.
Agate Ltd Case study - Requirements Analysis .

UNIT - II (15 periods)

Refining the Requirements Model: Component based development, Adding further structure, Software development patterns.
Object Interaction: Object Interaction and Collaboration, Interaction Sequence Diagrams, Collaboration Diagrams, Model Consistency;
Specifying Operations: The Role of Operation Specifications, Contracts, Describing Operation Logic, Object Constraint Language, Creating an Operation Specification;
Specifying Control: States and Events, Basic Notation, Further Notation, Preparing a Statechart, Consistency Checking, Qualify Guidelines;
Agate Ltd Case study - Further Analysis

UNIT -III (16 periods)

Moving Into Design: How is Design Different from Analysis?, Logical and Physical Design, System Design and Detailed Design, Qualities and objectives of Analysis and Design, Measurable Objectives in Design, Planning for Design.
System Design: The Major Elements of System Design, Software Architecture. Concurrency, Processor Allocation, Data Management Issues, Development Standards, Prioritizing Design Trade-offs, Design for Implementation;
Object Design: Class Specification, Interfaces, Criteria for Good Design, Designing Associations, Integrity Constraints, Designing Operations, Normalization;
Design Patterns: Software Development Patterns, Documenting Patterns-Pattern Templates, Design Patterns, How to Use Design Patterns, Benefits and Dangers of Using Patterns;
Human-Computer Interaction: The User Interface, Approaches to User Interface Design, Standards and legal Requirements;

UNIT-IV (14 periods)

Designing Boundary Classes: The Architecture of the Presentation Layer, Prototyping the User Interface, Designing Classes, Designing Interaction with Sequence Diagrams, The Class Diagram Revisited, User Interface Design Patterns, Modelling the Interface Using Statecharts; **Agate Ltd Case Study -** Design

Implementation: Software Implementation, Component Diagrams, Development Diagrams, Software Testing, Data Conversion, User Documentation and Training, Implementation Strategies, Review and Maintenance;
Reusable Components: Why Reuse?, Planning a Strategy for Reuse, Commercially Available Componentware;
Managing Object-Oriented Projects: Resource Allocation and Planning, Managing Iteration, Dynamic Systems Development Method, Extreme Programming, Software Metrics, Process Pattems, Legacy Systems, Introducing Object Oriented Technology;

Text Book:

1. Object-Oriented Systems Analysis And Design Using UML - Simon Bennett, Steve McRobb and Ray Farmer - Tata McGraw-Hili Edition - Second Edition

Reference Books :

1. James Rumbaugh, Jacobson, Booch, 'Unified Modeling Language Reference Manual', PHI.
2. Jacobson et al., 'The Unified Software Development Process', AW, 1999.
3. Atul Kahate, Object Oriented Analysis & Design, The McGraw-Hill Companies, 2004.

CS/IT-414 **ENTERPRISE PROGRAMMING**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I **(16 periods)**

J2EE Overview
Multi-Tier Architecture
Best Practices
Design Patterns and Frame Works
Java and XML

UNIT – II **(20 periods)**

Java Servlets
Java Server Pages
Enterprise JavaBeans

UNIT – III **(18 periods)**

Java Mail API
Java Interface Definition Language and CORBA
Java Remote Method Invocation
Java Message Service
Java Message Service
Java Naming and Directory Interface API

UNIT – I V **(20 periods)**

SOAP
Universal Description, Discovery
Electronic Business XML
Java API for XML Registries (JAXR)
Web Services Description Language (WSDL)

Books:

Jim Keogh **"**The complete Reference J2EE**"** Tata McGraw Hill.

References:

1. Subrahmanyam Allamaraju et.all "Professional Java Server Programming" SPD /a! Press.
2. Stephanie Bodoff, Eric Armstrong, Jennifer Ball, Debbie Bode Carson, Lan Evans, Dale Green, Kim Haase, Eric Jendrock, **"**The J2EE Tutorial**"** Pearson Education.
3. Dreamtech Software Team **"**Java Server Programming**"** Dreamtech Press.
4. James McGovern, et.all **"**J2EE Bible**".**
5. BV Kumar, S Sangeetha, SV Subrahmanya **"**J2EE Architecture**"** Tata McGraw Hill**.**

CS/IT 415(A) **OPEN SOURCE SYSTEM**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Unit I **(20 periods)**

An over view of Red Hat Linux
Installing Red Hat Linux
Setting up Apache Web Server
Setting up a MySQL Database server
Configuring PHP To Use MYSQL
Getting Started with PHP – Scripts, Types in PHP, Useful Functions.
The PHP Language – Data Types, Type Conversions, Variables and Constants, Expressions and Operators, Control Structures.
Code Organization and Reuse – Basic Code Reuse: Functions, Intermediate Code Reuse: Using and Including Files.
Object-Oriented Programming – Extending Objects, Other Features.
Working with Arrays – Arrays Revisited, Iterating Over Elements in an Array, Multi-Dimensional Arrays, Operations on Arrays.
Strings and Characters of the World – Strings and PHP, Character Sets and Unicode, Making Sense of It All in PHP, Configuring PHP for Unicode, Operating on Strings.
Interacting with the Server: Forms – Working with HTML Forms, Working with Server, Redirecting the User.

Unit II **(18 periods)**

Introduction to Databases – Basics, Motivations for Using a DBMS, Major Database Servers – How to Select a Database Server.
PHP and Data Access – Connecting and Authenticating, Executing Queries, Queries a Go-Go, Old-School Interfaces.
Web Applications and the Internet – A closer look at the WWW, Designing Web Applications
Implementing a User Interface – Considerations, Implementing your User Interface.
User Management – How users Connect to our Application, Visitors Versus Known Users, Validating Users.
Securing Your Web Applications: Planning and Code Security – Strategies for Dealing with Security, Identifying the Threats, Securing your Code.
Securing Your Web Applications: Software and Hardware Security – Securing Your Web Server and PHP, SSL, Database Security, Protecting the Network, Computer and Operating System Security.

Unit III **(17 periods)**

Error Handling and Debugging – How Errors Are Born, How PHP Manages Errors, Exceptions, Debugging.
Cookies and Sessions – Tasty and Useful, Sessions, Session Security.
User Authentication – Planning for Members: Web Server-Provided Authentication.
Advanced Output and Output Buffering – Globalization and Locales, Formatted Output, Output Buffering.

Data Validation with Regular Expressions – Using Regular Expressions, Data Validation with Regular Expressions, Other Regular Expression Functions.

Unit IV **(15 periods)**

Files and Directories – Accessing Files, Accessing Directories, Security Considerations.
File Uploading – Uploading User Files, A File-Uploading Example, Security Considerations.
Working with Dates and Times – Sources of Dates and Times, Dates and Times in PHP, More Dates and Times in Database Servers.
Using PEAR – Introduction, Installation and Configuration, Basic Commands, Example: Using the Date Class.
Development and Deployment – Coding Standards, Source Code Control, Testing, Deployment.
Strategies for Successful Web Applications: Singleton Objects - Session Management – A Holistic Approach to Error Handling, Database Connection Management, PHP Configuration Settings.

TEXT BOOKS :

1. Red Hat Linux Bible by Christoopher Negus Wiley Dreamtech
2. Core Web Applications Development with PHP and MySQL by Marc Wandschneider

REFERENCES :

1. Beginning PHP5, Apache, MySQL Web Development by Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jermy Stolz, Michael K. Glass, Wiley Dreamtech (Wrox) 2006.
2. PHP5 and MySQL Bible by Tim Converse, Joyce Park, Clark Morgan Wiley India 2004.

CS/IT 415(B) INTERACTIVE COMPUTER GRAPHICS

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT I : (20 Periods)

Introduction : Basic concepts, Application areas of Computer Graphics, overview of graphics systems - video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations, input devices and their logical classifications, Hard copy devices and Graphics software.

Output primitives: Points and lines, line drawing algorithms – DDA, Bresenham's, mid-point circle and ellipse algorithms, Filled area primitives - Scan line polygon fill algorithm, inside-outside tests, boundary-fill and flood-fill algorithms, character generation and Antialiasing.

UNIT II : (15 Periods)

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Liang-Barsky line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT III: (15 Periods)

Three Dimensional Concepts: 3-D Display method, 3-D object representation: Polygon surfaces, Curved lines and surfaces, quadric surfaces, spline representation, Bezier curve and surfaces.

3-D Geometric transformations : Translation, rotation, scaling, reflection and shear transformations, composite transformations.

UNIT IV: (15 Periods)

3-D viewing : Viewing pipeline, viewing coordinates, projections, view volume and general projection transforms and clipping.

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

TEXT BOOKS :

1. "Computer Graphics *C version*", Donald Hearn and M.Pauline Baker, Pearson Education.

REFERENCES :

1. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
2. Computer Graphics, Steven Harrington, TMH
3. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc- Graw hill edition.
4. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
5. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
6. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.

CS/IT 415 (C) .NET TECHNOLOGIES

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Unit I
Introduction to C# 2.0
Expressions and control structures
Strings and regular expressions
Arrays and collections
Object-oriented programming in C#
Introduction to generics
I/O and persistence
Working with XML
Events and delegates
Multithreaded programming
Reflection fundamentals

Unit II
Assemblies and AppDomains
COM and windows interoperability
Code access security
Cryptography and data protection
Optimizing your .NET 2.0 code
ADO.NET fundamentals
Advanced ADO.NET techniques
Working with ADO.NET data providers
Strongly typed DataSets
Programming with SQL Server 2005

Unit III
Introduction to ASP.NET 2.0 and Web forms
State management in ASP-NET 2.0
Using master pages
ASP.NET personalization and customization
Introduction to Web parts
Building rich, data-driven Web applications
Securing your ASP.NET applications
Creating custom ASP.NET providers
Development ASP.NET controls
ASP.NET management and monitoring
Exposing functionality with Web services
Advanced Web services programming

Unit IV
Introduction to Windows Forms 2.0
The Windows Forms control library
Advanced user interface programming
Data binding with Windows Forms 2.0
Developing smart clients
Deploying applications using ClickOnce
Using Enterprise services
Remoting

Text Book:
1. Microsoft Visual C# 2005 Unleashed by **Kevin Hoffman**, Sams (Pearson India), 2006.
Reference Books
1. Core C# and .NET by Stephen C.Pary, Prentice Hall (Pearson Education), 2006.
2. C#: The complete reference by Herbert Schildt, Tata McGraw Hill, 2006 2/e.
3. Pro C# 2005 and the .NET Platform by Andrew Troelson, Apless 2005 3/e

CS/IT 415 (D) **DIGITAL SIGNAL PROCESSING**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT 1 **(20 Periods)**

Introduction:
Signals, Systems, and Signal Processing, Classification of Signals, The Concept of Frequency in Continuous-Time and Discrete-Time Signals, Analog-to-Digital and Digital-to-Analog Conversion.

Discrete-Time Signals And Systems:
Discrete-Time Signals, Discrete-Time Systems, Analysis of Discrete-Time Linear Time-Invariant systems, Discrete-Time Systems Described by Difference Equations, Implementation of Discrete-Time Systems2.6 Correlation of Discrete-Time Signals.

The Z-Transform And Its Application To The Analysis Of Lti Systems:
The z-transform,Properties of the z-Transform, Rational z-Transforms, Inversion of the z-Transform, Analysis of Linear Time Invariant Systems in the z-Domain, The One-sided z-Transform

UNIT 2 **(18 Periods)**

Frequency Analysis Of Signals And Systems:
Frequency Analysis of Continuous-Time Signals, Frequency Analysis of Discrete-Time Signals, Frequency-Domain and Time-Domain Signal Properties, Properties of the Fourier Transform for Discrete-Time Signals.

Sampling And Reconstruction Of Signals:
Ideal Sampling and Reconstruction of Continuous-Time Signals, Discrete-Time Processing of Continuous-Time Signals, Analog-to-Digital and Digital-to-Analog Converters, Sampling and Reconstruction of Continuous-Time Bandpass Signals, Sampling of Discrete-Time Signals, Oversampling A/D and D/A Converters.

The Discrete Fourier Transform: Its Properties And Applications:
Frequency Domain Sampling:The Discrete Fourier Transform, Properties of the DFT, Linear Filtering Methods Based on the DFT, Frequency Analysis of Signals Using the DFT, The Discrete Cosine Transform.

UNIT 3 **(17 Periods)**

Efficient Computaiton Of The Dft: Fast Fourier Transform Algorithms:
Efficient Computation of the DFT: FFT Algorithms, Applications of FFT Algorithms, A Linear Filtering Approach to Computation of the DFT, Quantization Effects in the Computation of the DFT.

Multirate Digital Signal Processing
Introduction, Decimation by a Factor D, Interpolation by a Factor I, Sampling Rate Conversion by a Rational Factor I/D, Implementation of Sampling Rate Conversion, Multistage Implementation of Sampling Rate Conversion, Sampling Rate Conversion of Bandpass Signals, Sampling Rate conversion by an Arbitrary Factor, Applications of Sampling Rate Conversion, Digital Filter Banks, Two-Channel Quadrature Mirror Filter Bank, M-Channel QMF Bank.

UNIT 4 **(20 Periods)**

Linear Prediction And Optimum Linear Filters:
Random Signals, Correlation Functions and Power Spectra, Innovations Representation of Stationary Random Process, Forward and Backward Linear Prediction, Solution of the Normal Equations, Properties of the Linear Prediction-Error Filters, AR Lattice and ARMA Lattice-Ladder Filters, Wiener Filters for Filtering and Prediction

Adaptive Filters
Applications of Adaptive Filters, Adaptive Direct-Form FIR Filters-The LMS Algorithm, Adaptive Direct-Form FIR Filters-RLS Algorithms, Adaptive Lattice-Ladder Filters

Power Spectrum Estimation
Estimation of Spectra from Finite-Duration Observations of Signals, Nonparametric Methods for Power Spectrum Estimation, Parametric Methods for Power Spectrum Estimation, Filter Bank Methods, Eigenanalysis Algorithms for Spectrum Estimation.

Text book:

Digital Signal Processing by John Proakis, Dimitris Manolakis 4th Edition (Pearson)
(ISBN13: 9780131873742, ISBN10: 0131873741)

References:

Oppenheim & Ronald W Schafer," Digital Signal Processing", Prentice Hall India

CS/IT 415(E) **MULTIMEDIA SYSTEMS**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT I **(15 Periods)**

Multimedia Authoring and data representations: Introduction to multimedia and hypermedia, WWW, overview of multimedia software tools.

Multimedia Authoring and Tools: Multimedia authoring some useful editing and authoring tools, VRML.

Graphics and Image data representation: Graphics/Image data types , popular file formats.

Color in image and Video: Color models in images, Color models in Video.

Fundamental concepts in video: types of video signals, analog video, digital video.

UNIT II **(20 Periods)**

Basics of Digital Audio: Digitization of sound, MIDI, Quantization and transmission of audio

Lossless compression algorithms: Run-length coding, Variable length coding, Dictionary based coding, Arithmetic coding, loss less image compression.

Lossy Compression Algorithms: Quantization, Transform coding, Wavelet based coding.

UNIT III **(18 Periods)**

Image compression Standards: JPEG standard, JPEG 2000 standard, Bi-level image compression standards

Basic Video Compression Techniques: Introduction to video compression, Video compression based on motion compensation. Search for motion vectors, H.261, H.263

MPEG Video Coding: MPEG – 1 and MPEG – 2

UNIT IV **(17 Periods)**

Multimedia Network Communications and applications: Quality of Multimedia data transmission, multimedia over IP, Multimedia over ATM networks

Content Based retrieval in Digital Libraries: Current Image search systems, C-BIRD, multimedia databases

TEXT BOOKS:

Fundamentals of multimedia, Ze-Nian Li, Mark S. Drew, Pearson education 2007.

REFERENCES:

1. Multimedia Applications, Steinmetz, Naharstedt, Springer
2. Multimedia Communications,Applications, Networks, Protocols and Standards Fred Halsall, pearson education.
3. Multimedia systems design, Prabhat K. Andeliegh, Kiran Thakrar, PHI,2007.
4. Multimedia producers Bible, Ron Goldberg, comdex computer publishing.

CS/IT 415 (F) **SOFTWARE TESTING METHODOLOGIES**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT I : **(18 Periods)**

Principles of Testing; Software Development Life Cycle Models – Phases of Software Project – Quality, Quality Assurance and Quality Control - Testing, Verification and Validation – Process Model to Represent Different Phases

White Box Testing: Static Testing – Structural Testing – Challenges

Black Box Testing: What, Why, When, How.

UNIT II : **(18 Periods)**

Integration Testing: Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash.

System and Acceptance Testing: Overview – Functional Versus Non-Functional – Functional System Testing & Non-Functional – Acceptance Testing.

Performance Testing: Introduction – Factors, Methodology, Tools & Process.

Regression Testing: Introduction –Types – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

UNIT III: **(17 Periods)**

Ad hoc Testing: Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative – Agile and Extreme Testing – Defect Seeding.

Usability and Accessibility Testing: Approach to Usability – When to do Usability – How to achieve Usability – Quality Factors for Usability – Aesthetics Testing – Accessibility Testing – Tools for Usability – Usability Lab Setup – Test Roles for Usability.

Common People Issues: Perceptions and Misconceptions About Testing – Comparison between Testing and Development Functions – Providing Career Paths for Testing Professionals – Role of the Ecosystem and a Call for Action.

Organization Structures for Testing Teams: Dimensions of Organization Structures – Structures in Single-Product Companies, Multi-product Companies – Effects of Globalization and Geographically Distributed Teams on Product Testing – Testing Services Organizations – Success Factors for Testing Organizations.

UNIT IV: **(20 Periods)**

Test Planning, Management, Execution and Reporting: Introduction – Planning – Management – Process – Reporting – Best Practices.

Software Test Automation: Terms used in Automation – Skills needed for Automation – What to Automate, Scope of Automation – Design and Architecture for Automation – Generic Requirements for Test Tools – Process Model for Automation – Selecting a Test Tool – Automation for Extreme Programming Model – Challenges.

Test Metrics and Measurements: Metrics & Measurements – Types – Project – Progress – Productivity – Release.

TEXT BOOKS :

1. Srinivasa Desikan & Gopalaswamy Ramesh, "*Software Testing – Principles and Practices*", Pearson Education, 2007.

REFERENCES :

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. The craft of software testing - Brian Marick, Pearson Education.
3. Software Testing Techniques – SPD(Oreille)
4. Software Testing – Effective Methods, Tools and Techniques – Renu Rajani, Pradeep Oak, TMK.
5. Effective methods of Software Testing, Perry, John Wiley.

CS/IT 416(A) TOTAL QUALITY MANAGEMENT

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(15 Periods)**

INTRODUCTION: Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs - Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Principles of TQM, Leadership – Concepts, Role of Senior Management, Quality Council, Quality Statements, Strategic Planning, Deming Philosophy, Barriers to TQM Implementation.

Unit-II **(20 Periods)**

TQM PRINCIPLES: Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement – Juran Trilogy, PDCA Cycle, 5S, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure.

UNIT-III **(15 Periods)**

STATISTICAL PROCESS CONTROL (SPC): The seven tools of quality, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New seven Management tools.

TQM TOOLS: Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, and Benefits.

UNIT-IV **(15 Periods)**

TQM TOOLS :Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA.

QUALITY SYSTEMS: Need for ISO 9000 and Other Quality Systems, ISO 9001:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, QS 9000, ISO 14001 – Concept, Requirements and Benefits.

TEXT BOOK

Dale H. Besterfield, "Total Quality Management", Pearson Education, Indian reprint 2004.

REFERENCES

1. James R. Evans & William M. Lidsay, "The Management and Control of Quality" 5th Edition, South-Western (Thomson Learning), 2002
2. Feigenbaum. A. V. "Total Quality Management", McGraw-Hill, 1991.

CS 416(B) E – COMMERCE & ERP

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT I (12 periods)

1. Introduction to e-commerce and e-marketplaces: Overview of e-commerce E-marketplaces: Structure, Mechanism and Impacts
2. Internet Consumer Retailing: Retailing in e-commerce -- Products and Services; Customer Relationship Management (CRM), online advertising.

UNIT II (18 periods)

3. B2B e-commerce: company centric B2B and e-procurement, public B2B exchanges and portals, e-supply chains, collaborative commerce, and intra business EC
4. Support Services: Auctions, e-commerce security, electronic payment systems, order fulfillment, content management and other support services.

UNIT III (18 periods)

5. Other EC models and applications: e-government, e-learning, and other EC applications, mobile commerce and pervasive computing.
6. Agent Technology: software agents, multi-agent systems, shopping agents.
7. Middle agents and Mobile Agents: middle agents, mobile agents, trust and security.

UNIT IV (17 periods)

8. Introduction, Enterprise Resource Planning, the implementation challenge.
9. Company-Wide Implementation: Software, Project launch, Sales and operations planning, data integrity, going on the air—supply chain integration, ERP examples.

TEXT BOOKS:

1. e-commerce 2004: a managerial perspective -- Efraim Turban, David King, Jae Lee and Dennis Viehland, Pearson education.(Unit I,II,III)
2. ERP : Making It Happen : The Implementers Guide to Success with enterprise resource planning – Thomas F.Wallace, Michael H. Kremzar, Wiley publications, august 2001.(Unit IV)

REFERENCES:

1. Agent Technology for e-commerce – Maria Fasli, Wiley Publications, March 2007.
2. Frontiers of e-commerce – Ravi Kalakota, Andrew B.Whinston, Pearson education.
3. E-commerce: business, technology, society – Kenneth C. Laudon, Carol Guercio Traver.
4. Introduction to Information Systems: Essentials for the e-business enterprise 11th edition – James A.O'Brien.
5. e-business and ERP – Rapid implementation and project planning – Morrell G. Shields, May 2001, Wiley publications.
6. ERP A Managerial Perspective, By SADAGOPAN, S. Tata McGraw-Hill.

CS/IT 416(C) EMBEDDED SYSTEMS

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I **(15 Periods)**

A First Look at the Embedded Systems: Examples of Embedded Systems (Telegraph, cordless Bar-code scanner, Laser Printer, underground tank monitor, Nuclear Reactor Monitor), Typical Hardware.
Hardware Fundamentals: Terminology, Gates, A few other basic considerations, Timing Diagrams, Memory.
Advanced Hardware Fundamentals: Micro Processors, Buses, Direct Memory Access, interrupts, other common parts, Built-ins on the Micro Processor, conventions used on the Schematics.
Interrupts: Micro Processor Architecture, Interrupt Basics, the shared data problem, Interrupt Latency.

UNIT – II **(15 Periods)**

Survey of Software Architectures: ROUND-ROBIN, ROUND-ROBIN with Interrupts, Function-Queue-Scheduling Architecture, Real Time Operating System Architecture, Selecting an Architecture.
Introduction to Real Time Operating Systems: Tasks and Task states, Tasks and data Semaphores and shared data.

UNIT – III **(15 Periods)**

More Operating System Services: Message Queues, Mail boxes and pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS environment.
Basic Design Using a Real Time Operating System: Overview, Principles, An Example, Encapsulating Semaphores and Queues, Hard Real Time Considerations, Saving Memory Space, Saving Power.

UNIT – IV **(20 Periods)**

Embedded Software Development Tools: Host and Target Machines, Linker/Locators for Embedded Software, Getting Embedded Software into the target System.
Debugging Techniques: Testing on Host Machine, Instruction Set Simulators, the *assert* macro, using Laboratory Tools.

Textbooks:

David E.Simon, 'An Embedded Software Primer', Pearson Education Asia.

Reference Books:

1. D.Gajski, F.Vahid, S.Narayan, J.Gong, 'Specification and Design of Embedded Systems', Prentice Hall of India Pvt. Ltd.,
2. Raj Kamal, 'Embedded Systems Architecture & Programming', Tata McGraw-Hill.

CSE / IT 416(D) **BIOINFORMATICS**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I **(15 Periods)**

1. **Introduction**
   Definitions, Sequencing, Molecular Biology and Bioinformatics, Biological sequence/structure, Genomoe Projects, Pattern Recognition and prediction, Folding problem, Sequence Analysis, Homology and Analogy, Bioinformatics Applications, Central Dogma of Molecular Biology
2. **Information Resources**
   Biological databases, Primary Sequence databases, Protein sequence databases, Secondary databases, Protein pattern databases, and Structure classification databases DNA sequence databases, specialized genomic resources

UNIT – II **(18 Periods)**

3. **DNA Sequence Analysis**
   Importance of DNA analysis, Gene Structure and DNA sequences, Features of DNA sequence analysis, EST (Expressed Sequence Tag) searches, Gene Hunting, Profile of a cell, EST analysis, Effects of EST data on DNA databases, The Human Genome Project
4. **Pair Wise Alignment Techniques**
   Database Searching, Alphabets and complexity, algorithm and programs, comparing two sequences, sub-sequences, Identity and similarity, The Dot plot, Local and Global similarity, Different alignment techniques, Scoring Matrices, Dynamic Programming, Pair wise database searching

UNIT – III **(15 Periods)**

5. **Multiple sequence alignment & Phylogenetic Analysis**
   Definition and goal, The consensus, Computational complexity, Manual methods, Simultaneous methods, Progressive methods, Databases of Multiple alignments, and searching, Applications of Multiple Sequence alignment, Phylogenetic Analysis, Methods of Phylogenetic Analysis, Tree Evaluation, Problems in Phylogenetic analysis, Tools for Phylogenetic Analysis
6. **Secondary database Searching**
   Importance and need of secondary database searches, secondary database structure and building a sequence search protocol

UNIT – IV **(12 Periods)**

7. **Gene Expression and Microarrays**
   Introduction, DNA Microarrays, Clustering Gene Expression Profiles, Data Sources and tools, Applications
8. **Analysis Packages**
   Analysis Package structure, commercial databases, commercial software, comprehensive packages, packages specializing in DNA analysis, Intranet Packages, Internet Packages.

Text Book:

1. Introduction to Bioinformatics T K Attwood And D.J. Parry-Smith, Pearson
2. Bioinformatics methods and applications S.C. Rastogi, N. Mendiratta And P. Rastogi., PHI

Reference Books:

1. Introduction to Bioinformatics Arthur M. Lesk OXFORD Publishers (Indian Edition)
2. Elementary Bioinformatics, Imtiyaz Alam Khan, Pharma Book Syndicate

CS/IT 416 (E) VLSI DESIGN

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT- I (15 Periods)

An introduction to MOS technology: Introduction to IC technology, Basic MOS transistors, NMOS fabrication, CMOS fabrication and BICMOS technology. Basic Electrical Properties Of MOS and BICMOS Circuits: I_{ds} versus V_{ds} relationships, threshold voltage V_t, Transconductance g_m, Figure of merit ω_o , Pass transistor, NMOS inverter, Pull-up to pull-down ratio, CMOS inverter, BICMOS inverters, Latch-up in CMOS circuits.

UNIT- II (18 Periods)

MOS and BICMOS circuit Design processes: MOS layers, Stick diagrams, Design rules and layout, Sheet resistance Rs, Standard unit of capacitance, The Delay unit, Inverter delays, Propagation delays, Wiring capacitances, Scaling models, Scaling factors for device parameters.

UNIT- III (15 Periods)

Subsystem design and layout: Architectural issues, Switch logic, Gate Logic, examples of Structured Design (combinational logic). Design of an ALU subsystem, A further consideration of adders, Multipliers.

UNIT- IV (17 Periods)

VLSI design flow, Introduction to ASICs, Full Custom ASICs, standard cell based ASICs, Gate array based ASICs, Programmable logic devices, PLAs, PALs, CPLDs and FPGAs,
Hardware description languages.
The VHDL Hardware Description Language: Design Flow, Program Structure, Types and Constants, functions and Procedures, Libraries and Packages, Structural Design Elements, Dataflow design Elements, Behavioral design Elements, The Time Dimension and Simulation, Synthesis.

TEXT BOOKS:

1. Douglas A.Pucknell and Kamran Eshranghian, Basic VLSI Design, Third edition, PHI 2002.
2. Michael John Sebastian Smith, Application Specific Integrated Circuits, Addison Wesley, 2003.
3. J.Bhasker, A VHDL Primer, Pearson Education, Third edition, 1999.
4. John F Wakerly, Digital Design Principles & Practices, 3rd Edition, Pearson Education, 2002.

REFERENCE BOOKS:

1. Neil H E Weste and Kamran Eshranghian, Principles of CMOS VLSI Design, A system perspective, 2nd edition, Pearson Education, 2002.
2. Stephen Brown and Z Vonko Vranesic, Fundamentals of Digital Logic with VHDL Design, TMH Edition, 2002.

CS/IT 416(F) **QUANTUM COMPUTING**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT- I **(15 periods)**

Introduction – From Bits to Qubits – Power of Quantum Computing – How Quantum Physics Differs from – Obstacles and Research – Future Outlook.
Qubits, Quantum Mechanics and Computer Science Perspectives

UNIT- II **(15 periods)**

Quantum Gates – Single & Multiple Qubit Gates – Matrix Representation of Quantum Gates and Circuits – Bell States – Quantum Measurement – Quantum Half-Adder and Subtractor.

Applications of Quantum Computing – Quantum Teleportion – Parallelism – Superdense Coding – Quantum Communication.

UNIT- III **(15 periods)**

Shor's Algorithm and Quantum Fourier Transform

Grover's Algorithm (Quantum Search Algorithms)

UNIT- IV: **(15 periods)**

Physical Realization of Quantum Computers

Quantum Computing Software

Text book:

1. Vishal Sahni. "Quantum Computing", TMH, 2007.

Reference books:

1. Dan C. Marinescu, Gabriela M. Marinescu, "Approaching Quantum Computing" Prentice Hall, 2004.
2. Mika Hirvensalo "Quantum Computing" ,2nd Edition, Springer,2004
3. Giuliano Beneti, Giulio Casati, Guiliano Strini "Principles of Quantum Computation and Information" Vol.1 Basic Concepts, World Scientific Publishing Company; New Ed edition (October 2004)

CS/IT 451 SOFTWARE ENGINEERNG LAB / MINI PROJECT

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

CYCLE - 1

1. Problem Statement

ANALYSIS

2. Requirements elicitation
3. System Requirements Specification

USECASE VIEW

4. Identification of Actors
5. Identification of Use cases
6. Flow of Events
7. Construction of Use case diagram
8. Building a Business Process model using UML activity diagram

CYCLE - 2

LOGICAL VIEW

9. Identification of Analysis Classes
10. Identification of Responsibilities of each class
11. Construction of Use case realization diagram
12. Construction of Sequence diagram
13. Construction of Collaboration diagram
14. Identification of attributes of each class
15. Identification of relationships of classes
16. Analyzing the object behavior by constructing the UML State Chart diagram
17. Construction of UML static class diagram

CYCLE - 3

DESIGN

18. Design the class by applying design axioms and corollaries
19. Refine attributes, methods and relationships among classes

MINI PROJECT

The above three cycles are to be carried out in the context of a problem / system choosen by the Project batch and a report is to be submitted at the semester end by the batch.

CS/IT 452 **ENTERPRISE PROGRAMMING LAB**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Write a program to demonstrate Generic & HTTP Servlets.
2. Write a program to demonstrate cookie & Sessions.
3. Write an application to integrate JSP & Servlets.
4. Write a program to demonstrate Session Bean.
5. Write a program to demonstrate Entity Bean.
6. Write a program to demonstrate Java Mail.
7. Write a program to demonstrate Remote Method Invocation.
8. Write a program to demonstrate Java Message service.
9. Write a program to demonstrate JNDI.
10. Develop an e-business application using XML.
11. Develop an application for Client Request / Responses using SOAP.
12. Demonstrate how to describe web services using WSDL.

CS/IT 453(A) (ELECTIVE-II) OPEN SOURCE SYSTEM LAB

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Demonstrate the configuration of Apache, MySQL and PHP.
2. Write PHP Script to demonstrate String processing and regular Expressions in PHP.
3. Program to demonstrate Object Oriented features of PHP.
4. Write Script that takes user input data and validates it and write the data into the database.
5. Program to demonstrate DML commands in MySQL.
6. Program to demonstrate exception handling in PHP.
7. Program to demonstrate Passing of Information between Web pages.
8. Program to demonstrate the use of Cookies.
9. Program to demonstrate user management and authentication.
10. Program to demonstrate file Uploading.
11. Program to demonstrate source code control and Testing.

CS/IT 453(B) (ELECTIVE-II) **INTERACTIVE COMPUTER GRAPHICS LAB**

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Write a program to implement the following line drawing algorithm
   a. DDA b. Bresenham's
2. Write a program to implement the mid-point circle algorithm.
3. Write a program to implement the mid-point ellipse algorithm.
4. Write a program to check whether the given point is inside or outside of a polygon using even-odd and winding number methods.
5. Write a program to implement the scan-line polygon filling algorithm
6. Write a menu driven program to implement the following 2D Transformations
   a. Scale b. Rotation c. Translation
7. Write a menu driven program to implement the following 2D Transformations
   a. Shear b. Reflection
8. Write a program to implement the following line clipping algorithms
   a. Cohen-Sutherland b. Liang-Barsky
9. Write a program to implement the Sutherland-Hodgman polygon clipping algorithms.
10. Write a menu driven program to implement the following 3D Transformations
    a. Scale b. Rotation c. Translation
11. Write a menu driven program to implement the following projections
    a. Parallel b. Perspective
12. Write a program to implement a simple animation.

CS/IT 453(C) (ELECTIVE-II) .NET TECHNOLOGIES LAB

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Write a program to demonstrate OOPs concepts in C#.
2. Write a program to demonstrate Exception handling in C#.
3. Write a program to illustrate the concepts of events & delegates in C#.
4. Write a program to demonstrate multi-threaded programming in C#.
5. Write a program to demonstrate generics.
6. Write a program to demonstrate StreamWriters and StreamReaders.
7. Write a program to demonstrate Building and consuming a multi file assembly.
8. Write a program to demonstrate DML and DDL Commands using ADO.NET.
9. Write a program to build a data driven ASP.NET Web application.
10. Write a program to demonstrate ASP.NET controls.
11. Write a program to demonstrate Windows Forms Controls.
12. Write a program to demonstrate the building of a simple Windows Forms Application.

CS/IT 453(D) (ELECTIVE-II) DIGITAL SIGNAL PROCESSING LAB

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

1. Implementation of Linear Convolution
2. Implementation of Circular Convolution
3. Implementation of DFT using direct formula
4. Implementation of IDFT using direct formula
5. Implementation of DFT and IDFT using DIT FFT algorithm
6. Implementation of DFT and IDFT using DIF FFT algorithm
7. Design of Butterworth Filter using Bilinear Transformation
8. Design of Chebyshev filter using Bilinear Transformation
9. Design of FIR filter using Rectangular window
10. Design of FIR filter using Hamming window

CS/IT 453(E) (ELECTIVE-II) MULTIMEDIA SYSTEMS LABORATORY
USING FLASH/MAX2007/DAZZLER SPARKLES

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

Software Programs:

1. **A tour of motion**
2. **Generators and particle presets**
3. **Groups layers and blend modes**
4. **The third dimension**
5. **Using templates**
6. **Creating text effects**
7. **Particles and parameter behaviors**
8. **The replicator**
9. **Advanced particle design**
10. **Keyframing**
11. **Painting in motion**
12. **Plugging multimedia hardware**

Hardware Plugins:

13. **Optical storage devices**
14. **DVD**
15. **Touch screens**
16. **Magnetic card encoders & readers**
17. **Graphics tablets**
18. **OCR's**
19. **Infrared remotes**
20. **Voice recognition systems**
21. **Digital Cameras**
22. **Amplifiers and speakers**
23. **Video devices**
24. **Projectors**
25. **Printers**
26. **Modems**
27. **ISDN**
28. **Cable modems**

TEXT BOOKS & WEB REFERENCES:

1. Vaughan, T. "Multimedia – Making it work (5th edition) ", McGraw-Hill.
2. Boyle, T. "Design for Multimedia Learning", Prentice-Hall, 1997.

CS/IT 453(F) (ELECTIVE-II) SOFTWARE TESTING METHODOLOGIES LAB

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

WinRunner:

Create the following tests using any GUI application:
1. GUI Map Editor
2. Merging GUI file
3. Rapid test script wizard
4. Recording using context sensitive and analog modes
5. GUI Check points
6. Bitmap Check points
7. Database Check Points
8. Synchronization Points
9. Parameterized Check Points
10. Break points and Monitor
11. Data Driven
12. Web Page Test

TestDirector:

1. Creating a New Project
2. Create Test Plan
3. Execute Test Plan
4. Track Defects

LoadRunner:

Create the following Test
1. Virtual User Generator
2. Virtual User / V-Scripts
3. Controller

Text Books:
1. Dr.K.V.K.K.Prasad, "Software Testing Tools", Dreamtech Press.
2. Nageswara Rao Pusuluri, "Software Testing Concepts and Tools", Dreamtech Press.

CS 421 **CRYTPOGRAPHY & NETWORK SECURITY**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(17 periods)**

INTRODUCTION: The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security.

CLASSICAL ENCRYPTION TECHINIQUES: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography.

BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARDS: Block Cipher Principles, The Data Encryption Standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Multiple Encryption and Triple DES, Block Cipher modes of Operation

ADVANCED ENCRYPTION STANDARD: Evaluation criteria for AES, The AES cipher.

UNIT-II **(15 periods)**

INTRODUCTION TO NUMBER THEORY: Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithm.

PUBLIC KEY AND RSA: Principles of Public –Key Cryptosystems, The RSA algorithm.

KEY MANAGEMENT: Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

MESSAGE AUTHENTICATION AND HASH FUNCTION: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security Hash Functions, and MACs.

UNIT-III **(14 periods)**

HASH ALGORITHMS: Secure Hash Algorithm, HMAC.

DIGITAL SIGNATURES AND AUTHENTICATION PROTOCOLS: Digital Signatures, Authentication Protocols, Digital Signature Standard.

AUTHENTICATION APPLICATIONS: Kerberos,X-509 Authentication Service.

Electronic Mail Security: Pretty Good Privacy (PGP).

UNIT-IV **(14 periods)**

IP SECURITY: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Pay Load, Combining Security Associations, Key Management.

WEB SECURITY: Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

INTRUDERS: Intruders, Intrusion Detection, Password Management.

Firewalls: Firewall Design Principles, Trusted Systems.

TEXT BOOK:

1. William Stallings "Cryptography And Network Security" 4th Edition, (Pearson Education/PHI).

REFERENCE BOOKS:

1. Behrouz A.Forouzen, "Cryptography & Network Security", TMH.
2. Kaufman, Perlman, Speciner, "Network Security", 2nd Edition, (PHI / Eastern Economy Edition)
3. Trappe & Washington, "Introduction to Cryptography with Coding Theory", 2/e, Pearson.

CS 422 ADVANCED COMPUTER ARCHITECTURE

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT - I (15 periods)

Parallel Computer Models: The state of computing, Classification of parallel computers, Multiprocessors and Multicomputers, Multivector and SIMD computers. **Program and network properties:** Conditions of parallelism, Data and resource Dependences, Hardware and Software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms.

System Interconnect Architectures: Network properties and routing, Static interconnection Networks, Dynamic interconnection Networks, Multiprocessor system Interconnects, Hierarchical bus systems, Crossbar switch and multi-port memory, Multistage and combining network.

UNIT-II (20 periods)

Principles of Scalable Performance: Performance Metrics and Measures, Parallel Processing Applications,

Speedup Performance Laws - Amdahl's law for fixed load, Gustafson's law for scaled problems, Memory Bounded Speedup Model.

Pipelining: Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer Arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines.

UNIT -III (20 periods)

MULTI Processors: Multiprocessor System Interconnect, Cache Coherence and Synchronization Mechanisms, Message-passing Mechanism.

Scalable, Multi-Threaded and Dataflow Architectures:

Latency-Hiding Techniques, Principles of Multithreading, Scalable and Multithreaded Architectures.

UNIT-IV (15 periods)

Parallel Models, Languages and Compilers:

Parallel Programming Models, Parallel Languages and Compilers, Dependence analysis of Data Arrays, code optimization and Scheduling, Loop parallelization and pipelining.

Text Book:

1. Kai Hwang, "Advanced Computer Architecture"; TMH.

Reference Books:

1. D.A. Patterson and J.L.Hennessey, "Computer organization and Design", Morgan Kaufmann, 2nd Edition.
2. V.Rajaram & C.S.R.Murthy, "Parallel Computer", PHI.
3. Barry Wilkinson and Michael Allen, "Parallel Programming" Pearson Education.

CS/IT 423 **DATA ENGINEERING**

Lectures	:	4 periods/week, Tutorial: 1	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT – I **(18 Periods)**

Data Warehouse – Introduction, A Multi-dimensional data model, Data Warehouse Architecture, Data Warehouse Implementation.
Data Mining – Introduction, Data Mining, Kinds of Data, Data Mining Functionalities, Classification of Data Mining Systems, Major issues in Data Mining.

UNIT – II **(18 Periods)**

Data Preprocessing – Data cleaning, Data Integration & Transformation, Data Reduction, Discretization & Concept Hierarchy Generation, Data Mining Primitives.
Mining Association roles in large databases – Association rule mining, mining single-dimensional Boolean Association rules from Transactional Databases, Mining Multi-dimensional Association rules from relational databases & Data Warehouses.

UNIT – III **(15 Periods)**

Cluster Analysis – Introduction, Types of data in Cluster analysis, A categorization of major clustering methods, partitioning methods, Hierarchical methods, Density-Based Methods: DBSCAN, Grid-based Method: STING; Model-based Clustering Method: Statistical approach, Outlier analysis.

UNIT – IV **(20 Periods)**

Classification & Prediction – Introduction, Classification by Decision tree induction, Bayesian Classification, , Classification by Back propagation, Other Classification Methods, Prediction, Classifier accuracy.
Mining Complex Type of Data – Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web.

Textbooks:

Data Mining Concepts & Techniques – Jiawei Han Micheline Kamber – Morgan Kaufmann Publishers.

Reference Books:

1. Data Warehouse Toolkit – Ralph Kinball – John Wiley Publishers.
2. Data Mining (Introductory and Advanced Topics) – Margaret H.Dunham – Pearson Education.
3. Data Warehousing in the real world – A Practical guide for Building decision support systems – Sam Anahory, Dennis Murray – Pearson Education.
4. Introduction to Data Mining with case studies – G.K.Gupta, PHI Publications, 2006

CS/IT 424 INDUSTRIAL ENGINEERING & MANAGEMENT

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(15 periods)**

GENERAL MANAGEMENT: Principles of Scientific Management; Brief Treatment of Managerial Functions.

FORMS OF BUSINESS ORGANISATION: Salient features of sole proprietorship, Partnership, Joint Stock Company – Private limited and public limited companies.

UNIT-II **(17 periods)**

FINANCIAL MANAGEMENT: Concept of interest, Compound interest, Equivalent cash flow diagram.

ECONOMIC EVALUATION OF ALTERNATIVES: The annual equivalent method, Present worth method, Future worth method.

DEPRECIATION: purpose, Types of Depreciation; Common methods of depreciation; The straight line method, Declining balance method, the sum of the years digits method.

UNIT-III **(15 periods)**

PERSONNEL MANAGEMENT: Functions of personal Management: Human Resources Planning, Recruitment, Selection, Placement, Training and Development, Career development and Performance Appraisal.

JOB ANALYSIS: Job Description and Job specification. Motivational Theories, Leadership Styles & Stress Management.

UNIT-IV **(18 periods)**

MATERIAL MANAGEMENT: Introduction

PURCHASING: objectives, source selection, vendor rating, procurement methods.

INVENTORY MANAGEMENT: Objectives, Economic Order Quantity, Economic Production Quantity and ABC Analysis.

MARKETING MANAGEMENT: Functions of Marketing, Product life cycle, Channels of distribution, Advertising & sales promotion, Market Research.

Textbooks:

1. K.K.Ahuja, 'Industrial Management' Vol. I & II,
2. E.Paul Degarmo, John R.Chanda, William G.Sullivan, 'Engineering Economy'.

Reference Books:

1. Philip Kotler, 'Principles of Marketing Management' PHI
2. Gopalkrishna, 'Materials Management' PHI
3. Koontz & Weirich, 'Management' TMH

CS/IT 425(A) **DIGITAL & IMAGE PROCESSING**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

Unit – I **(15 periods)**

INTRODUCTION: Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.
DIGITAL IMAGE FUNDAMENTALS: Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Some basic Relationships Between Pixels.

Unit – II **(20 periods)**

IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN: Some Basic Gray Level Transformation, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing spatial Filters, Sharpening spatial Filters.
IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN: Introduction to the Fourier Transform and the Frequency Domain, Smoothing frequency-domain Filters, Sharpening frequency-domain Filters, Homomorphic Filtering, Implementation.

Unit – III **(15 periods)**

IMAGE RESTORATION: A Model of the Image Degradation/Restoration Process, Linear, Position-Invariant Degradations, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering.
WAVELETS AND MULTIRESOLUTION PROCESSING: Multiresolution Expansions, Wavelet Transforms in one Dimension, The Fast Wavelet Transform, Wavelet Transforms in Two Dimensions.

Unit – IV **(20 periods)**

IMAGE COMPRESSION: Image Compression Models, Error-free Compression, Lossy Compression, Image Compression Standards.
IMAGE SEGMENTATION: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation.

Text Book:

1. Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing' Addison Wesley Pubs (Second Edition).

Reference Books:

1. Milan Sonka, Vaclav Hlavac, Roger Boyle Image Processing. Analysis, and Machine Vision (Second Edition).
2. A.K.Jain, 'Fundamentals of Digital Image Processing' PHI.
3. Philips, 'Image Processing in C', BPB Publications.

CS 425 (B) **ADVANCED SOFTWARE ENGINEERING**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT -I **(18 periods)**

PROJECT MANAGEMENT:
The Management Spectrum, The People, The Product, The Process, The Project, The W5HH Principle, Critical Practices.

METRICS FOR PROCESS AND PROJECTS:
Metrics in the Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics within the Software Process, Metrics for Small Organizations, Establishing a Software Metrics Program.

ESTIMATION:
Observations on Estimation, The Project Planning Process, Software Scope and Feasibility, Resources, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, Estimation for Object-Oriented Projects, Specialized Estimation Techniques, The Make/Buy Decision.

PROJECT SCHEDULING:
Basic Concepts, Project Scheduling. Defining a Task Set tor the Software Project, Defining a Task Network, Scheduling. Earned Value Analysis.

UNIT -II **(15 periods)**

RISK MANAGEMENT:
Reactive Vs. Proactive Risk Strategies, Software Risks. Risk Identification. Risk Projection, Risk Refinement, Risk Mitigation, Monitoring and Management, The RMMM Plan.

QUALITY MANAGEMENT:
Quality concepts. Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Statistical Software Quality Assurance, Software Reliability, The ISQ 9000 Quality Standards, The SQA Plan.

CHANGE MANAGEMENT:
Software Configuration management, The SCM Repository, The SCM Process, Configuration Management for Web Engineering.

FORMAL METHODS:
Basic Concepts, Mathematical Preliminaries, Applying Mathematical Notation for Formal Specification. Formal Specification Languages, Object Constraint Language (OCL), The Z Specification Language, The Ten Commandments of Formal Methods, Formal Methods- The Road Ahead.

UNIT-III **(15 periods)**

CLEANROOM SOFTWARE ENGINEERING:
The Cleanroom Approach, Functional Specification, Cleanroom Design. Cleanroom Testing.

COMPONENT BASED DEVELOPMENT:

Engineering of Component-Based Systems, The CBSE Process, Domain Engineering, Component-Based Development, Classifying and Retrieving Components, Economics of CBSE.

REENGINEERING:
Business Process Reengineering, Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering, The Economics of Reengineering.

WEB ENGINEERING:
Attributes of Web-Based Systems and Applications, WebApp Engineering Layers, The Web Engineering Process, Web Engineering Best Practices.

UNIT-IV **(18 periods)**

INITIATING A WEBAPP PROJECT:
Formulating Web-Based Systems, Plam1ing for Web Engineering Projects, The Web Engineering Team, Project Management Issues for Web Engineering, Metrics for Web Engineering and WebApps, "Worst Practices " for WebApps Projects.

ANALYSIS FOR WEBAPPS:
Requirements Analysis for WebApps, The Analysis Model for WebApps, The Content Model, The Interaction Model, The Functional Model, The Configuration Model, Relationship-Navigation Analysis.

DESIGN FOR WEBAPPS:
Design Issues for Web Engineering, The WebE Design Pyramid, WebApp Interface Design, Aesthetic Design, Content Design, Architecture Design, Navigation Design, Component Level Design, Hypermedia Design Patterns, Object-Oriented Hypermedia Design Method(OOHDM), Design Metrics for WebApps.

TESTING FOR WEBAPPS:
Testing Concepts for WebApps, The Testing Process-An Overview, Content Testing. User Interface Testing, Component-Level Testing, Navigation Testing, Configuration Testing, Security Testing, Performance Testing.

Text Book.'

1. Roger S.Pressman, 'Software Engineering- A Practitioner's Approach', Sixth Edition, McGraw-Hill International.

Rejoence Books:

1. Ian Sommerville, 'Software Engineering', Sixth Edition, Pearson Education.

2. WAMAN S JAWADEKAR., 'Software Engineering Principles and Practice', Tata McGraw Hill. 2004.

3. Shari Lawrence Fleeger, 'Software Engineering - Theory & Practice', Pearson Education Asia.

CS/IT 425(C) **GRID COMPUTING**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT - I **(20 periods)**

GRID COMPUTING – Introduction: Early Grid Activities, Current Grid Activities, An Overview of Grid business Areas, Grid Applications. **Grid Computing Organizations and Their Roles:** Organizations Developing Grid Standards and Best Practice Guidelines, Organizations Developing Grid Computing Toolkits and the Framework. **The Grid computing Anatomy:** The Grid Problem.
The Grid Computing Road Map:

UNIT-II: **(15 periods)**

Merging the Grid Services Architecture with the Web Services Architecture: Service-Oriented Architecture, Web Service Architecture, XML, Related Technologies, and Their Relevance to Web Services, XML Messages and Enveloping, Service Message Description Mechanisms, Relationship between Web Service and Grid Service. **Open Grid Services Architecture (OGSA) :Some Sample Use cases that drive the OGSA:** CDC, NFS, Online Media and Entertainment. **OGSA Platform Components.**

UNIT –III **(15 periods)**

Open Grid Services Infrastructure (OGSI): Introduction, Grid Services, High-Level Introduction to OGSI, Technical Details of OGSI specification, Introduction to Service Data Concepts, Grid Service : Naming and Change Management Recommendations .**OGSA Basic Services:** Common Management Model (CMM), Service domains, Policy Architecture, Security Architecture, Metering and Accounting, Common distributed Logging, Distributed Data Access and Replication.

UNIT-IV **(15 periods)**

GLOBUS GT3 TOOLKIT: Architecture: GT3 software Architecture Model –

GLOBUS GT3 TOOLKIT: Programming Model - Introduction, Service Programming Model. **GLOBUS GT3 TOOLKIT: A Sample Implementation,** Acme Search Service Implementation in a Top-down Approach.

TEXT BOOK:

1. Joshy Joseph and Craig Fellenstein "Grid Computing" ;Pearson Education

REFERENCE BOOKS:

1. Fran Berman, Geoffrey Fox, Anthony J.G. Hey, "Grid Computing: Making the Global Infrastructure a reality ", John Wiley and sons,2003.
2. Ahmar Abbas, "Grid Computing: A Practical Guide to Technology and Applications", Charles River media, 2003.
3. D Janaki Ram "Grid Computing" TMH.

CS 425 (D) **PERVASIVE COMPUTING**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(15 periods)**

Pervasive Computing Application - Pervasive Computing Devices and Interfaces - Device technology trends, Connecting issues and protocols
Pervasive Computing and web based Applications - XML and its role in Pervasive Computing

UNIT-II **(16 periods)**

Pervasive Computing and web based Applications (continued)-Wireless Application Protocol (WAP) Architecture and Security - Wireless Mark-Up language (WML) – Introduction.
Voice Enabling Pervasive Computing - Voice Standards - Speech Applications in Pervasive Computing and security

UNIT-III **(14 periods)**

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

UNIT-IV **(15 periods)**

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

Text Books

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

Reference Books

1. Rahul Banerjee: Internetworking Technologies: An Engineering Perspective, Prentice –Hall of India, New Delhi, 2003. (ISBN 81-203-2185-5)
2. Rahul Banerjee: Lecture Notes in Pervasive Computing, Outline Notes, BITS-Pilani, 2003.

CS/IT 425(E) **NATURAL LANGUAGE PROCESSING**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT - I **(12 periods)**

Introduction to Natural Language Understanding, Syntactic Processing: Grammars and Parsing

UNIT-II: **(20 periods)**

Features and Augmented Grammars, Toward Efficient Parsing, Ambiguity Resolution: Statistical Methods: Probabilistic Context-Free Grammars, Best-First Parsing.

UNIT –III **(15 periods)**

Semantic Interpretation:
Linking Syntax and Semantics, Ambiguity Resolution, other Strategies for Semantic Interpretation.

UNIT-IV **(15 periods)**

Context and World Knowledge: Using World Knowledge, Discourse Structure, Defining a Conversational Agent.

TEXT BOOK:

Natural Language Understanding – James Allen, Second Edition, Pearson Education.

REFERENCE BOOKS:

1. Speech and Language Processing – Daniel Jurafsky, James H.Martin.
2. Foundations of Statistical Natural Language Processing – Christopher Manning, Hinrich Schutze, MIT Press.
3. Artificial Intelligence, Elaine Rich and Kevin Knight, Second Edition, Tata McGraw Hill.

CS/IT 425(F) **MOBILE AD HOC NETWORKS**

Lectures	:	4 periods/week	Sessional Marks	:	30
University Exam	:	3 hours	University Examination Marks	:	70

UNIT-I **(18 periods)**

Introduction to Wireless Networks: Evaluation of Mobile Cellular Networks, Global System for Mobile Communications (GSM), General Packet Radio Service (GPRS), Personal Communications Services (PCSs), Wireless LANs (WLAN), Universal Mobile Telecommunications System (UMTS).
Origins of Ad Hoc: Packet Radio Networks: Introduction – Technical Challenges, Architecture of PRNETs – Components of Packet Radios – Routing in PRNETs – Route Calculation – Pacing Techniques – Media Access in PRNETs – Flow Acknowledgements in PRNETs.
Ad Hoc Wireless Networks: What Is an Ad Hoc Network? – Heterogeneity in Mobile Devices – Wireless Sensor Networks – Traffic Profiles – Types of Ad Hoc Mobile Communications – Types of Mobile Host Movements – Challenges Facing Ad Hoc Mobile Networks

UNIT-II **(12 periods)**

Ad Hoc Wireless Media Access Protocols: Introduction – Problems in Ad Hoc Channel Access – Receiver & Sender Initiated MAC Protocols – Existing Ad Hoc MAC Protocols – MARCH.
Overview of Ad Hoc Routing Protocols: Table-Driven Approaches – DSDV – WRP – CSGR – Source-Initiated On-Demand Approaches – AODV – DSR – TORA – SSR, LAR – PAR – ZRP – STAR – RDMAR.

UNIT-III **(12 periods)**

Associativity-Based Long-Lived Routing: A New Routing Paradigm – Associativity-Based Long-Lived Routing – ABR Protocol Description
Implementation of Ad Hoc Mobile Networks: Introduction – ABR Protocol Implementation in Linux – Experimentation and Protocol Performance – Important Deductions.
Communication Performance of Ad Hoc Networks: Introduction – Performance Parameters of Interest – Route Discovery (RD) Time – End-to-End Delay (EED) Performance – Communication Throughput Performance – Packet Loss Performance – Route Reconfiguration/Repair Time – TCP/IP-Based Applications.

UNIT-IV **(18 periods)**

Emergency Conservation: Power Life Issues: Introduction – Power Management – Advances in Device Power Management – Advances in Protocol Power Management – Power Conservation by Mobile Applications – Periodic Beaconing On Battery Life – Standalone Beaconing – HF Beaconing with Neighboring Nodes – Comparison of HF Beaconing with and without Neighbors – LF Beaconing with Neighboring Nodes – Comparison of LF Beaconing with and without Neighbors – Deductions.
Ad Hoc Wireless Multicast Routing: Multicasting in Wired Networks – Multicast Routing in Mobile Ad Hoc Networks – Existing Ad Hoc Multicast Routing Protocols – ABAM – Comparisons of Multicast Routing Protocols
TCP over Ad Hoc: Introduction to TCP – Versions of TCP – Problems Facing TCP in Wireless Last-Hop – Problems Facing TCP in Wireless Ad Hoc – Approaches to TCP over Ad Hoc.

TEXT BOOKS:

1. C.K.Toh, "*Ad Hoc Mobile Wireless Networks – Protocols and Systems*", Pearson LPE.

REFERENCE BOOKS:

1. Charles E.Perkins, "Ad Hoc Networking", Addison-Wesley, 2001.
2. Y-Bing Lin and Imrich Chlamtac, "Wireless & Mobile Network Architectures", Wiley, 2001.
3. C.Sivaram Murthy, "Ad Hoc Wireless Networks : Architectures & Protocols", Prentice Hall.

CS/IT 461 – DATA ENGINEERING LAB
USING
ORACLE 9i & 10g, ORACLE OWB, INFORMATICA, Clementine Tools

Lectures	:	3 periods/week	Sessional Marks	:	25
University Exam	:	3 hours	University Examination Marks	:	50

I. **Analyzing data with ROLLAP, CUBE.**

II. **Cube slicing – come up with 2-D view of data.**

III. **Drill-down or Roll-down- going from summary to more detailed data.**

IV. **Roll up – summarize data along a dimension hierarchy.**

V. **Dicing – projecting 2-D view of data.**

VI. **Creating Star Schema/snowflake Schema.**

VII. **Create and populate FACT table.**

VIII. **Building dimensions.**

IX. **ETL : Extraction Options**
- i. Full extraction
- ii. Incremental extraction
- iii. Change Data Capture(CDC)

X. **ETL: Transformation Options**
- iv. Transformation: during extraction, in staging area, during load, etc.
- v. Multi-state transformation
- vi. Pipelined transformation

XI. **ETL: DW Load options**
- vii. Loader: SQL(DML)
- viii. Data Pump

XII. **DW index design options**
- ix. B*tree index – how they work
- x. Bitmapped index – how they work
- xi. NULL value considerations

TEXT BOOKS & WEB REFERENCES:

1. **Oracle 10G & 9i Oracle Press Manual.**

CS/IT 462 **PROJECT WORK**

Lectures	:	9 periods/week	Sessional Marks	:	50
University Exam	:	3 hours	University Examination Marks	:	100

The Project work shall be carried out by a batch consisting not more than four students for one semester. It should help the students to comprehend and apply different theories and technologies that they have learnt through and are learning. It should lead to a substantial result as a comparative study, a new application of the technologies available or some extension to the works carried out by some researcher and published in referred journals. Each batch must carryout the analysis, design, implementation and testing of the entire project basing on the Software Engineering principles. There shall be a total of four reviews made by the batch regarding:

1. 0^{th} review : The idea/concept which forms the basis for their project shall be presented to the guide, concerned incharge and classmates and shall get the approval for continuation.
2. 1^{st} review : The analysis and design carried out.
3. 2^{nd} review : The implementation and the testing done.
4. 3rd review : Over all presentation of the work carried out and the results found out for the valuation under the internal assessment.

A comprehensive report on the lines of IEEE Format is to be submitted at the end of the semester, which is certified by the concerned guide and the HOD.

There shall be an external guide appointed by the University to make an assessment and to carryout the Viva-Voce examination.